Art Museums and the Incorporation of Virtual Reality: Examining the impact of VR on spatial and social norms

Abstract

Art Museums implicate established spatial and social norms. The norms that shape these behaviours are not fixed, but rather subject to change as the sociality and physicality of these spaces continues to develop. In recent years, the re-emergence of virtual reality (VR) has led to this technology being incorporated into art museums in the form of VR based exhibits. While a growing body of research now explores the various applications, uses, and effects of VR, there is a notable dearth of studies examining the impact VR might be having on the spatial and social experience of art museums. This article, therefore, reports on an original research project designed to address these concerns. The project was conducted at Anise Gallery in London, UK, between June and July 2018, and focused on the multi-sensory, and VR-based, exhibition, *Scents of Shad Thames*. The research involved 19 semi-structured interviews with participants who had just experienced this exhibition. Drawing on scholarly literature that surrounds the spatial and social norms pertaining to art museums, this study advances along three lines. First, the research explores whether the inclusion of VR might alter the practice of people-watching, which is endemic in this setting. Second, the research explores whether established ways of navigating the physical setting of art museums might influence how users approach the digital space of VR. Third, the research examines whether the incorporation of VR might produce a qualitatively different experience of the art museum as a shared social space.

Keywords:

Virtual Reality (VR), immersion, art museum, spatiality, sociality, social norms, private-public space, new media, presence

Introduction

Art museums[1] are continually in flux (Geismar, 2018). Over the past century, art museums have slowly moved away from being spaces that contained private collections that could only be accessed by a select number of people (Falk and Dierking, 2016), to now playing 'a central role in making culture accessible to the mass audience' (Carrozzino and Bergamasco, 2010: 452). This emphasis is demonstrated by related research and the suggestion that social interaction, particularly for families (Falk and Dierking, 2016), is a significant motivating factor for visitors going to art museums (Davidsson and Jakobsson, 2012; Debenedetti, 2003), alongside leisure, recreation, and the acquisition of knowledge (Falk and Dierking, 2016). The spatial and

[1] We use the term art museum throughout this article to refer to both museums and art galleries (Duncan, 1995)

social character of art museums has also been affected by the gradual incorporation of new and emerging technologies, such as virtual reality (VR) (Duguleană et al, 2019; Geismar, 2018), which is the focus of this article. In 1995, for example, Benjamin Britton developed the VR art installation LASCAUX, which was a reimagining of the cave of Lascaux in France. Between1995 and 1997, he toured this exhibit across the US, France, Italy, England, and South Korea. The huge success of LASCAUX is not only testimony to the international power of VR (Ronchi, 2009), but equally demonstrates that '[despite] some initial hesitation, museology and humanities disciplines in general are catching up with this major technological breakthrough' (Galdieri and Cazzozzino, 2019: 122).

Today, VR is going through a renaissance (Evans, 2018). 'After many decades of incubation, fully immersive virtual reality (VR) has finally become a customer-ready technology' (Galdieri and Cazzozzino, 2019: 122). This is evidenced by the mounting popularity of modern systems like the Oculus Rift and the HTC Vive, as well as Oculus's most recent standalone system, the Oculus Quest. *Immersion* and *presence* are two terms that are frequently used to describe the experience of VR (Glover and Linowes, 2019). While *immersion* is 'simply what the technology delivers from an objective point of view' (Slater, 2003: 1), *presence* is contrastingly understood as being 'a human reaction to immersion' (p.2). In other words, *immersion* implicates the technological, while *presence* implicates the psychological. Symptomatic of this, there is mounting evidence to suggest that the ability to create virtual worlds that users 'feel as if they are part of' (Calleja, 2011: 25) is predicated, in part at least, on the technology underpinning the experience. Notwithstanding the impact physical setting can, of course, have on any given experience (Sherman et al., 2018), virtual or otherwise, VR today is significantly more advanced than it was in the 1980s and 1990s, which was marked by 'low resolution and unacceptable latency' (Steinicke, 2016: 7). And the consequent potential to create more convincing experiences of 'being *there*' (Bailenson, 2018) has not gone unnoticed by both scholars and industry practitioners alike.

