Experiential Realism and Digital Place-Making

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Abstract
Despite originating as practical aides for the design of real-world architecture, Computer Aided Design and Draughting (CADD) software initially encountered a great deal of resistance, in part because of their initial expense and apparent technical complexity, but also because they were seen as blunt tools, crude instrumentation inadequate for the artistic expression of place. In March 2004 at an informal seminar hosted at the University of Melbourne in Australia, 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. With all due respect to Professor Frascari, this article will argue the converse: that recent developments in interactive technology offer new and exciting ways of conveying 'lived' and experientially deepened notions of architectural place-making.

Keywords
Games, game engines, place-making, architecture, Mayan archaeology, CADD

Introduction
CADD (Computer Aided Design and Draughting) tools were resisted by the architectural profession for decades (Andia, 2001) and were not seen as greatly helpful to the creative process (Lawson, 2002), and these reports have continued on into this decade (Ibrahim & Rahimian, 2010). Because of their views on the limitations of CADD tools, architects and spatial designers may be similarly skeptical of the artistic and evocative features of virtual places, virtual worlds, and immersive games while game designers might well read articles by architects on game-space and despair (Wigley, 2007).

In my own research I use game engines and low-cost VR software to attempt to communicate the cultural significance of heritage sites. I continually encounter the tension between not just those who preach realism and scientific accuracy and those who believe the focus should be on impressionistic and immersive ‘adventures’ into historical simulations. There is of course a third party, those who want the underlying mechanics of archaeological simulations to engage and provoke students, but even with these three major yet disparate interests (and there may be more) for designers of virtual worlds especially for heritage and heritage there is a central problem that their skill is showcased by the artistic flair of the simulated environment but this artistic flair can impede engagement, pedagogical aims, and scientific realism. And they are not helped by the increasing power and sophistication of game engines and increasingly affordable virtual reality.

Technology is not the impediment to creativity; it is becoming an impediment to accuracy. As Eiteljorg (1998) wrote of the dangers of this ‘sanitized view of the past’:

*Mr. Tressel and I both wrote previously about how compelling the images can be, but we are now seeing images that seem to be photographs on a fairly regular basis... scholars too will find it harder and harder to maintain any scepticism about the accuracy of the images as those images get better and better ... Our reconstructions are also too clean and neat. The real world includes people, animals, plants, trash, signs of age and decay on structures, etc. Here again, we can only include some of these items and make mistakes or omit them and present an antiseptic world that is equally misleading.*
History is not a preciscience, and aiming at visual fidelity rather than cultural significance is actually not in the best interests of virtual heritage (Boskovic, 1997) and at odds with UNESCO’s policy on the importance of intangible heritage (UNESCO, 2010):

The Convention for the Safeguarding of the Intangible Cultural Heritage defines the intangible that communities, groups and individuals recognise aspart of their cultural heritage...intangible cultural heritage istransmitted from generation to generation, and is constantly recreated by communities and groups, in response to their environment, their interaction with nature, and their historical conditions of existence. It provides people with a sense of identity and continuity, and it safeguarding promotes, sustains, and developscultural diversity and human creativity.

This art suggests four points of departure for testing whether fidelity is given or not limitation in the experiencing of virtual worlds. My premises are: sensations are more than aesthetic experiences, history is fluid and not a concrete and invariable objective fact, the most engaging virtual environments are NOT necessarily the most realistic ones, and that computer peripherals and related technologies are beginning to help us produce more personalized, atmospheric and contextually relevant virtual worlds.

Sensations are more than aesthetic experiences

Martin Heidegger (1971) wrote several books on the distinction between aesthetics and artworks. For Heidegger art cannot be simply reduced to being merely responsive to sensations. For example, Heidegger argued that we hear sounds not acoustical sensations, and thus by implication all aesthetic phenomena are actually distillations of past experiences codified and responded to as the outcomes of deliberate, intentional activity.

