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Real and Virtual Places

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When Windmills Turn Into Giants: The Conundrum of Virtual Places

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Abstract

While many papers may claim that virtual environments have much to gain from architectural and urban planning theory, few seem to specify in any verifiable or falsifiable way, how notions of place and interaction are best combined and developed for specific needs. The following is an attempt to summarize a theory of place for virtual environments and explain both the shortcomings and the advantages of this theory.

Introduction

What is Virtual Reality (VR)? According to Schroeder (1996, p. 2) it is "often taken to refer to a computer linked to a head-mounted display and a glove. VR systems give the user a sense of being inside a computer-generated environment and of being able to interact with it." The head-mounted displays (HMDs) track where the user's head is looking and update the virtual scene accordingly. While pictures of HMDs grace many computer science labs, few will readily admit they are typically low-resolution with limited field of view, can damage vision (especially in children), have latency problems (Brooks, 1999, p. 19) in updating the screen quickly enough, are typically wired (so the user cannot easily move freely) and the HMDs with good screen resolution are fiendishly expensive.

Due to some of the difficulties of expensive "VR" equipment, I am going to refer to virtual environments rather than to VR. VR has many sci-fi connotations that are often best to avoid and I also wish to talk about the virtual environments commonly used by people, viewed on desktop computers and not via head-mounted displays.

Arguably, the only successful virtual environments so far have been games, flight simulators and architectural walk-throughs. However, commercial success does not necessarily mean that these examples are successful virtual instances of "place." For example, Weckström has recounted how a class of Media students at Arcada in Helsinki found virtual environments "sterile." They surveyed simulators, chat-worlds and games, including *Microsoft flight simulator 2004, TRANSIMS Visualizer, Habbo Hotel, The Sims Online* and *EverQuest*. As a result of this analysis Weckström (2004, p. 38) declared:

> …a virtual world has to support the following factors: there has to be a feeling of presence, the environment has to be persistent, it has to support interaction, there has to be a representation of the user and it has to support a feeling of specific worldliness.

So there are elements of real places that somehow have been left out of virtual environments. Many writers, frequently from architecture, have made the distinction between place and cyberspace (Benedikt, 1991). Some of these researchers have further attempted to propose

features that are needed for place making (Kalay and Marx, 2003). However, they have listed all the features that create a sense of place, not which features create a sense of place for specific audiences and conditions. It is obviously impractical to attempt to provide all place-making features when one designs places for specific purposes, especially considering that real world places do not typically use all these place-making elements. Are there unique aspects to real places as opposed to virtual places?

Realism, Agency and Experience

Perhaps at a conceptual level *place* is fundamentally different from *space* (Harrison and Dourish 1996). It is not however immediately clear to me how a theory of place can be applied to the success or failure of both designed real places and virtual places. Not all virtual environments are intended to be realistic simulations of the real world. And even the most accurate, realistic and powerful virtual environments do not necessarily produce a corresponding increase in user enjoyment (Mosaker, 2000). Such research indicates that lack of engagement have been due to a lack of meaningful content rather than to a lack of realism.

The use of realism may actually cloud the message that the content needs to get across (Mosaker, 2000; Gillings, 2002; Brown and Bell, 2004). By concentrating on achieving photo-realism rather than on understanding any unique capabilities for digital media to enrich the user-experience, some researchers are concerned that the playful potential experience of digital media could be under threat (Brown and Bell, 2004).

To further complicate the matter, many virtual environment designers may desire to allow the visitors to interact or collaborate in the place in a way appropriate to that place rather than to personal tasks or conceptions held by the visitors. A sense of being engaged with different local cultural perspectives is not always possible as a real-time 'tourist' or 'student' (Cipolla, 2004), hence we may, for example, wish for visitors to a virtual environment to encounter mythical or culturally specific perspectives of reality. Digitally mediated technology can attempt to reproduce existing data but they can also modify the learning experience of the user through augmentation, filtering, or constraining. They may also be used to communicate a certain experience, or aesthetic sensation. So attempting realistic places is not always conceptually required, let alone technically possible (especially if being streamed over the Internet).

But the second major issue, once we have solved how the place is to be depicted, is how to interact with it. Not only do people learn through interaction, they learn through watching or inferring the interaction of others. And their interaction and traces of their interaction may interfere with the experience of others. We may or may not wish to see how people have tried to annotate, augment, or vandalize virtual places, but we may not want to be pushed around or obstructed by them. On the other hand, if physical collision is not enabled, we may not feel that we co-inhabit an actual place.

