Reworking Architecture as Art in the Age of Virtual Replication

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Abstract

Given nearly three decades of online 3D formats since VRML (Virtual Reality Modeling Language) designed to create virtual models, virtual spaces, and virtual worlds, to the hype of the "Metaverse" in 2022, we might be surprised the Metaverse is no clearer and not very much closer to the 31-year-old vision of the book *Snowcrash*. This paper will attempt to address key recent philosophers' and media critics' core challenges for how we can assess the cultural value of built space in a virtual realm. The challengers include a take and retake on Second Life by the philosopher Hubert Dreyfus, modernist architecture as sculpture by Antony Saville, the promise of convergence culture by Henry Jenkins.

Keywords: Virtual Reality; Internet; Digital Heritage; Immersive Literacy

Abstract

Negli ultimi tre decenni, i formati 3D online hanno fatto molta strada, dal VRML (Virtual Reality Modeling Language), concepito per creare modelli, spazi e mondi virtuali, fino al recente entusiasmo attorno al "Metaverso" nel 2022. Tuttavia, è sorprendente come il Metaverso resti ancora lontano dall'essere pienamente realizzato e distante dalla visione prefigurata 31 anni fa nel romanzo *Snow Crash.* Questo articolo analizza le principali sfide sollevate da filosofi e critici dei media riguardo alla valutazione del valore culturale degli spazi virtuali. Tra le questioni affrontate figurano la critica del filosofo Hubert Dreyfus su *Second Life*, la concezione dell'architettura modernista come "scultura" secondo Antony Saville e l'idea di cultura convergente di Henry Jenkins.

Parole chiave: Realtà Virtuale; Internet; Patrimonio Digitale; Immersive Literacy

Given nearly three decades of online 3D formats since VRML (Virtual Reality Modeling Language) designed to create virtual models, virtual spaces, and virtual worlds, to the hype of the "Metaverse" in 2022, we might be surprised the Metaverse is no clearer and not very much closer to the 31-year-old vision of the book *Snowcrash*. This paper will attempt to address key recent philosophers' and media critics' core challenges for how we can assess the cultural value of built space in a virtual realm. The challenges include disillusionment with virtual reality and related simulations, a denouncement of the Internet and virtual worlds by the philosopher Hubert Dreyfus, modernist architecture criticized by Antony Saville, and the earlier promise of convergence culture by Henry Jenkins threatened by corporate walled gardens and the rise of AI. My focus will be on virtual representations as virtual replications of the past. I will attempt to link the concepts of cultural presence, hermeneutic environments, and immersive literacy.

1. Virtual Reality: Less or More than Reality

Virtual reality is under attack. Australian Professor of Philosophy Janna Thompson (Thompson 2016) has written an article entitled "Why virtual reality cannot match the real thing." Her main criticism of VR is that it cannot supplant real-world travel, but the issue has wider significance, especially in the field of digital humanities. She proposed that real-world travel experience is difficult to simulate let alone be equalled by virtual reality technology and raises a further conceptual limitation: she only considers VR (and AR) capable of providing accurate and equivalent realistic interactive simulations of the existing real world.

A more recent article by Hannah Lewi, a Professor of Architecture writing in the same online publication as Thompson, has claimed that virtual architecture lacks atmosphere (Lewi 2020). The article reminds me of a 2004 seminar in Australia, where the eminent scholar Professor Marco Frascari argued computer reconstructions of architecture were far too exact and thus too limited in conveying the mood and atmosphere of architecture. Although Computer-Aided Design and Draughting (CADD) software used by architects are complex yet blunt tools focused on construction drawings rather than ideative design focused on the creation and expression of place, I argue the above philosopher and the two architecture professors have not kept themselves informed with the expressive power of game design, machinima, and virtual production. These tools offer new and exciting ways of conveying "lived" and experientially deepened notions of virtual heritage place-making. An even more fundamental point to make is that the above critics see virtual reality and digital tools as creating simulations to mimic reality yet the power of these tools is in explaining and expressing processes.

Consider, for example, the contemporary museum sector, ravaged by the long-term implications of COVID-19, and progressively competing with rival forms of media entertainment and information. Museum case studies reveal that visitors want physical experiences, and to sense that other people are there as well (Somers 2018; Hadley 2017). Curators and interpretation specialists are increasingly interested in VR and AR to engage younger users, as alternatives to text (Lynch 2020), and as more engaging ways to disseminate significant elements of their collection. This use of technology is not to show, but to reveal, not to explain but to allow support for self-directed learning. XR (extended reality, virtual, augmented and mixed reality) does not only have to copy what is there, it can allow people to reconfigure, view underlying hypotheses and processes or mix and match contested views or clashing interpretations.