In his own words (1971):

Much closer to us than all sensations are the things themselves. We hear the door shut in the house and never hear acoustical sensations: even mesounds. In order to hear a bare sound we have to listen away from things, divert our ear from them, i.e., listen abstractly.

For Heidegger there is a ‘thingly character’ to works of art (including paintings and buildings), which is not encompassed by the perception of mere sensations. Inherently, Heidegger’s argument has been recently bolstered by experiments in virtual environments. Researchers have suggested that there is indeed ‘a toolness’ quality to certain objects in virtual environments (Eurekalert, 2003). We may further extend the argument to suggest there is an aspect of ‘thingness’ to our perception of our world that should be considered when we design virtual environments.

In the nineteenth century, empathy theorists viewed architecture as something more than sculptural objects that we can create associations for (Morgan, 1996). The philosopher Anthony Savile attacked architect Richard Foster’s work for the same concept: treating the essence of architecture as sculptural form (Savile, 1993). For that reason, we must not merely think of the objects floating in space. Architecture also involves inner spaces, the linking of spaces (e.g., from inner to outer and the converse), and the placing or locating, using and imagining of symbolic objects (as well as the self and other people) in space.

As well as the ordering of inanimate objects, architecture orders us. Schelling suggested that architecture could be reviewed as clothing, implied that rather than merely acting as a clumsy mass, architecture covers modifies and directs our imagination and real movement. We are in effect kinetic sculpture. To quote Morrison (Morrison, 1988):

Viewers perceived the immobility of paintings in one way by moving into and out of the focal point in front of the works. They perceived that of statues in a second way, by
Architecture is not only a shifting combination of human movement and imagined intention through hinter-related spaces. Architecture uses non-realistic perceptual tricks to convey a sense of atmosphere, or to stoke the curiosity as to what lies around the corner. Such architects include Utzon, Asplund and Aalto. I am naming Nordic architects as examples because in the far north architects had to ensure their buildings kept people entertained during the long cold dark winter. Architectural methods included indirect light to lighten visual massing, no floor barriers, and changes in slope or textures that indicate an important symbolic area is nearby (E Champion, 1993).

The three architects I mentioned were also seen as ‘heroes’ of the modern movement, so any view of modern architecture is the embodiment of rationality and the machine aesthetics is debatable. Spatial illusion was used by many architects of the nineteenth and twentieth century, including early modernists such as Mies van der Rohe who drew heavily on the tricks of artistic illusion, however, much of his supporters might talk of structural honesty. In almost every famous building by Mies the structure was expressed, but only partially. Hidden and unexpressed supports were necessary for the external form to appear perfectly flat and freely floating, such as in the Farnsworth house and the Barcelona Pavilion.

The canonical work of Mies, Le Corbusier, and Frank Lloyd Wright can be viewed as Apollonian in pavilion, but they were contrasted with the Dionysian wildness of national park (the Barcelona Pavilion), French fields (Villa Savoye), and waterfall (Fallingwater). This contrast was described by Nietzsche in his doctoral dissertation written in the previous century on the importance of aesthetic illusion (Nietzsche, 1967).

Architecture may also create the appearance of popularity through the illusion of erosion. In the famous Wooden Crematorium in Stockholm, Asplund sawed into the marble columns so that they would prematurely age, and detailed clocks and lights so that from a distance they appeared to wilt (Figure 1). In his Listr courthouse Asplund created a buried typology; part of a hall appears to bead out classical colonnade, implying the modern courthouse building had been built over another building dating from antiquity and in his Stockholm Public Library he exaggerated the tapers of doors to distort their apparent and to allude to Egyptian architecture.

Figure 1: Asplund’s Stockholm Woodland Crematorium

Yes it is true that computer models, as Professor Frascari remarked in his seminar, do not normally incorporate these illusions and aesthetic contrasts, but this is changing. Partly these techniques are not used because computer models themselves are typically flat and infinitely thin illusions, but we are increasingly seeing not so much digital models on a flat screen as immersive environments that occupy both virtual and physical space.