A body of work now surrounds VR and its manifold uses (see Evans, 2018; Martin, 2017). Studies have explored the role VR might play in the realm of healthcare, serving as a tool to rehabilitate stroke victims (Layer, et al., 2015), tackle phobias (Carlin, et al., 1997), and train surgeons (Grantcharov, et al., 2004). Research has also considered the implications of VR in education (Psotka, 1995) with some of the suggested effects of this technology being that it can increase the speed of learning, and deepen the retention of information (Merchant, et al., 2014; Freina and Ott, 2015). Likewise, scholarly enquiry has recently extended to the application of Mobile Virtual Reality (MVR) headsets in public environment, and the suggestion this assemblage temporarily places users in a 'dislocated space', where the 'the digital no longer augments the physical, but rather the digital supersedes the physical while simultaneously being constrained by the norms and constraints of the surrounding shared space (Saker and Frith, 2019: 12). At the same time, studies have also started to investigate the application and utility of VR in art museums (Wojciechowski, et al., 2004) as a nascent form of 'edutainment' (Lepouras and Vassilakis, 2004) that could provide the digital space required

for new forms of sociality to arise (Economou, 2008; Jones, 2008). While these studies are undoubtedly helpful and do raise interesting questions, for the most part, such work has tended to focus on the technical character of VR (Worjciechowski, et al., 2004) and has not necessarily presented qualitative data on the *lived* experience of VR-based exhibitions (Roussou, 2001). Given the forecasted growth in VR technology and its diffusion into other industries (Yang and Kang, 2016), a better understanding of the impact of VR in art museums becomes more critical.

Our article, therefore, reports on an original research project conducted at Anise Gallery in London, UK, between June and July 2018, focusing on the multi-sensory, and VR-based, exhibition, *Scents of Shad Thames*[2]. The research comprises 19 semi-structured interviews with participants who had just experienced the *Scents of Shad Thames* exhibition. 11 interviews were conducted with individual participants and the remaining 4 interviews were conducted in pairs. The study advances along three lines of enquiry. First, the research investigates whether the inclusion of VR might alter the endemic practice of people-watching. Second, the research explores whether established ways of navigating the physical setting of art museums might influence how users approach the digital space of VR. Third, the research examines whether the incorporation of VR might produce a qualitatively different experience of the art museum as a shared social space. In the following section, we outline the conceptual framework that underpins this research. This begins by detailing an anti-essentialist understanding of spatiality (de Certeau, 1994 Lefebvre,1991/[1974]) alongside a symbolic interactionist approach to the development of social rules. We then summarise three recurring spatial and social behaviours that have emerged within the art museum: (1) people-watching, (2) the physical navigation of space, and (3) the experience of this environment as a shared and social space (Ash, 2004; Debenedetti, 2007: 54; Falk and Dierking, 2016; Rosenfeld, 1980). These behaviours inform our research questions that revolve around the possibility of VR reshaping the lived experience of art museums. We briefly describe the Anise Gallery, as well as provide a detailed description of *Scents of Shad Thames,* before outlining the methodological design of this research. Finally, we present and discus our findings.

The Spatial and social Norms of Art Museum

For Falk and Dierking (2016), the experience of an art museum is affected by the physical, social and personal context. Not only does the architecture shape how visitors experience this or that exhibition, so too does the surrounding sociality, alongside the personal motivations for going (Hornecker and Ciolfi, 2019). Space is not just an empty container that we simply inhabit, but instead a social product rooted in shared values and socially produced meanings (de Certeau, 1984; Lefebvre, 1991/[1974]); space is modified through continued use, with ascribed meanings changing over time as a consequence of interrelations and interactions (Massey,

[2] https://www.a-vr.co.uk/portfolio/scents-of-shad-thames/

2005; Smith, 2001: 36). The art museum, then, is very much a lived space in which social actions, often dependent on social norms, can alter and modify the phenomenological experience. This is not to suggest, however, that art museums are not governed by tacitly agreed rules of conduct.