Secondly, XR can show you, on-site or remotely, what you would not have seen, contested, inferred, amalgamated or extrapolated, from a more locally-situated or past point of view. In many discussions with scholars over the last two to three decades, I have been constantly reminded that great learning experience related to games and virtual environments is frequently what is learnt from designing them, not by experiencing (or playing them).

Third, and perhaps most controversially, technology is not necessarily an impediment to creativity; it is becoming an impediment to accuracy. As Eiteljorg (1998) wrote, "sanitized" images of the past are dangerous, they obscure our understanding of accuracy. Presentations of virtual reality environments tend to focus on final, fixed projects, they miss exciting possibilities in developing the immersive and interactive capabilities of XR as open-ended, discursive frameworks.

Perhaps we are too busy trying to comprehend the latest technology, we don't have the time and patience to perfect the content. But many of the technical devices, fundamentally, are not new. Scholars who have recently arrived in the field of virtual reality may be led to believe that virtual reality and augmented reality are new. Yet stereoscopic projects have been around since 1838 (leading to the View-master, patented in 1939), there was a form of multimedia cinema in the 1950s (the Sensorama) and augmented reality/virtual reality since Ivan Sutherland's projects such as the Sword of Damocles, in 1968. More recent developments, such as large-display VR systems (CAVES, Wedges, Cylinders, curved and cylindrical displays) as well theoretical definitions of computer games as "systems" may have also persuaded scholars to think that virtual reality's primary purpose was to create closed, abstracted simulations of reality.

XR technologies have typically been seen as the final and closed stage of data visualisation for the humanities; but there are many important and useful applications of this technology for providing open-ended, discursive research-questioning learning environments. In particular, for history and heritage fields, history is fluid and not a concrete and inviolable objective fact, the most engaging

virtual environments are not necessarily the most realistic ones, and a synthesis between artistic practice and the wider humanities may be mutually beneficial. I suggest this is also true for architecture as it peers into the haze of the digital horizon. Recent media releases of the Metaverse have not investigated this potential. If we put people into a virtual world and let them wander around, what will they be able to discover, to enact, to share? Large corporations have difficulty in accepting the benefits and risks of allowing creative communities to contribute to the development of virtual simulations (from massive multiplayer games to open online virtual worlds) and hence have conveyed the Metaverse as a simplified office meeting space and virtual cinema (Purtill 2021). Some science journalists paint an even more alarming future vision: a future all-encompassing Metaverse as slyly personalized mass manipulation (Waltzman 2022). This would also further confuse our understanding of what is real and what is virtual, both past and present. I hasten to note, though, that Snow Crash, the 1992 book by Neal Stephenson in which the term Metaverse emerged, was indeed dystopic but inspired by the many new interactive things one could do (Zenou 2022).

2. On the Internet

Thirty years ago, in 1993, the internationally interconnected computer network now known as the Internet was born: with, for the first time, a standard way for computer networks to communicate. Despite its altruistic start, Professor Hubert Dreyfus (Dreyfus 2008) made some interesting criticisms of the effectiveness of Internet-based distance learning and the wider use of the Internet via his book *On the Internet*. Despite my appreciation of his prose and clarity, I have concerns with both the method and the content of his approach. Only a few years after the first edition of the book, Dreyfus mentioned in an interview that the book was already dated (Kreisler 2006) but his content was also arguably restricted by a limited view of the Internet, while his selective method of projecting the thoughts of long-dead philosophers onto the issues of the internet and virtual worlds remains questionable.¹

For example, Dreyfus suggested the Internet is the successor to the popular press of the mid-nineteenth century Danish philosopher Dr. Søren Kierkegaard (1813-1855). Kierkegaard derided the press of his time for its instant opinions, anonymity, and lack of an ethical (or even religious) position. *On the Internet* applies Kierkegaard's criticisms to the Internet: Dreyfus declared that Internet-based learning could not develop mastery or convey a sense of the presence of other people or reality in general and lacks embodiment (Dreyfus 2008, 2001). I

¹ I published a longer critique of *On the Internet* (first edition) by Hubert Dreyfus in a 2004 issue of the ACM journal *Computers and Society* (Champion 2004).

agree that the currently accessible range of sensory experiences in virtual reality easily accessed by the public is still relatively small and virtual environments (and online worlds) have no or little sense of embodiment and thus the usefulness and meaningfulness of the Internet as an embodied and inhabited realm is fleeting, illusive and limited.