Traditional usability studies will not fully explain the huge recent popularity of online multi-player games (MORGS), nor will they tell us how to create meaningful interaction. Many of these games are crying out for help from HCI specialists to design improved interfaces, they do not necessarily create entirely new forms of narrative or cinematic innovation and yet they are still commercial successes. And unlike a typical software package, which ideally is designed to be easy to learn and easy to master, a virtual place is elusive in boundary and contrary in nature: humans often wish to experience both the periphery and the center, simultaneously. Similarly, a

digital game is often designed to be challenging, difficult to learn, and difficult to master (Brown and Bell, 2004). Does it follow then, that these game-worlds are places? Not necessarily, for if a game is perpetually challenging, it will not help afford typical symbolic elements of place, such as rest, stability, shelter and identity. There must be a spatially (and perhaps chronologically) locative distinction between activity and rest, which the player can choose between.

The issue of agency, the degree of interactive control and how that interactive power and interaction history is communicated, is a central concern of game design. However, game designers cheat, using thematic notions of fantasy to ignore, restrict or expel interaction that is too time-consuming or computer memory-intensive to develop or process. Players in a game are consciously entering a make-believe world, so a game designer has more freedom to abstract and reduce extraneous detail.

The issue of fantasy as an important, perhaps necessary game design component was observed over twenty years ago by Malone (1982). Malone explained that HCI traditionally seeks to design software that is easy to learn and easy to master, but noted the founder of Atari said games are designed to be easy to learn but difficult to master. Malone argued that computer games are more like toys than other software applications, which in turn are more like tools. Unlike shopping web pages, or software designed for office use, games have goals but they do not have to have clear outcomes. They do however incorporate challenge and fantasy, and stimulate curiosity.

Based on his empirical studies, Malone stated that fantasy, curiosity and challenge enabled games to entertain and to captivate. He defined fantasy as incorporating emotionally appealing features, or well mapped cognitive metaphors. Curiosity is an "optimal level of information complexity." It may incorporate randomness or contextual humor. Challenge is based around "a goal whose outcome is uncertain," as there is often variable difficulty level or multiple goals (potentially distributed over different levels). Challenge is not merely about making things difficult, but also making these barriers tantalizing, enticing players to surpass them.

Figure 1: Screenshot of The Elder Scrolls IV: Oblivion by Bethesda Softworks

For example, two of the most popular computer games have been *The Elder Scrolls IV: Oblivion* (single player medieval-styled quest fantasy for game consoles and computers) and *World of Warcraft* (an online multiplayer role-playing fantasy). The degree to which players can choose their character attributes, magical star sign and class, allows them to undertake the game using a myriad of skills and strategies (steal, fight, bribe, trade, charm, enchant, or heal), in order to solve a variety of challenges. They do not buy these games because the games are programmed to have conditions and triggers, they do not play these games because the games are rule-based systems; they play these games because the games *challenge* them to change the world and to explore how these character roles embody and express aspects of their own personality.

Juul (2003) defined a game as "a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome and the consequences of the activity are optional and negotiable." Salen and Zimmerman (2003) also wrote that "A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome."

Where is the fun in that? Definitions of computer games as systems, do not address why users find games enjoyable. Despite being in relatively recent publications, these definitions do not directly lead us to producing better games (or, in my case, virtual environments), that users enjoy more. Malone's paper reminds us that games are not played *because* they are systems, so defining games in terms of rules-based systems does not shed any light on the user experience.

What is also striking about computer games is how they can motivate people without explicitly showing them what lies ahead. These games are mysterious knowledge structures that loom out of the dark, closed portals surrounded by long-lost instructions, or meeting grounds of conflict and competition where players do not actually know what happens next, only that there is the possibility of eventual success.

I do not however wish to suggest that challenging digital places are infinite in scale or detail. Even if technology allowed us to create limitless space with infinite power, the lack of constraints may actually bore people. While we may wish to wander through eternal lands, with eternal space we may never find interesting things to experience, we may never meet other humans. If there are too many activities, we may also feel overwhelmed. The possibility that people will be overawed, cognitively overloaded, or even physically exhausted by the technology, is another layer of difficulty in designing virtual places.