**Historical interpretation is fluid**

Archaeologists are interested in controversy and the degree of agreement upon accuracy as they are in the historical reconstruction itself (Kensek, Swartz Dodg, & Cipolla, 2002). Current digital reconstructions don’t necessarily show the process by which archaeologists piecemeal errors to scenarios that have taken place. For archaeologists are site detectives. They deduce patterns of behaviour from artefacts, knowledge of other comparative cultures, and by testing changes to the landscape anthropologists and archaeologists may develop their own ‘detective knowledge’ of past culture which is not accessible to the general public via either trips to the actual site or through tourist literature.

What may surprise the general public is that archaeologists are also very sensitive to the
Embodied and physical nature of their work, I am constantly asked how to employ virtual reality and haptics to ‘feel the earth’ of a site. We have not fully tackled this in virtual environments, perhaps because virtual heritage showcases are staggeringly hermetic and inflexible, but this is also changing (E. M. Champion, 2002) and there are interesting explorations of other media to help convey the sense of site (Eve, 2012).

Fidelity can be seen as faithfulness to obligations, duties, or observations. It may mean an exact correspondence with reference, time, condition, reference, or accuracy. It may also refer to the degree to which a system accurately reproduces the sound or image of its input signal (Anon, 2015a).

Yet in virtual heritage projects, the fidelity is not conceptually or even physically faithful to the past. Fidelity of reproduction is often high-resolution capture of the static remains residing in the present, using scientific extrapolation of past circumstances through analysis of remaining data, or anomalous evidence on a singular, historically situated, archaeological insight.

Virtual environments don’t tell us how the local past inhabitants modified or interacted with their environment or how the alien perspectives of viewers. We could argue that the missing factors are hermeneutically embedded in the interpretation of the interpreter as well as the world of the interpreter in the original meaning of the text or object of art (Gadamer, 1976).

For example, the philosopher Hans-Georg Gadamer wrote that one couldn’t negate the temporal and spatial difference of reader and reading, for that implies that modern humans, as in the Enlightenment view of humanity, can separate a modern human from their historical background. Reflection cannot hold a distance and objectify the past, for the present is always given. ‘To be historical,’ Gadamer asserted, ‘means that one is not a subject of oneself, one’s knowledge’ (Gadamer, 1976, p. xiv). Given the constants of normative issues in history permeate our understanding of place and cultural identity (Andrews, Bratton, & Lewis, 2000; Graves-Brown, Jones, & Gamble, 2013), virtual environments with historical content should also somehow communicate these varying levels of certainty and agreement (Kensel et al., 2002) while being aware of different audiences (Wineburg, 1991).

For a more direct discussion of how historical interpretations do not so much fix as fight over notions of place, please consider reading the geographer Doreen Massey (Massey, 1995) or the philosopher Ed Casey (Casey, 2013).

Engagement versus realism

Part of the problem of discussing virtual environments has been the many shifting meanings of virtual and virtuality. Sometimes the virtual has been conflated with the digital when in fact it is a Middle Eastern term derived from Latin virtus, and actually predates it (yes digitus is also Latin, but Latin for toe).

Virtuality can be defined as existing or resulting in essence or effect though not in actual fact, form, or name: the virtual extinction of the buffalo. It may refer to that which exists in him, especially a product of the imagination (used in literary criticism of text). In Computersciencemay meanathatwhichhiscreated, simulated, or carried on by means of a computer or computer network: virtual conversati ons in a chatroom (Anon, 2015b).

In popular use, the meaning seems to be a confabulation between the word ‘virtual’ meaning to have the effect of he’re a real without actually having material or form and does as a synonym for the word ‘digital.’ Further, ‘appears true or believable could mean, ‘an object looks like something that really exists’ or ‘I can believe that this exists’.