Established norms within these spaces make social behaviour predictable and understandable (Barker and Wright, 1955; Falk and Dierking, 2016). An individual may actively decide to visit an art museum, but the behaviours enacted during this visit are strongly influenced by the social norms that predate this decision. A symbolic interactionist approach to social rules (Carter and Fuller, 2015) suggests that society is constructed through the continued interaction and negotiation between social agents and that 'agreement upon the relevant norms will be entwined with the activity needed to make sense of the sort of social event to which one is party' (Edgar, 2008: 232). Context is thus an important factor (Blumer, 1969). Social agents apply specific context-based behaviours so that a shared understanding of a situation can be developed, and common norms adopted (Carter and Fuller, 2015). Within the setting of the art museum, the following behaviours have gradually emerged, (1) people-watching, (2) the physical navigation of space, and (3) the experience of this environment as a shared and social space (Ash, 2004; Debenedetti, 2007: 54; Falk and Dierking, 2016; Rosenfeld, 1980).

People-watching is a recurring motif of art museums. Visitors' attention is always partially devoted to observing others co-inhabiting their space (Falk, 1991; Falk and Dierking, 2016; Falk, et al., 1985; Rosenfeld, 1980). Visitors watch either their own social group, other social groups or art museum staff to learn how to behave appropriately and to become oriented to the implicit conventions of their environment. This process is known as modelling (Falk and Dierking, 2016). Casey (2003) argues that 'the viewer is acutely aware of his place in the museum and acts appropriately. He positions himself in front of the painting in a certain way, seeing himself see the object, mindful of how he is viewed by others' (p. 5-6). For Falk and Dierking (1998), a notable part of this self-awareness revolves around the fear many adults have about making mistakes in front of an audience (Foucault, 2005/[1970]).

Navigation of the art museum is another important feature of these environments. In many ways, this is indicative of the necessary ordering of objects and artefacts. Exhibits and displays are usually grouped in a decisive manner and designed to be experienced in a particular sequence that visitors are expected to follow (Falk and Dierking, 2016). Likewise, adults have been socialized to not touch the items contained within these spaces (Falk and Dierking, 2016: 43). Duncan (1995) argues that art museums provide 'both stage set and script' (p. 10) for visitors to performatively adhere to. While the overall flow of bodies may seem chaotic, most people consistently move from one object to the next (Hooper-Greenhill, 1994: 113). And the majority of people are also conscious of not negatively affecting the experience of others. As Falk and Dierking (1992) point out, visitors often 'quietly wait their turn to look at exhibited objects, and respect the rights of others to have a turn' (p. 92). Consequently, people are more likely to participate in interactive

exhibitions if they feel their experience is not prohibiting other people from similarly taking part (Falk and Dierking, 1998; Perlin, 1998).

Art museums are, of course, very much shared social spaces, predicated on a 'public-private duality' (Debenedetti, 2003: 58). '[Whether] they arrive accompanied or not, all visitors have to negotiate an often delicate balance between two irreconcilable poles: conviviality - sharing, exchanging ideas; and introspection - establishing a personal relationship with the art works' (Ibid). Being accompanied by someone else is frequently part of the experience of art museums and individuals tend to move through these spaces as a unit, sharing their thoughts and exchanging ideas to help comprehend and validate each other's reactions (Debenedetti, 2003: 54; Falk and Dierking, 2016; Hooper-Greenhill, 1994; Pekarik, Doering, and Karns, 1999). Yet, the introspective element of the art museum is just as important as the social experience. The process of engaging with a work of art creates a conceptual space that can feel solitary (Perlin, 1998). The practice of visiting an art museum alone can therefore make the overall experience feel more private and provide 'an opportunity for self-reflection, tranquillity and personal freedom that the elevated, austere, even magical atmosphere of a museum particularly lends itself to' (Debenedetti, 2003: 57). Consequently, many visitors establish verbal or physical barriers to social interaction in order to be able to seamlessly move between the public and private experience of the museum (Debenedetti, 2003: 58).

Drawing on an understanding of spatiality as something that is socially constructed (Lefebvre (1991/[1974]), alongside a symbolic interactionist approach to social rules (Blumer, 1969; Carter and Fuller, 2015) it is our contention that the addition of VR in art museums has the *potential* to present new ways of approaching and experiencing this setting. While a body of research has gradually developed around the social norms between avatars within virtual environments (Blascovich, 2002; Schroeder, 2002; Yee, et al., 2007) little empirical research exists regarding social norms when VR is adopted in public spaces like art museums. Similarly, there are limited studies that explicate the lived experience of VR-based exhibitions (Roussou, 2001). Our research, therefore, addresses these gaps in the literature. The questions guiding our study are as follows. First, does the inclusion of VR within art museums alter the practice of people-watching? Second, do established ways of navigating the physical setting of art museums influence how users approach the digital space of VR? Third, does the incorporation of VR produce a qualitatively different experience of the art museum as a shared social space?