Interestingly, in the second edition version of On the Internet - which added a fifth chapter on Second Life (Dreyfus 2008) - Dreyfus rethought his earlier views. In his preface to the second edition, he declared "Second Life is the most prominent example of how one can create and control a virtual body in a virtual world" and based his argument totally on how Second Life "affects what sort of meaningful lives are and are not possible on the Internet." It is debatable whether Second Life is or was "the most prominent example of how one can create and control a virtual body in a virtual world," (Dreyfus 2008, xii) perhaps it was the most famous. Even if it were the most engaging, interactive and popular of virtual worlds, I would be reluctant to consider Second Life an exemplar of virtual embodiment. In its early years, the creation tools were behind some of its competitors, its use of streaming technology meant environments would float in an infinite space and the early gestures and overall animation of the avatars were limited. In terms of imagination and animation. I suggest computer games would have been worth investigating before Dreyfus decided to make his claim based on Second Life. Dreyfus also claimed, "they [creative work] make Second Life worth visiting, but these achievements don't give rise to new philosophical questions or insights." (Dreyfus 2008, 94) Yet, he later appears to contradict himself by saying philosophers should visit Second Life. He has visited Second Life, he has delivered some of his courses there, and he added a fifth chapter to the second edition of his book that centred on Second Life. Was he saying his new Chapter Five has no philosophical insights arising from Second Life? Dreyfus might have countered that as we enter into a virtual world voluntarily, stepping complicity into the magic circle, we cannot truly learn and meaningfully commit because our actions have no real-world, physical consequences. On page 95 of the second edition, he invokes the story of the Star Trek Holodeck to make such a claim: virtual worlds don't carry risk so they don't require courage or provide real thrills.

However, he then goes on to say "But, as Kierkegaard points out, an experimental life lacks seriousness and focus" (Dreyfus 2008, 106). Here we stumble upon another problem with this line of arguing, both Kierkegaard and Friedrich Nietzsche (whose views he also transplanted), had, arguably, very experimental lives. They certainly tested the public, their supervisors, and their colleagues.²

² Ironically, given Dreyfus promoted campus-based learning and academic philosophy, both Kierkegaard and Nietzsche nearly failed their doctoral dissertations.

Dreyfus' other arguments against Second Life are that there is no shared spatial intimacy, shared focus or mood, or understood social proxemics. However, he then goes on to attempt to prove this by what I suggest is a faulty syllogism. He creates a scenario based on a character from the novel *Snowcrash* (Dreyfus 2008, 112) that however much programming may improve in the future, it will never be quite good enough. This raises an interesting question: what would the criteria for success be, and who would be a worthy judge?

3. Convergence Culture and Collective Intelligence

Perhaps the success or failure of Metaverse would be judged by the big corporations (or at least by how much money they could continue to do so) but perhaps they already have too much control over the future of the Metaverse. The book *Convergence Culture*, by Henry Jenkins (2006) is an enthusiastic and idealist counter-proposal to the challenges of corporate control via digital media (and, by extension, virtual reality and virtual worlds). Jenkins made these provocative claims:

- Fan Culture is equivalent to Collective Intelligence.
- Mainstream popular media is a good example of participatory media.
- There will be no one Black Box through which all media will have to flow.
- Old media does not die.³

I admit, I find his term "Convergence Culture" confusing. In Jenkins' introduction (2006, 2) and his glossary (2006, 282), convergence is:

A word that describes technological, industrial, cultural, and social changes in the ways media circulates within our culture...the flow of content across multiple media platforms, the cooperation between multiple media industries, the search for new structures of media financing... the migratory behaviour of media audiences who would go almost anywhere in search of the kind of entertainment experiences they want. (Jenkins 2006, 282)

A second major theme in Jenkins' book is Participatory Culture: "Rather than talking about media producers and consumers as occupying separate roles, we might now see them as participants who interact with each other according to a new set of rules than none of us fully understands" (2006, 2). So even if the relationship can be unequal, for Jenkins convergence will not be the result of media appliances, or even the result (I imagine), corporations, but: "within the brains of individual consumers and through their social interactions with others" (2006,2). So, it is a democratic, collaborative and creative process. An

³ I explored these issues in more depth in the book chapter: *The cultural and pedagogical issues of new media and the humanities*, see: Champion 2015.

idealistic dream perhaps, but is it possible, and is it feasible for a high-tech, high-energy Metaverse?