As discussed above (Eiteljorg, 1998), sometimes realism is conflated with visual fidelity but it could also mean conceptual fidelity. Consider the experiential realism of immersive computer games. I might believe something exists and is ‘real’ even if it does not look ‘realistically’ like anything I know; as long as I believe it may affect me (Thompson, 2000). So when wetalk of limitations applied to virtual environments we may mean that fidelity to the real world is conceptually rather than visually realistic. Realism has its uses, but sodoes the expanding of perception and cultural understanding. The virtual environment designer can modify the information affordances to highly selective (more appropriate to the learning curve of the audience), interaction patterns can be shaped to be metaphorical and dramatic rather than god-like (omniscient and omnipotent), or designers may deliberately reduce the cognitive loading required to complete tasks.

At ACADIA 2001, Kalay and Marx defined eight types of virtual places but their paper may lead to some designers believing the classifications were both descriptive and prescriptive (Kalay &
What do the above technologies and techniques promise for the public’s experience of virtual

cultural environments? The ever-evolving field of virtual reality (VR) and augmented reality (AR) holds
promise for enhancing the user experience in various domains, from education and entertainment to
museum exhibits and historical reenactments.

In response, at ACADIA 2002, the author and Bharat Dave proposed a new
categorization of virtual environments (E. Champion & Dave, 2002). We proposed that virtual
environments could instead be classified by the overall design goal.

In this framework, the first and typically easiest virtual environment to design is visualization-based.
This type of environment focuses on providing for activities, and the third (and most difficult to design)
allows participants to decode, interpret, and possibly even create ‘inscriptive’ (hermeneutic) environments.
Our hypothesis was that virtual environments (and digital archaeological reconstructions in particular)
would more engage if they are capable of engaging the user in a world of interactive but culturally
constrained social communication.

An important distinction to make here is that simply flooding a virtual world with other players
does not create a sense of cultural presence, but of social presence. Museum research has indicated
that realistic but non-interactive installations of virtual heritage projects may bore the audience
(Mosaker, 2001) but allowing participants to talk to each other in a virtual heritage world may improve
the sense of engagement at a cost to cultural presence.

To put it another way, if we allowed participants to appear in avatar form as typical tourists, and
to chat about whatever they liked in an online world, this social presence of like-minded
others may destroy the cultural immersion necessary to understand the virtual environment
from a historical and locally constrained perspective. If we instead give them contextually
appropriate goals rather than let them wander around at will (i.e. as travellers or inhabitants
rather than as tourists), and provide contextual constraints and affordances (just as some
games do); this may actually increase their enjoyment and also their understanding.

However, much presence research has been focussed on general virtual environments, and
contextual information on what works best for specific types of virtual environments seems to
have been less of a priority.

This is a chicken and egg situation, designers wish for more generally useful guidelines, but
universal findings derived from experimental conditions are less likely to find out what
specifically appropriate interaction works best (Turner, 2007). More research is needed to
determine which forms of interaction and type of depiction are more compelling, task-effective,
useful for cultural presence, and optimal for learning purposes.

More atmospheric virtual environments

Computers may appear to be too exact and yet game engines can produce fog, human
physiology-based game shaders, texture-based erosion, people-based erosion, and artistic
visualization. Even Autodesk is producing a game engine; architects are now using game-
engines for real-time interactive virtual simulations. Computer peripherals are beginning to
offer up more personalized, atmospheric contextualization thanks to biofeedback (Figure 2),
hybrid display equipment, physical computing and projection mapping, camera tracking and
Head Mounted Displays. These new technologies along with the Internet of Things, promise
more engaging incorporation of disperse sources of information databases and sensor-based
data.

Figure 2: Biofeedback that changes the atmosphere, shaders, gameplay, AI, and music

Apart from hardware, some of the techniques used in computer games may
help. Director indirect lights might glorify pro-ness or sound
someone when participants approach important paths or tools. As with action-based
cellular games there can be damage areas, territory-based factors, and sacred spaces that
are off limits or change the navigation or exploration capabilities of the participants. Avatars could change
their appearance or ability to perform tasks at certain times or in proximity to key objects and events.