Method

This article reports on an original research project that explores the spatial and social impact of VR in the context of art museums. Our research was conducted at Anise Gallery in London, between June and July 2018. Anise Gallery presents a variety of exhibitions and events that relate back to 'architecture, technology and the built environment' (Anisegallery, 2019a). Founded in 2012, Anise Building is situated along historic

Shad Thames, occupying the ground floor of renovated spice warehouse. The multi-sensory, and VR-based, exhibition, *Scents of Shad Thames*, which is the focus of this article, chiefly engaged with the regeneration of London and 'how the identity of the architecture is shaped by its inhabitants and vice versa' (Anisegallery, 2019b).

After putting on the supplied VR headset – which was tethered to a powerful PC - visitors were presented with a detailed virtual depiction of the London SE1 postcode area, which effectively hovered in the middle of the room they were standing in. Six selected Shad Thames buildings, including Wheat Wharf, Anchor Brewhouse, Anise Building, Cinnamon Wharf, Tea Trade Wharf, and 28 Shad Thames, then slowly floated upwards from of the map before moving towards six evenly spaced positions within the gallery. Each designated position was accordingly marked by a red building shaped block. And as each building reached its destination, the red blocks became detailed versions of the buildings listed above. Significantly, these virtual buildings corresponded to six physical tables within the gallery, each with a doll house sized crate perched on top of it, and each filled a different spice, tea or fruit. Accordingly, visitors engaged in a multisensory experience, taking in the scents historically associated with this envirnoment. It is also important to point out that this experience took place amongst various other exhibitions and was thus not cordoned off from the shared social space of Anise Gallery.

In total, 19 semi-structured interviews were conducted. Participants comprised 10 females and 9 males. 11 interviews were conducted with individual participants and the remaining 4 interviews were conducted in pairs. The mix of interviews was considered appropriate because couples often wanted to be interviewed together and their individual experience was influenced by the presence of a companion in the gallery. Purposive sampling was employed throughout this project. Participants were selected if they had experienced the VR portion of the *Scents of Shad Thames* exhibit and were over 18 years old. In all instances, potential participants were approached within Anise Gallery, given a participant information sheet and then asked if they would like to take part in the project. Participants then completed a consent form, which detailed how their data would be used following the study. All participants were given pseudonyms.

Interviews consisted of 16 questions and 45 sub-questions. Each interview was effectively broken down into three sections. The first section focused on the art gallery, with questions exploring why participants visited this gallery and how they usually felt and acted, spatially and socially speaking, when interacting in similar settings. The second section focused on the *Scents of Shad Thames*, with questions exploring how users described this experience, and how they approached and interacted with the exhibit itself. The third section focused on both the spatial and social effect of using VR within this context, with questions exploring how participants felt this experience differed from non-VR based exhibits, and what effect the dislocated space of VR had on the social aspect of their visit.

Interview data were thematically analysed using an established series of codes that related to the key themes underpinning this study: (1) people-watching, (2) the physical navigation of space, and (3) the

experience of this environment as a shared and social space; with each theme containing several sub-themes or codes. A question that focused on both the spatial and social effect of using VR within the context of the art gallery, for example, elicited responses that were commensurate with the following broad themes: emerging forms of privacy; the impact of the physical setting on the digital experience; concern for how participants might appear to visitors outside of the headset; and reconciling the sensorial configuration of VR with the desire to continue socialising. This approach to data was both inductive and deductive. All data were initially coded outside of our theoretical framework, before being reinterpreted through the chief themes underpinning our study.