Others, such as Bruce Sterling, have declared that old media has been superseded, but Jenkins quotes writers who have suggested that all future content will be controlled through a single proprietary device or network franchise. He denies there will be a Black Box, at least one that is "the nexus through which all future media content will flow" (Sterling 2003, 23-24). Is the Black Box metaphorical, hardware, or could it be a franchise? At least three global giants, Facebook, Apple, and Samsung, already practice Walled Gardens (Bajarin 2017; Grubb 2013). The Walled Garden phenomenon also applies to games. Gerardi (2012) writes: "Because of the strict ownership rules set in place by the various digital-only retail services, such as Valve Corporation's Steam for computer games and Microsoft's Xbox Live Arcade on the Xbox 360, preservationists have very few legal options when it comes to duplicating and distributing modern games for research purposes." The giant corporations are increasingly controlling the sale of computer games as a digital rather than physical phenomenon (Plant 2021). So even if there is not a single Black Box, there are certainly attempts by large corporations to restrict people to one device or one delivery service (Higa 2008). Ironically, it is the development of Walled Gardens and Black Box franchises that is preventing our interaction with *historical* new media, at least in the area of game design and almost certainly virtual worlds as well. As Henry Lowood, Curator for History of Science & Technology Collections and Film & Media Collections in the Stanford University Libraries, remarked: "Download-only distribution, copyright law and end-user license agreements those lengthy contracts users agree to but seldom read when installing a new computer program - are the biggest hurdles facing video game preservation at the moment" (Gerardi 2012). In another article (Zarembsky 2013; Garcia and Calantone 2002), Lowood further warned against seeing game preservation as merely being about retaining working software, it is "rather a historically specific site of shared experience." To preserve games and various types of new media we must preserve not only the technology but also the cultural practices as well.

The third major theme in Jenkins' book is Collective Intelligence, a term coined by Pierre Lévy (1997). Jenkins argues that via Collective Intelligence: "We can put the pieces together if we pool our resources and combine our skills...an alternative source of media power" (Jenkins 2006, 4). The most detailed example that Jenkins (93-130) provides for Collective Intelligence is *The Matrix* franchise across the three films, games and websites. Jenkins' definition of a transmedia story is that it "unfolds across multiple media platforms, with each new text making a distinctive and valuable contribution to the whole" (97). The last two of the three conditions do not seem to be met: merely providing clues in one media to help understanding in another media is not a distinctive

use of the supporting media, and if it is not distinctive one wonders how the secondary media contribution can be valuable as a multi-media *unfolding*.

While collective intelligence and convergence culture sound like promising antidotes as a bulwark against the potential dehumanizing and exploitation of virtual world citizens via XR and global digital media, there is so far sketchy evidence for them. They do however raise the question as to how these potential (or perhaps already here) challenges can be resisted, and whether virtual architecture can support collective intelligence and convergence culture. Can collective intelligence and convergence culture resist or refashion machine learning and AI? Will the corporations and our weakness for convenience allow us to resist and refashion?

4. Critical Futures

4.1 Digital Heritage and Culturally Significant Presence

I have argued that virtual architecture can be atmospheric if we consider its role past the function of visual simulacra, beyond mere imitation of reality. Regards Hubert Dreyfus I have also suggested that his book's attacks on the internet as a civic forum for discourse are a little premature, inconsistent, or misapplied. While Convergence Culture and Collective Intelligence are laudable concepts, I don't think they are likely to answer the critics of virtual architecture, who view it as impoverished and incomplete aesthetic objects. To address critical issues besetting the future of virtual architecture we need to understand its context, and this means to also address its relationship with our past. The majority of the virtual architecture of the past lacks a sense of presence, of time, of care. And the subset (or intersection) of digital heritage, 3D, and virtual simulations of architecture, virtual heritage, far too seldom expresses the effect of time, the depiction of care, or even more generally, the value of that place to the local, historically situated, society. The depiction of care and value is social as well as environmental. According to Kojève's interpretation of Hegel's Phenomenology of Mind, we are the only species to desire the desire, attention, and respect of others, symbolized via physical artefacts such as awards and medals (Warminski 2013). And here it is not just the objects but the process by which desire and the value of desire is created, that is cultural. It is important to note that creating a culturally codified system of expressing desire does not (yet) appear to take place inside a virtual world or a digital game, just as badges in gamification examples are not cultural beyond the shared use of tokens.