To avoid discomfort or boredom, can we evaluate the experience of place? Real places are experienced as a gestalt. And the closer virtual places are to environments, the more that intentions, expectations and experiences may vary spectacularly, according to the differing needs, memories and associations of patrons, users, or clients (Slater, 1999; Mitchell et al. 2000). Such issues compound the difficulty of evaluating whether people thought they were in a different place, rather than staring at a computer screen. For example, Slater (1999) has noted:

> This 'experiencing-as-a-place' is very much what I have tried to convey as a meaning of presence in VEs: people are 'there', they respond to what is 'there' and they remember it as a 'place'. If during the VE experience it were possible to ask the question 'where are you?' - an answer describing the virtual place would be a sign of presence. However, this question cannot be asked - without itself raising the contradiction between where they know themselves to be and the virtual place that their real senses are experiencing.

I don't believe it is a radical claim to therefore suggest there is a shortage of research integrating theory and practice on how best to augment or invoke the context-specific user-experience of place through interactive digital media and others have agreed with me (Gillings, 2002; Weckström 2004). Why do we still have these problems? Partially this is because we are still debating what exactly "place" means, connotative wording and personal agendas are heavily implicated in this debate, a great deal of money has been paid to create and present rather than evaluate virtual environments and virtual environment technology has struggled to provide either a unique "killer application" of place, or directly testable results that show a theory of place can directly help create a better experience of a virtual place.

Designers Require Useful Guidelines

Research into place-making can be described as involving three stages, critiquing the absence of place, prescribing which elements of place are needed and evaluating and extending place-making in virtual environments. For the sake of simplicity, I would argue that the first stage was reached as recently as the mid nineteen nineties. However and despite the increased power and sophistication of technology, we are still somewhere in the second stage of theorizing which elements of place go where. Part of the problem is perhaps that the critical literature is so far descriptive rather than prescriptive. That is, it describes what is wrong or missing with virtual environments, but not how to test possible design solutions.

A paucity of clearly defined concepts prevents designers from developing appropriate place making elements for virtual environments. The challenge of selecting appropriate place making features is not helped by the slippery (and circular) nature of language in the literature and discussion of virtual environments. Perhaps part of the problem is that social notions of place are thematic, symbolic, and circumscribed by habitual use or social ritual. Yet until recently, many designers considered the degree of visual correspondence between real and virtual worlds as a sufficient measure of successful virtual environments. For example, Kalay and Marx use such a scale to classify 'cyber' environments into the following: hyper-reality; abstracted reality; hybrid cyberspace; hyper-virtuality (Kalay and Marx, 2001). However, terminology based solely on appearances or delivery does not explain the aims of designers, the goals of users, or the interactive content that arises out of virtual interaction and interpretation between users in their attempts to solve tasks.

As a provisional answer to the above problem of classification, I wish to suggest five major features of place that could be but often are not addressed in virtual environment design. One caveat: while these features may not be held by all places, most places have at least a few of these features.

Firstly, real world places are dynamic and changeable. Their boundaries may be vague and amorphous. To replicate this effect in a virtual environment we may need to simulate or suggest attenuating environmental forces (for example, wind, fog, rain, directional and dynamic lighting, sound, perhaps even varying vision acuity). Games are beginning to develop this dynamic environmental change. Some games, such as *Black and White*, even updated the game environment with actual local weather conditions via the Internet.

Unfortunately, game environments are not permanently changed by weather conditions, virtual weather is not erosive. And erosion may or may not irritate people who gather in virtual worlds to meet and share information. If erosion was based on random weather patterns, it may add to the variety of the backdrop, but if it obscured understanding of a conversation (through storms or wind), or if erosion of the virtual world accelerated due to the number of players or the passing of time, a popular virtual world would be a short-lived one. This does not make immediate commercial sense for the creators of social virtual environments.

Secondly, places can range from the comforting to the uncanny, the sublime, to the terrifying. Scale, detail, atmosphere replication, or phobic triggers, heighten the *experiential realism* and are often used in computer games. Unfortunately, what scares one person may not scare another, there are ethical issues in evaluating virtual environments that deliberately terrify, and people become used to the atmospheric triggers or may simply turn the sound down, defeating the purpose of the design.

Thirdly, place is full of references and evocations of related places via the movement of people and their artifacts. It may also evoke images of its previous self, related activities, or other places. Programmers could incorporate a way of triggering past associated environments or events that the virtual environment thinks a visitor has been to. This is perhaps one of the most challenging yet interesting of place-attributes, how to create place-associations. One immediate problem is that the camera view may capture a view of the virtual environment, but that does not mean the viewer is looking in that specific spot or finds it particularly memorable.