When more culturally embedded perspectives are required, one could also use memory-based
mapping (two-dimensional maps of the local area fade in and out depending on how long ago
the actor was there) so that the actor is not
cognitively overloaded. Overlays can also be used to highlight objects or add task-related character-

Place-making

What do the above technologies and techniques promise for the public’s experience of virtual
environments?

I would agree that even though technology is now promising unlimited virtual universes (Parkin, 2014) it does not by itself explain and demonstrate how places inside these virtual universes are places. This lack of detail is also obvious even in games and other virtual environments which offer some degree of personalization and user-modification (Quiring, 2015) but I suggest an even more fundamental issue concerns our understanding of place-making rather than the power and accessibility of the technology at our disposal to create or evoke it digitally.

For example, the academic literature on virtual worlds (Thomas & Brown, 2009) commonly references place-making, but without detail or prescriptive design guidelines or even clearly explain how digitally replicated space (on different computers) can possibly be equivalent to physically and experientially shared space between people. Information Sciences can provide extensive surveys on place-making and ‘sense of place’ definitions based around a notion of ‘a space that has acquired meaning as a result of human activities’ (Arora & Khazanchi, 2010) but once they actually design virtual places how the researchers can ascertain the activities that take place are genuinely experienced inside the virtual place and are genuinely meaningful to the participants is not demonstrated.

Even in the architectural publications that focus on virtual place-making (Gu & Maher, 2014; Tan & Yee, 2009) design guidelines are vague or high-level. Anthropologists who write about virtual world design seem to focus more on the designers and their politics rather than on the actual experienced inhabitation of place (Malaby, 2011). So I suggest part of the vagueness around virtual place-making is due to the vagueness of the subject rather than technological limitations.

The more traditional academic literature on real-world places may appear archaic or contrarian (Erik Champion, 2005), but in general focuses on place affording a sense of insideness (Heidegger, 1971).

Although Casey (Casey, 2013) disagrees (and with good reason) that this is always required, I think we can say that in general place surrounds us. Following Relph (Relph, 1976), we can also argue that place allows people to engage in activities which in turn leave marks on a space so that it is identifiable to others. So place has a spatial identity and presence, affords room and clues for activities and can be interpreted to identify its typical use or the behaviour or identity of its users.

I have said that real-world places typically surround and provide boundaries, but they are also spatially complex even if they are thematically unified (and this is one of the great challenges of architecture; to thematically link yet artistically separate functional spaces from symbolic places is not trivial). Place as a spatially enclosing experience would be a challenge to fully recreate on conventional computer displays.

Real-world places are also multimodal, contestable, and re-interrelated (Massey, 1991, 1995) and our personal preferences and abilities to receive and appreciate these different place sensations also vary over time. So places are not static objects and they require interaction with the observer for the latter to understand and experience places as filtered and filtering processes rather than simply as designed products.

Real-world places are inhabited and experienced by us as bodily sensations and even as extensions of the body. They change dynamically according to climate, weather and extreme or gradual events of nature. Not only do they change, our memory of them changes. Our experience of them may also be affected by our changing experiences of other places.

Given the above, how could we create a more immersive yet beguiling sense of place, rather than merely a space in which objects are ordered purely because of their size, shape and position? There are design techniques that could be better employed to help virtual environments be experienced more like places and less like spaces. The first and most obvious technique would be to better employ peripheral space. Conventional video games were displayed on flat walls, but we can use new software to project them across multiple surfaces and on curved displays to engage peripheral vision and increase a sense of territoriality and general embodiment (Figure 3).

**Figure 3: The Cylindrical Stereo Display At Curtin University, HIVE**

Secondly, real-world places are full of thresholds and interstitial space (Bridges & Charitos, 1997; Graham, 1998). Consider a medieval church, before you enter the main room of the
church you typically have to enter a very small space, the relatively cramped foyer or vestibule increases the apparent sense of space of the main hall. Interstitial space is more the space between floors, and many computer games have collision problems when spaces intersect, but coding can ensure that when there are collision issues the player is teleported to another less troublesome location.