Secondly, beyond social interaction, we are also cultural beings, we record, instruct and pass on knowledge and beliefs to future generations. However, despite virtual worlds and open online gaming environments affording degrees of social presence, human visitors (players) lack a rich sense of awareness of each other inside the virtual world, and the ways they communicate social knowledge and practice are not culturally integrated inside that virtual world. Virtual worlds and online games do not pass on cultural instructions as players change content *internally*, their graphics and mechanics may change, but not from the actions of the players inside the virtual world. It may be graphically detailed and moving, but the inside of the virtual world or online game is not a cultural environment. I noticed this over two decades ago when I tried to apply the success of games and online simulations to the design of virtual heritage environments. Instructions are passed on outside the world, and following the instructions does not change the world for the players that go after you, there are no personalized traces, and instructions are never culturally transformed, damaged or eroded. Yet the potential of such digital media to convey history and heritage through interaction is huge, after all, culture is a process as much as it is a collection of objects. We could use the specific themes and affordances of this media to encourage visitors to understand that the typical ways they act, think and believe, are not appropriate or useful. We could provide cultural affordances to help people understand a world of values distant from their own. To measure and encourage a sense of another culture, I developed the term cultural presence, describing "not just a feeling of 'being there' but of being in a 'there and then' that is not following the cultural rules of the 'here and now" (Champion 2002). For several decades virtual environments have been assessed in terms of their presence, how they communicate to us a sense of "being there." I noticed that even 3D digital cultural heritage models, on the few occasions they underwent user evaluation were not assessed on how well they afforded cultural presence, the meaning and significance of a time, place, or object to people of the past (E. Champion, Bishop, and Dave 2012). So yes, to Thompson and Lewi and Dreyfus, 3D digital environments seldom provide for critical reflection, they could greatly improve in terms of providing for more collaboration and sharing, but collaborating sharing and sense-making, architecture more than non-narrative games. This is partly because many of these projects are academic and short-lived, or they were designed to demonstrate scholarly or technical achievement, but these critics have confused what is available with what is possible. We can see many aspects of collaboration, creativity, and community participation in online forums, open worlds, social games, and game-modding communities but cultural understanding and transmission are not normally available on the inside of these designed "worlds."

4.2 Immersive Literacy

To clear up confusion as to whether presence or immersion was subjective or objective, Mel Slater proposed *presence* (the subjective experience of "being there") versus the more objective or general term *immersivity*: the amount the virtual reality (or gaming) equipment supports a subjective sense of immersion. While I don't want to wade into the battle between immersion and presence, I suggest that the word *immersion* is highly relevant to the particular requirements of designing 3D environments, while presence is typically used in conversations in a highly subjective way. This leads me to propose a new term, *immersive literacy* (similar to visual literacy, but in a virtual environment). Immersive literacy, however, is not digital literacy. Contrasting information literacy to digital literacy, Becker (2018) explained digital literacy requires an emphasis on guiding and encouraging not just technical but also cognitive skills in a digitally literate person, as shown in their five traits. These skills can be summarized as discernment and judgement; understanding (of relationships between learning, privacy and stewardship); ability to socially connect; and civic participation. I suggest digital literacy but does not clearly show the importance of non-textual literacy skills.

Of course, there is already the notion of media literacy. AMLA (Australian Media Literacy Association 2020) defined Media Literacy as "the ability to critically engage with media in all aspects of life. It is a form of lifelong literacy that is essential for full participation in society." Media literacy emphasizes the citizen element of digital media, so it adds a powerful civic participation element to a still very broad notion of digital literacy but is still not adequate to describe the learning one can achieve in visiting and designing virtual environments.

Educationalists warned us that how today's younger generations learn from social media and computer games indicates we need a new form of education delivery (MacArthur Foundation 2010). These new forms of media are fast-changing and highly interactive, hence their users are not just digitally literate, to be effective, they must also be digitally dexterous. Acquiring digital dexterity requires more effort than mere digital literacy. Immersive content is seldom found in typical digital humanities courses, apart from the recent impact of GeoHumanities, digital humanities studies often had a textual focus but not a multimedia let alone a concerted 3D media focus (Liu 2013).