People-watching

In line with established understandings of art museums (Falk, 1991; Falk and Dierking, 2016; Falk, et al., 1985), people-watching remained an integral facet of our participants' experience of Anise Gallery. As Nici explains:

> 'I was thinking where's the VR and then I could see it in the corner. And then I saw people walking around very slowly so I thought okay there are things to take in' (Nici, female)

Here, many participants observed other visitors 'to gain information or knowledge about appropriate ways to use museums' (Falk and Dierking, 2016: 51-52); or rather how to approach this VR exhibit. This point is supported by the following extracts:

> 'Before I did it, I saw this other woman doing it and she was very careful about what not to touch. I think she felt that she was going to touch the wall or something or fall' (Beth, female)

> 'I saw some people walking into the crates. So, I was mindful of that when I was looking at the model. I was aware that there was a wooden crate in front of me' (Ryan, male)

> 'Well once you see somebody bump into the box, you think, I'll do better' (Katherine, female)

The spatial and social norms of the art museum were therefore a significant factor in the inclusion of VR (de Certeau, 1984; Lefervre, 1991/[1974]). At the same time, we would also suggest there is something noteworthy about the incorporation of this technology that differs from the people-watching norms commonly associated with more conventional exhibitions, effectively making the practice less casual (Gurian, 2006) and more active.

Certainly, the observation of others that typically occurs in relation to non-digital displays (Rosenfeld, 1980), involves a visual connection of sorts between the actions of visitors and their physical environment. In other words, there is a tangible referent that corresponds to a certain sensibility. VR, however, is different. To account for the physical, visual and audible schism that occurs within a VR experience, Saker and Frith (2019) use the term 'dislocated space', which they define as '*concrete space being temporally superseded by … digital space'* (p. 9; italics in original). This digital space remains concealed from those outside of the headset, just as the meanings communicated by the physical actions of users are necessarily partial. For some participants, the disruption of this practice meant that the process of people watching suddenly lacked meaning:

> 'When you're looking at people who are experiencing it, it doesn't mean that much to the bystander' (George, male)

> 'You do not know what they are doing and why they are doing it. This doesn't have a meaning to you in the same way as you are looking at a picture' (Thomas, male)

Interestingly, Thomas compares witnessing someone interacting with VR to looking at a picture, which is, of course, an established behaviour that facilitates a shared understanding, as well as implicates common norms (Carter and Fuller, 2015). For Durkheim (1997/[1893]), norms are the essence of social order. Norms effectively provide a sense of solidarity among individuals. And this is no different in the setting of an art museum. When Thomas comments that the actions of the person he was watching lacked meaning, he is equally suggesting the solidarity of the space has been altered. Symptomatic of this, some participants found the attenuated nature of their experience evoked reflexive concerns about how they might appear to others were they to inhabit this digital space themselves. As Leah's pondering attests:

> 'Would I look silly? Would I trip up?' (Leah, female)

How to behave within an art museum is, of course, not something that is intuitive (Gurian, 2006). Visitors with limited experience of these spaces might therefore feel more fearful of behaving in a manner that was unfitting (Foucault, 2005/[1970]). In the context of VR, our research found that the practice of people-watching not only took on a more active and contemplative hue, it also prophetically provoked anxiety in some participants about the prospect of reckoning with this seemingly normless experience.

Navigation

The *Scents of Shad Thames* was designed so that digital objects correlated with physical objects placed in the center of the gallery. Many participants approached this experience in a manner that closely resembled the norms ordinarily associated with the physical site of art museums (Duncan, 1995; Hooper-Greenhill, 1994). As Kat explains:

> 'I'm in a gallery so I have to go carefully, one, two, three, then go to the other side, one, two, three. And I think that's a way that you should be in a gallery' (Kat, female)

Importantly, this *way of being* is predicated on a particular sequencing of objects, which is another rule generally associated with art museums.

The rules or norms for navigating art museums involves visitors sequentially moving from object to object in a methodical and purposeful fashion (Leahy, 2016). As Falk and Dierking (2016) explain, 'many museums design exhibitions composed of groupings of cases or interactive displays that present a single, large, multi-faceted story or concept' (p. 68). This sentiment was echoed by Peter when he explained why he chose to adopt a regimented approach to this virtual exhibit:

> 'To get the most out of the place' (Peter, male)

For Peter, the navigation of this space is intentionally structured to produce an optimum experience. In the majority of instances, participants described approaching the digital space of VR following a normative pattern and comprehended virtual items as being curated in a manner not dissimilar to their physical counterparts.