Fourthly, place constrains, suggests and localizes activities. The constraints may be highly variable and affect the physical, conceptual, or cultural sides of human experience. This in turn means that place frame communities-ideally one could read a place from the way it frames individual ritual and communal activity. Addressing this feature of place may go some way towards creating a social 'world' which (perhaps counter intuitively) actually limits rather than frees a visitor. The phenomenological world defines itself through limitations and constraints; it is the complexity and interrelationship of these constraints that create opportunities for strategies, not complete agency. Unfortunately, not all virtual environment designers seem to have understood this, preferring to see virtual environments as limitless possibility rather than as an imaginative balance of affordance and constraint (Novak, 1991).

Finally, places are recordable and can be identified through use. Generally, dystopias can be identified by how they do not change according to human use and erosion. Normal places (topias), on the other hand, gain their unique character through the passage of time and use in relation to the ebb and flow and interaction of dynamic physical and climatic changes. As I have noted, real worlds have the ability to be affected (modified) by dynamic and unpredictable environmental forces. Further, the real world is permanently and uniquely changed by our interactions with it. Just as every copper roof changes its patina as a result of the local climate and pollution, so too every page of every book we touch is permanently modified. Research has indicated that one of the pleasures of books is the ability to mark it (Ruecker, 2006), so why not allow this with virtual places? For a real place is a conscious and subconscious palimpsest of our interaction with it.

The above summarizes how five types of place-experiences may be conveyed via digital media. Yet this approach may compel the designer to overload their virtual environment with every possible place feature. The danger of such an approach appears to be already happening in some of the academic literature (Kalay and Marx, 2001; Nitsche et al. 2002; Kalay et al. 2004). Real world places only have some place making features and practical considerations suggest we only create those place features that most effectively trigger the required sensation of place. With this in mind, we can also approach place-experience through designing for different types of audiences and intentions.

Types of Virtual Environments

The simplest stage of visualization is capturing and manipulating and visualizing three-dimensional objects, a more advanced stage is the ability to navigate through landscapes. Technology now allows us to capture adequately realistic detail and to mimic more accurately physical laws, so this type of digital environment, while achievable and useful for various scientific purposes, only represents spatial configurations and navigation through them. But is this not enough for virtual environments and therefore for virtual places? After all, due to the success of architectural computing-based models, it has been suggested that Virtual Environment design be informed by architectural and planning theory (Kalay and Marx, 2001). It might be argued that Computer Aided Drafting (CAD) applications are directly synonymous with building three-dimensional digital environments and therefore the CAD programs used by architects are tailor-made for designing virtual environments.

My concern here is that CAD was designed to get buildings built, to quantify rather than qualify the architectural experience. They show static additions to the environment, rather than environmental changes acting and interacting over time. There is no fog, no dirt, no wind and

often even no people (Figure 2). Yet the real world experiencing of architecture is always mediated through a dynamic and imperfect sensory interface: our minds and our bodies.

Figure 2: An archaeological visualization of a 19th Century mining town with real-time rendering. Without people or dynamic environmental forces, the place lacks human scale and seems to float.

More than a straight visualization of objects, an activity based virtual environment allows one or more users to alter some character or element in pursuit of a defined goal. Activity-based virtual environments allow activities to take place. Many are games or training programs, which are arguably the most commercially successful type of virtual environment. They can also appear to have 'atmosphere'. There are tasks to complete, navigation reminders, inventories, records of interaction history (such as damage to surroundings) and social agency (such as real or computer directed opponents). These features of games could be employed in creating effective virtual environments as a form of performance space and some designers have worked from this idea of 'place' as purely a container for an activity. Yet 'place' is the very reason why we should treat the spatial experience as part of the learning experience, otherwise one may ask why conventional two-dimensional media do not suffice. For three and four-dimensional media add an extra feature to learning environments: we can interpret the habits of other *embodied* agents as they attempt to orient themselves in the [virtual] world.

This three-dimensional interaction with a world can also create erosion that signifies embodiment. Being able to see how our appearance or interaction is perceived as human by what appears to be other humans may help create a sense of *social presence*. Recent research has shown that the spatial distances we create between ourselves and others is reflected in how we space our avatars in virtual environments, "Male avatars (whether created by a man or a woman) stood further apart than female avatars, for instance, and were more likely to avert their gaze... Men are also less likely to maintain eye contact. And both sexes will reduce eye contact if the person they are talking to gets too close..." (Giles, 2006).