This is a whole new field, beyond graphics, beyond traditional arts and crafts. Visual Literacy (Bowen 2017) includes non-visual senses and can incorporate the pedagogical advantages of dual-coding (Boser 2019) but is not necessarily proprioceptive and kinaesthetic. And XR can greatly improve its development of the multimodal and multisensory (Schraffenberger and Heide 2016), better leveraging participants' sense of embodiment. Therefore, for XR, (and related immersive games) we require a new term: *immersive digital literacy*.⁴ Neither digital literacy nor digital dexterity quite cover the need to educate say, new would-be game designers on how participants must learn how to orient and navigate themselves with immersive media.

⁴ For the sake of clarity, I will refer to immersive digital literacy as immersive literacy.

Navigating and orienting oneself in earlier virtual environments frequently resulted in feelings of nausea and confusion. Even with more recent head-mounted display environments, motion sickness and confusion remain potential issues (Heffernannov 2014; Lewis 2016; Mason 2017). Virtual environments often lack the sensory cues familiar to the body, and they may also lack the navigational cues present in the real world, such as smell, touch, kinaesthetic, or proprioceptive cues. Also, learning how to engage people in virtual environments is not easy, because beginning game designers often underestimate the importance of mechanics, or creating challenging but also rewarding interaction that leads to a goal, that is not too easy or too difficult. Added to this challenge, games and virtual worlds are often far harder for non-designers, so a designer, must create engaging and rewarding (not sickening) immersive environments, based on the knowledge of how people move in immersive (virtual) space, what convinces and coaxes them to explore, and so on. Even highly experienced virtual world designers such as Raph Koster (Koster 2021; Takahashi 2022) have avoided 3D virtual worlds, for these very complexities. However, in their attempt to replace 3D virtual worlds with 2D virtual worlds, they have left themselves open to the criticisms of Levi and Dreyfus: it is even more difficult to create memorable and atmospheric 2D worlds than 3D ones. Our memories and our emotions are triggered and created by more than the single sense of sight, and our three-dimensional sense of self in relation to place and to others is an essential factor in the way societies have traditionally organized themselves, through urban design, housing, performance, customs, and rituals.

A further complication arises with the emerging field of XR. Augmented Reality (AR) Mixed Reality (MR) and Virtual Reality (VR), are now increasingly called XR or extended reality, it is not important to the participant whether their view is virtual, mixed between a real or virtual, or real-world with some digital "augmentations" overlaid, the software will automatically calibrate the content to fit that particular device and its interface. But this also means a designer may not know if the final use of their digital game or virtual world will be on a table or a phone, in mono or stereovision. Ideally, these digital environments will be designed and experienced in the future across a variety of platforms, but this requires digital dexterity and there are specific skills and knowledge required to develop robust, widely accessible and engaging XR-based games.

And digital literacy is not enough when faced with a 3D immersive and highly interactive digital environment which is even more taxing on the human brain. I suggest immersion into a virtual environment relies on convincing the brain of the sensation of being virtually in another place and this sensation is constantly and consistently supported. A player will not fall through the floor, the camera will not get stuck in a wall, physics will behave consistently and appropriately, the mechanics and events of the game will not snap the player out of a complicit magic circle, while the simulated building and environment will give the sensation of being real, material, grounded. An architect may suggest digital architecture can cover these sensations, but digital architecture typically lacks a sense of player agency, and social change, and does not try to convince anyone they are in the real world when they are merely *viewing* 3D models.

In the real world, architects can visualize buildings from simple 2D plans. In digital games, experienced gamers can work out how to navigate, where to find and manipulate objects, and how to perform tasks faster and more efficiently than non-gamers. They are experienced with the special affordances or signifiers (Norman 2018), and clues of games and virtual worlds. In that sense, they have higher levels of *immersive literacy*. However, they may not necessarily gain a deeper understanding of the underlying content (Champion, Bishop, and Dave 2012). But there is another type of literacy when designers understand how the public would experience and navigate through a virtual reality environment or computer game. This is a crucial distinction: as I noted earlier, navigating and orienting yourself in earlier virtual environments could (and still does) often lead to nausea and confusion. More recent head-mounted display environments can still cause motion sickness and confusion (Heffernannov 2014; Lewis 2016; Mason 2017). There are far fewer sensory cues to the body in virtual environments, they can lack the navigational cues of the real world (there is usually no smell or touch, kinaesthetic or proprioceptive cues).