Thirdly, immersion is more powerful when vision is supported by another sense (touch, taste, hearing or smell). Research into presence in virtual environments suggest the importance of augmenting vision with other senses, such as touch (Biocca, Kim, & Choi, 2001), sound and smell (Maeda, Ishibashi, Fukushima, & Sugawara, 2013; Ramic-Brkic & Chalmers, 2014) or other environmental triggers such as floor vibration (Feng, Lindeman, Abdel-Moati, & Lindeman, 2015).

Fourthly, embodiment and inhabitation (to create a sense of scale and outlook) is important to reduce an impression of a flat and empty world and will be affected both by the content and the display technology (Creem-Regehr, Stefanucci, & Thompson, 2015; Glenberg, Witt, & Metcalfe, 2013).

Fifthly, virtual environments could follow the lead of roleplaying games that feature changing climate and topography which affect the avatar. Virtual environments don’t typically have ‘experiential comfort zones’ but such zones would great more variety and interest. Video games where climate, weather or topography affects the ability or experience of the player’s avatar include Bethesda’s Elder Scrolls (Oblivion and Skyrim), EA Digital Illusions Frostbite 3 and Hinterland Game’s The Long Dark. Commercial video games already feature weather that affects the gameplay (Fahey, 2014), the next step is to leverage these technical features in order to evoke a richer sense of place.

**Case study: evaluation of Palenque**

*Figure 4: The Warm-up Screen for the Palenque Prototype*

For a Lonely Planet-assisted PhD project, I attempted to test these assumptions by modeling and scripting a virtual heritage project with three different interaction modes (Figure 4). Thanks to the help of Australian and American archaeologists, I was able to design virtual learning simulations of the Mayan temple City Palenque in Chiapas Mexico. In Adobe Atmosphere (a Second Life like world designer than ran as plug-in inside Internet Explorer), I created three different modes, in order to evaluate whether cultural learning was best afforded by activity, by observation, or by talking to others (scripted avatars). In order to separate game-like activity from the more straightforward archaeological learning simulations, I gave the participants the option of teleporting through Mayan portals to the more mythic and game-like environments when they finished each task in each of the three archaeological learning environments.

One mode was action-based, and the participants had to push back slabs to find the hidden tomb (this was actually what happened in the discovery of the Tomb of Pakal under the Temple of Inscriptions). If they man aged to push back the sarcophagus lid of Pakal when they reached the tomb, a portal appeared that took them to a reconstruction of Palenque’s Ballcourt (the Mayan Ballcourt symbolized warfare, life, and death, the growth of maize, and the victory of the Mayan ancestors over the Lords of the Underworld, Xibalba).

The second mode was observation based only, and participants were asked to find artefacts located in the large and navigationally confusing Palace. In the third mode, the three major temples of the Cross Group had scripted guides, representing a Mexican tour guide, King Pakal, and his son. Their movements and speech were proximity-based, and they got angry or fell over if participants ran into them. The goal was also to click and read information relating to the giant inscribed tablets in each of the Temples. At the end of the experiment people were asked to answer six questions for each interaction mode, to see if they had learnt and were able to extrapolate information from what they had seen.

Evaluation results were conducted using a stage one archaeology class of forty-three first year university students, and twenty-four more experienced participants who were either virtual environment designers or cultural historians with an interest in virtual heritage.
They were also asked if they noticed the mountain they were on was actually a giant crocodile (the Mayans believed the world was created from a crack in the back of a caiman or turtle). Not a single person said they had noticed unless it was pointed out to them or they had fallen off the mountain.

In the Mayan Village world, users could select an avatar (a three dimensional representation of themself) that was either one of four western-style backpacking characters, or an avatar in local Mayan dress. Photographs of real people available via the Lonely Planet Images database were mapped onto the face of each avatar.

The Mayan avatars were also sized appropriately (less than five feet tall) and only by changing into that smaller avatar were participants able to explore the interior of the Mayan huts. The aim was to find the other participant by orientating themselves against large Mayan carvings in the jungle.