Our research also found that many participants approached the virtual space of VR as if it *were* physical. These participants consequently spoke of being wary of walking into digital objects even though they knew, of course, that this was not possible:

> 'You know that the table is not really there. You've seen the space you could walk straight through it, but you just obey the rules of the virtual space and walk around it' (Thomas, male)

> 'You know it's not real but we're walking around it as if, in terms of perception for safety, if we walk into it will cause us some sort of danger' (Nici, female)

> 'I found that the space was so small for me to walk because there was that map in the center and I was afraid to crash with it. It was weird because I really know that it wasn't really there' (Peter, male).

Behaviours commonly associated with the concrete space of the art museum therefore carried over into the digital space of VR, with each participant demonstrating a marked level of 'restraint' (Case, 2003). Here, even the idea of transgressing the virtual map was discussed as being a rebellious act:

> 'We can do whatever we want. And I think that's the kind of rebellious, renegade kind of idea, like I'm just going to stand in there. (Nici, female)

At the same time, this is not to suggest these perceptions of 'restraint' were necessarily experienced as being undesirable.

For many participants, the sense of alignment between the physical and digital world did not restrict their experience, but instead assisted their navigation of this space:

> 'I felt comfortable in the space and one of the things that I liked the most is that it is the same area. So, you already saw the space, you have already seen where you are going to walk around. It is the same one, so you don't feel that you're going to fall or drop' (Beth, female)

For Beth, the relationship between the physical and the digital meant she was attuned to the experience because she already had an understanding of the concrete space of the museum. As David amusingly describes this process:

> 'It's like seeing a friend in a funny hat' (David, male)

Significantly, then, the internalised parameters of this exhibition were not cast in a deleterious light. Virtual objects acted as boundaries, performing a similar function to physical objects and the confines of the art museum itself. For many participants, going outside of these boundaries felt 'weird' specifically because the norms associated with both physical and digital aspects of the museum appeared commensurate. The practice of avoiding virtual objects adhered to the social norm of not touching or interacting with items in a museum, which adults have been 'socialized' to do (Falk and Dierking, 2016: 43). As Falk and Dierking (2016) note, people know how to act in certain spaces, and 'they do not feel coerced into this behaviour; they just do it' (p. 65). Similarly, our participants reinstated established norms, even though they were not compelled to perform in a certain way. It is our assertion, however, that this process does not simply illuminate the collective desire to establish boundaries to help make sense of an exhibit *per se*, but rather the power of the physical setting vis-à-vis the VR experience. As Sherman et al (2018) concurringly suggests, '[if] the same VR system and application are placed in two different venues, such as an entertainment arcade versus the Guggenheim

Museum, there will be a significant difference in the way the experience is perceived' (Sherman et al., 2018: 396)

A Shared Social Space

The art museum has been recognized as providing both a public and a private experience for visitors (Debenedetti, 2003; Falk and Dierking, 2016). Our research found that the use of VR in this setting readily amplified both the public and private aspects of Anise Gallery:

> 'What I was seeing was certainly private, but how I was viewing it and how I was interacting with it, the way I was putting my hand out was public' (Katherine, female)

> 'It was public because there was somebody else in the room. Somebody else was watching you while you were seeing a private exhibition' (Kat, female)

While both Kat and Katherine felt that they were inhabiting an environment that was qualitatively concealed they were equally aware that their physical movements within the digital space of the virtual corresponded with a physical space that they were equivalently cordoned off from. For George, it was the acoustics of the physical setting that made him more cognisant of the space outside:

> 'I was aware of the presence of others, because people are being loud' (George, male)

For some participants it was precisely the ability of VR to place them in a space that felt distinctly removed from other people - ocularly and audibly speaking - that made their experience feel qualitatively different. Carol makes an equivalent point while discussing the difference between a gallery she had recently visited and the *Scents of Shad Thames*:

> 'When you had it all by yourself and you were the only person there, that was really cool. It was like having your own private gallery moment. I really valued that because I think it's very rare that you would get, not everywhere is necessarily busy, but it's very rare that you get gallery space to yourself to enjoy something, so you're still part of the gallery but you're having your own experience' (Carol, female)

Art museums are, of course, commonly understood as being shared spaces (Barrett, 2012). It is through the sharing of space that spatial and social norms are established. In this instance, however, Carol was able to engage with the exhibit as if she were the only person there because she did not have to share the virtual space with other people. Leah makes a similar point:

> 'You immerse yourself in what you're looking at. Everything else was disregarded. I thought, no, no, I'm having a good time, forget about everybody else' (Leah, female)

As Elden (2004) explains, 'the meaning of the space and the space itself, is adapted and transformed as it is perceived and lived by social actors' (p. 192). For some participants, it was precisely this solipsist vantage-point and its marked difference from the common experience of other art museums that made the lived experience feel more satisfying:

> 'It was private because I feel like I have the space for myself. So, I was free to go to any of the pieces of work there were. But it's only because anyone can't see what I was doing. I feel like I have more freedom without people, because you can go anywhere you want without people being in the middle of it' (Peter, male)

At the same time, Peter also touches on an interesting contextual aspect of VR. Peter intimates that part of this 'freedom' was symptomatic of people not being able to *see* what he was doing. The removal of people provided a mastery of space and autonomy that is rare in a crowded museum. For Debenedetti (2003), individuals who experience the museum alone

> benefit from total freedom in decision-making. Once inside, they are free to go at their own pace and stay as long as they wish. This autonomy allows the singleton to set a very personal itinerary ... to preserve the intimacy of their encounter with the artworks. (P. 58)

And this spatial and social autonomy can facilitate a more immersive experience:

> 'I was engrossed as soon as I started doing it. Actually, I was surprised when I took off the headset how many people there were, how busy it was, and knowing these people had been watching what I was doing and staring I was like "oh, okay". When you're actually in the environment and you know, you are smelling things, you are seeing things, you are listening to things, and you are choosing where to navigate, you do not think about external things' (Thomas, male)

> 'I want to be in my head and with the art. So, I'm born for VR' (Marcy, female)

For both Thomas and Marcy, then, the sense of privacy VR provided notably allowed them to be more absorbed in the experience and therefore less conscious of their own reflexive role in maintaining tacitly agreed norms.

This is not to suggest, however, that the carapace of VR was impenetrable, as many participants equally found the concrete space of the art museum continued to bleed into their experience in a variety of ways. As Saker and Frith (2019) put it, '*the shared norms of actual space … remain a constraint upon actions in the virtual space*' (p. 10; italics in original). Equally, our research found that for some participants their experience of the digital space of VR was marred by an awareness that other visitors might be waiting to have their turn, which resonates with common concerns associated with this setting (Perlin, 1998). As Kat and Thomas explain:

> 'I am in front of a big group of people. There are people watching, waiting to have a go on this thing. You can feel self-conscious' (Thomas, male)

> 'I think it goes back to me being always self-conscious of not being in the way of people. So, it is like in a restaurant when there is a queue and you don't feel welcome to stay because there is somebody else waiting for the table. So, in this experience, I knew somebody else was waiting, even if it was him, waiting for the headset' (Kat, female)

For Kat, her attentiveness to people waiting meant that she could never fully transcend the physical space of the gallery and inhabit the digital space of the virtual. We suggest here that the fractional immersion of VR might intensify this experience as any sense of a queue building beyond the headset is, in part at least, imaginary.

For other participants, it wasn't necessarily the temporality of the VR experience that led to the shared space of the art museum seeping into the digitality of the experience, but rather a concern for how their actions might be perceived by others. Here, the prophetic anxiety provoked by the practice of watching other people engage with this exhibit, as detailed above, moved beyond mere contemplation and actually shaped the experience from within the headset:

> 'I didn't know if someone was laughing at me when I was touching the box and nothing was there, and I was like wearing the goggles and reading the explanation from the buildings. I don't know, I felt kind of foolish' (Kat, female)

'Because even what I was watching the guy before me, I was just there thinking he looks so funny, but he is just getting on with it. And then when I put it on, I thought "oh, I look funny"' (Nici, female)

'If you could see yourself doing it you would be like "oh my god, I look like an idiot"' (Carol, female)

While the private experience became more personal for some participants, then, for others the public space of the art museum intensified and affected their experience of the virtual. This is perhaps in large part due to the unease that accompanies the feeling of being watched, which resonates with Sartre's suggestion that 'the intrusive Other shatters the illusion of mastery initially enjoyed by the solitary viewer and turns him into the spectacle of another's gaze' (cited in Cavallaro, 2001: 135).