Also, learning how to engage people in virtual environments is not easy, because designers often under-estimate the importance of mechanics in games and motion sickness or nausea in virtual environments, and creating challenging but also rewarding interaction that leads to a goal, that is not too easy or too difficult (an always appropriate "Goldilocks" game balance is required to ensure this). So, there is also immersive literacy required of a designer, creating engaging and rewarding (not sickening) immersive environments, based on the knowledge of how less VR-experienced people move in immersive (virtual) space. For example, when participants first wear a Microsoft HoloLens version 1 Mixed Reality headset (Fig. 1.) and are asked to click the MR object to move it, they hold their fingers away from the camera not side onto the camera. So, the HoloLens cannot see the fingers gesticulate and won't work. Moving up or down or quick rotations in virtual reality headsets can also lead to nausea, and objects in many virtual reality headsets appear very differently from how they are in real life (apparent differences or sizes can be deceiving, text can be hard to read). Digital Literacy applied directly to VR makes little sense as reading is so much more difficult in most virtual environments, but the immersive literacy of the participants and the designer's awareness of that level of immersive literacy, are crucial factors to ensure the success of the conveyed content.



Figure 1. Microsoft HoloLens (PhD project: Mafkereseb Bekele, Curtin University).

5. Case Studies



Figure 2. Microsoft HoloLens (PhD project: Mafkereseb Bekele, Curtin University).

Unterthered mixed reality devices such as the Microsoft HoloLens allow people to walk around the real world and see virtual images or 3D models, with voice control, gestural control, and genuine 3D sound, manipulate them and see how they interact with their environment, providing a new dialogue between the mixed reality object and the physical surrounds (Fig. 2). However, the project by Mafkereseb Bekele (Bekele et al. 2021; Bekele and Champion 2019) took this further, two people have similar headsets and see the same physical world, but what they see and hear and can move or otherwise interact with digitally, can differ. This can induce visitors to try to decipher and share or even roleplay their own personal views, facts, narratives, or interfaces with others. In this instance, in Western Australia's Shipwrecks Gallery, participants walk towards a display and a map appears before them with a ship on it circling the world (the 1848 SS Xantho, and the museum managed to save and restore to working condition its original steam engine). They can find the related physical engine parts in the museum and move and place them to restore the virtual ship, or they can be given different tasks and views to each other. They then have to work together to solve the relevant puzzle or work out which social role each one has and why they see slightly different mixed reality views into the past. Mixed reality can reveal, merge and separate different views of the same past.



Figure 3. Shared personhood (intern project: Agathe Limouzy, Curtin University/ Toulouse University).

Another experimental project was developed by a French engineering student, who was an intern at Curtin University in Western Australia (Fig. 3). Here though the concept was to share an avatar's body between two people, how would they communicate to make the virtual body move? One person wore a bandana with a leap controller that tracked her hands and passed that information to the screen. The other person was in a conventional HTC headset wearer, and this person could control the legs. Neither person knew what the other was looking at, and yet they had to learn to communicate to successfully move the avatar they both shared.

I'll mention a fourth example that is older than the other three. In 2010 a master's student originally from mainland China wanted to convey the intangible aspects of Taoism (via the stories of the four great arts: painting, music, Go, and calligraphy) to Western audiences. The student chose a hands-free monitor with a touchscreen (Fig. 4) and programmed four games in Adobe Flash that could track the fingertips of the player. The player's task was to draw, paint, compose or write in synch with the theme of the graphics or sound conveyed. Their relative success determined the transparency of a landscape painting that would appear when their task was finished. What most fascinated me was how entranced spectators were of those playing the games, the sense of touch used created a more empathic and memorable experience that also intrigued spectators far more than a conventional monitor and keyboard.





In 2006 I supervised an even older and smaller project which connected biofeedback (thimbles that sat on your fingertips and detected heartbeat and GSR-Galvanic Skin Response) with Unreal Tournament and its various game mods (Champion and Dekker 2011). When a player's heart rate changes or their GSR changes, the game level design, the monsters (Zombies) the music and the game's shaders (filters) could all dynamically change as well (Fig. 5).

When the player was at peace they could see through walls, when scared or angry the zombies became more persistent.



Figure 5. Biofeedback (Andrew Dekker, Honours project, University of Queensland).