They were then asked to find the village using the interface guides and the sound of music. If they walked straight into trees, their avatar slowed down and cried out in pain. Which objects they found and how quickly they found them was also automatically recorded. Participants were asked at the end the relative sizing of the avatars and the results are being statistically compared to how well the participants answered other questions.

In the Mayan Cave world, when the avatar walks into the water, they automatically start swimming under water, blue fog appears and the sound of bubbling water drowns out the ambient Mayan music. If the participant does not keep pressing the forward arrow they slowly ascend back to the surface of the water. By finding, collecting and then dropping artefacts at a hidden shrine, a Mayan sky-snake appears and so does a portal that takes them back to the start.

In the Mayan Ballcourt world, each participant turned into a Mayan ball player, and was asked to try to get the rubber ball to touch the hoop. If they did so, thunder and lighting were triggered.

As this article is written to discuss the issue and relevance of realism and fidelity to virtual heritage and architectural history, the results of the experiments have been presented in more depth elsewhere (E. Champion, Bishop, & Dave, 2012). However, we can make mention of several interesting findings from the experiments that may bolster some of the arguments already discussed.

Although participants indicated they preferred the archaeological environment to the more imaginative environments, it was harder to stop the participants from continuing past the time given for the game-based worlds rather than the archaeological worlds. This was true both for the students and the practitioners.

They were also asked the question 'In future which would you like such environments for?' and the results are as follows:

<table>
<thead>
<tr>
<th>Answer Chosen</th>
<th>Students</th>
<th>Practitioners</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A  Tosocialize with friends.</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>B  To explore on your own as a scientist and accurately reconstruct.</td>
<td>13</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>C  To experience the aesthetic experience of that particular place through digital media.</td>
<td>16</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>D  Not decided either way.</td>
<td>11</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>24</td>
<td>67</td>
</tr>
</tbody>
</table>
The students in particular were keen to explore all the capabilities of the avatars rather than the archaeological modeling they were meant to be interested in. Some wished to know what parts of the environment and others they could find and destroy. It is possible that the closer to a game we design virtual heritage projects, the more genre-trapped they become, persuading the student to see them only as a game, and a destructive one at that. However, the results above indicate that even many practitioners as well as the majority of students are keen to explore more imaginative versions of virtual heritage sites.

**CONCLUSION**

While we may have initially praised virtual reality for not being constrained by limitations, the continued success of games that are based on challenges and thematic constraints have shown us that limitations may be desirable rather than a necessary evil. Technology can create artificial freedom, but it is a shallow type of freedom if there is nothing to escape from. So embodying and socially embedding a visitor in a virtual world may at first seem more confining than the liquid freedom proposed over a decade ago for virtual built environments (Novak, 1991) but it may actually improve the user experience rather than detract from it. While clear and cohesive evaluations of why certain places appear to be rich and meaningful may elude us – for how do you test the experience of a city in a laboratory – virtual worlds and other types of digital environments still require places if they are to be memorable, rich experiences and returned to.

Place-making is experiential, the success of organically developed historic towns versus the criticism of modern architecturally designed urban spaces should remind us that uniform design frameworks may look aesthetically pleasing but they are not necessarily experientially fulfilling. While architects can create wonderfully evocative and atmospheric sketches, the built environment seldom conveys the spirit of their doodles and visualizations precisely because the imagination is not required to look past the lines and the dots, the experience is already filled in. So my response to Professor Fascari is not so much a negation of his criticisms as a request for reflection. To suggest that digital technology cannot be evocative or memorable is to avoid the real issue: how do we digitally design or otherwise afford a sense of place? That said, I don't suggest there is any one concrete and clear definition and prescription of place. I have suggested five aspects of place that my students and I have attempted to evoke in our projects in order to break down the spatial monotony and shallowness of many digital environments, I am sure there are many more aspects of digital place-making to explore.

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**References**