For other participants, however, an awareness of being observed was intensified precisely because they had not come to the gallery alone. Of course, traditionally speaking, companions readily share their experience of art museums through dialogic interaction (Debenedetti, 2003). Our research found that while participants still conversed with other people during this exhibition the inclusion of VR notably reshaped how this sociality was experienced:

'It is difficult to interact with someone or something when you don't see what you are thinking' (John, male)

'Yeah, I agree. It's hard to interact when you're not seeing other people. So, you know they're there, but you don't know which direction to speak to them' (Kat, female)

For these participants, then, a significant difficulty encountered in VR was the inability to 'see' what their partner was thinking, precisely because the digital space of VR was necessarily dislocated from the concrete setting of the gallery. And for some participants the inability to experience this exhibit with someone else was seen as being unfavourable:

'I actually quite naturally thought we'd experience it together' (Molly, female)

'It could have made it better to interact with someone seeing the same thing' (Leah, female)

As a corollary to this, dialogic interaction had to occur after the *Scents of Shad Thames* instead of during the experience. Consequently, for these participants the social bonding commonly confirmed through imminently shared 'actions, observations and reflections' (Coffee, 2007: 382) became markedly fragmented.

Conclusion

This article has examined the effect VR might be having on established spatial and social norms within art museums, specifically focusing on the VR-based exhibition, *Scents of Shad Thames*, at Anise Gallery in London, UK, between June and July 2018. Established spatial and social norms include, (1) people-watching, (2) the physical navigation of space, and (3) the experience of this environment as a shared and social space (Ash, 2004; Debenedetti, 2007: 54; Falk and Dierking, 2016; Rosenfeld, 1980).

Three main inferences can be made about the impact of VR on the experience of this environment from our data. First, the process of people watching became notably less casual (Gurian, 2006) and more active. Participants were aware that they were observing users perform physical actions that were necessarily dislocated from the physical environment they were inhabiting (Saker and Frith, 2019). As a corollary to this, the practice became more contemplative, with participants not only thinking about how they might react to this digital space themselves but also trying to envisage the digital environment overlaying the physical space of the gallery. Second, established norms for physically moving through the art museum influenced how participants interacted with the virtual setting of the exhibition. In part, participants did this to help contextualise and make sense of the exhibit. At the same time, we would also suggest the serious sensibility adopted by some participants was indicative of the physical space of Anise Gallery. As Sherman et al's (2018) posit, '[the] venue, or setting in which the VR system resides, can have a great impact on how an event is experienced' (p.394). Third, the public and private duality of the art museum was amplified. Through VR, participants experienced a sense of 'being *there*' (Bailenson, 2018) that felt markedly more private. For some participants, this meant that they ostensibly had the exhibition to themselves, which provided a more satisfying experience. For other participants, however, this meant that they became more conscious that other visitors were waiting their turn. For Galdieri and Cazzozzino (2019), however, this is not indicative of VR *per se*, but rather the consequence of a system that only enables one user at a time. In other words, this is symptomatic of *Scents of Shad Thames* and the decision for it not to be a multiuser experience. Here, our data support the suggestion that *presence* is a psychological reaction to technology (Slater, 2003). While the technology involved can create immersive environments (Calleja, 2011), this does not mean all visitors will have the same experience. In a similar vein, the dislocation of participants from their physical setting impacted social connections. For some participants, this meant they were unable to share the experience with their companion. Consequently, established practices of sociality within this setting fractured with the dislocated space of VR.

In sum, then, while VR has the *potential* to create a different kind of spatial and social relationship with art museums, for the most part, the physical setting of art museums seemingly limits the transgression of established norms. However, as visitors become more comfortable with this technology, and emerging

applications surface that allows multiple users to inhabit these digital spaces at any one time, it is very possible that different spatial and social norms might still develop that are not as firmly governed by the laws of physical space. Likewise, with the mounting popularity of modern systems like the Oculus Quest, and the multitude of applications available, people are now able to experience VR-based exhibits in environments that are not art museums, which raises interesting questions about the kind of interactions these exhibits might forge given the incongruous physical settings involved. In either case, one thing seems fairly clear: VR is set to continue permeating multiple industries in the coming years (Yang and Kang, 2019). Additional research is therefore encouraged to gain a broader understanding of the spatial and social effects of this unique technology within the field of museology.

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