5.1 Art, Aesthetics, and Virtual Architecture

What do these small experimental projects or case studies have to do with virtual architecture? They revealed to me that smaller-scale subtle interaction can still induce a sense of atmosphere, that interaction could be more subtle or more pantheistic, and that virtual reality (and XR in general) can more creatively afford, represent or otherwise constrain different viewpoints and beliefs. Game engines, advanced interfaces and sensors can more dynamically and powerfully provide personalized and reactive or calming virtual environments that are effective as processes rather than just as visual candy.

Pollution, the effects of mass tourism, age, or neglect can all be factored into the generation of the building. Visitors could roleplay different characters in a mixed reality environment, and each character might see only their view of reality and must learn to communicate or survive through teamwork.

I had also mentioned above that virtual immersion can mean a subjective (psychological) feeling of being immersed, but in what? In a game, or a virtual world per se as a world (the world of the medieval era, for example). Could it also signify immersion into a *historical* mode, or even being immersed as an

historian? I don't mean here to merely experience a simulation of a past place, but a simulation of a past place and an experiential frame where one acts and operates as a historian. Is there a playful historian's magic circle, and if so, can we communicate this to students? For example, I mentioned to a colleague that "Assassin's Creed: Odyssey" featured Vitruvius. I suggested to him that a virtual world or game could be based on Vitruvian theory and drawings and - in this virtual world - Vitruvius's slogan of commodity, firmness, and delight being the cornerstones of architecture. My colleague immediately reacted that Vitruvius' theory was archaic but he missed my point: we could experience the virtual world conceptually in a way that seems native, localized and highly situated even if the concepts and beliefs driving this past world are no longer highly valued in the present. I suggest this also relates to the importance of culturally significant presence: we can no longer be satisfied with the depiction of past models of architecture, we should aim to convey the values and meanings they contained for their people. There are of course many challenges. The cost and speed of technological change, the sheer lack of art appreciators in virtual realms of art, and questions surrounding the agency and creative vision of the "artist."

In various publications Stephen Davies (1990, 2015) argued that aesthetic theories could be considered to be function or procedure-based: the functionalist view of art is that it is art if it performs a particular function. The procedural view of art is that it is art if it has been created according to predefined rules and procedures. I won't investigate this concept further, apart from suggesting that machine learning and AI threaten to hide the steps and decisions of human designers. Given the apparent power and randomness of recent smart design aids and creative AI tools and the corresponding narrowed human agency, one wonders if the value of art is now lessened for the functionalist as well. In terms of virtual architecture, the apparent functionality is lessened because a virtual building does not need to protect us and itself from the environment. Apparent adherence to procedures is also no longer as clear, for the operations and processes are typically hidden from us.

What is apparent to me, though, is that virtual architecture experiences will become more intelligent, more aware, more personalizable, more directed towards goals, more capable of supporting rituals, and more embodied. To avoid some of the threats I mentioned above, virtual architecture will also need to accommodate more user creation, express and provide (and express) a sense of caring (for property and the environs and each other), new theories and practices of embodiment, and leverage XR's ability to convey processes and afford more experiential realism. Perhaps XR content also needs to "die" or at least fade away.

6. Conclusion

Current definitions of digital literacy are limited in terms of non-literary digital collections and 3D virtual worlds, especially for a wider audience. There are many impressive VR apps (Dutta 2021; Graham 2020) and from a digital humanities scholar's perspective, current game engines are powerful, impressive and engaging. They can import data and create impressive 3D, VR data visualisations, from drones, phones, human 3D designers or free and low-cost AI solutions. While games engage learners, the main game engines are too complex and favour designers with a strong 3D spatial sense. VR is expensive, usually, single-person, requires specialized and seldom portable equipment and MR headsets are more expensive. These constraints have restricted humanities experts and designers from creating successful immersive and meaningful worlds.

Arguably, we have not yet created multiversal and visionary virtual worlds, let alone a dominant Metaverse, but recent developments in AI, graphics, sensors, 3D media formats, enhanced portability and sheer computing power suggest the technology is advancing rapidly. What is not advancing rapidly is rich, satisfying content. And while we bind ourselves to merely advancing the power of XR, the situation will not drastically improve. Virtual reality and its relatives need better content. In terms of architecture, we need to improve our simulation of not just the world around us but also the simulation of the relationship we have to this simulated world. And we need to develop the capacity to convey this depth and sense of care to others while inside the simulated world.

Atmosphere takes time and intent, realism is not merely a simulation of the real, and Internet-based worlds should not be limited by extrapolations from either Second Life or from 19th-century philosophers.

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