However, I believe that the notion of place helps create a related sense of *cultural presence* which does not necessarily have to rely on the apparent existence of other sentient beings in the same virtual space, but it does rely on material manifestation of their customs and values that affords interpretation. They do not however have to speak or use the same language or visual symbols as us. An idea of cultural presence may mean that people with a similar or different cultural perspective to ours, can occupy a place and be identified as like or unlike, by us and therefore allow us to be present "in a place that has some present meaning" (Slater, 1999). Of course a place may also suggest a past and now lost meaning. As Relph (1976) noted:

> The identity of a place is comprised of three interrelated components, each irreducible to the other, physical features or appearance, observable activities and functions and meanings or symbols.

So the third type of environment identifies us and our personal form of physical embodiment through how we modify artifacts and the environment. Ideally, it identifies us as well as helps us understand the identity and intentions of other intelligent beings through how they appear to have modified artifacts and the environment. For either purpose, it caters for symbolic interaction. This third type of environment is thus like a symbolic stage or palimpsest. It may either allows us to express our identity and intentions to ourselves and to other people, or it allows us to feel that we can interpret identity and intentions of others through how they appear to have modified and personalized the environment to better express themselves.

In order to create a virtual environment with Relph's third notion of a 'place' (a region recognizable to a user as a culturally coded setting), we need to have more than merely identifiable or activity-based virtual environments. A place can also carry cultural indications of inhabitation driven by a similar or different cultural perspective to that of our own. For example, unlike a conventional computer game and even unlike a social game-world, a virtual heritage environment must allow us to see through the eyes of the original inhabitants, or at least feel that this place once belonged to someone else. Such a virtual environment requires the ability to personalize and communicate individual perceptions through artifacts and the more deeply this cultural communication can be unselfconsciously expressed through our modification of our surrounds, the more this environment becomes a dwelling, a home, a place.

We can test for "mild" cultural immersion in such a virtual environment, where a participant begins to use and develop the codes of other cultures in order to orient and solve tasks and to communicate the value and significance of those tasks and goals to others. The particular type of virtual environment that might be required thus depends on the amount and intensity of cultural perspectives that needs to be generated and conveyed. The degree of complexity of such a virtual environment may range from merely believing people with a different world-viewpoint existed in an environment, to feeling that we are being rejected or assimilated by another culture, to feeling that we are 'home'.

Only if the environment evokes a notion of other people interacting with the environment in ways similar or dissimilar to us, does the virtual environment as a *world* begins to form. To paraphrase Heidegger, that moment is when "worlds world." The notion of world is very interesting and complex, often vaguely defined (Bartle, 2003; Maher and Gu, 2003) or assumed by game players (Bartle, 2005) but sometimes used to mean a shared social perspective (Weckström, 2003) or the manifestation of both individual potential and predetermined fate as part of a wider social mindset (Champion, 2006). However, in its real world sense, a world covers all that we can do,

with all that we decide not to do. It provides us with the chance to cement our identity and social purpose while defending against those values we reject or feel threatened by.

Collaborative Activity in Virtual Places

Recent writings in the field of Computer Supported Collaborate Work (CSCW) have suggested the importance of place rather than space to support meaningful and real-world activity through the use of social computing and tangible interfaces (Harrison and Dourish, 1996; Dourish, 1998). They were right to suggest that place helps provide cues as to appropriate behavior. However, they may not have gone far enough.

Another problem for this subsection of virtual environment research is that people may wish to experience a community that can no longer be authentically recorded, via technology that typically does not remember and integrate social interaction as a real place does. One may well argue that traditional communities like the Well, or a MUD, capture this notion of a platial history, but they typically do so through text, not spatiality. For example, the developers of the Deva CVE system have complained that they could not fit more text onto the screen interface of their virtual environment, they did not complain that they had to use text at all (Mitchell et al. 2000). The developers also admitted that reference to the rules was via text logs, not via in-world activity or research. Having enough to do in a rich social way while in-world can also be a problem for players in the more complex and powerful multiplayer games (Ducheneaut and Moore, 2004).

The virtual communities that offer virtual landscaping and house design may also remember vandalism of visitors, but the actual social history of the visitors and inhabitants is still textual and social interaction is typically outside of the spatial environment, via forum or email, not a materially embedded part of the actual virtual environment as a *hermeneutically self-supporting world*. By this phrase I mean to suggest a world is a self-supporting interpretable medium when participants can communicate and understand communication from not just other people inside the world, but also from the intentional or unintentional messages they leave inside the world. Many games, such as MORGS, (massive online role playing games), are instead a combination of a virtual environment, a chat-box and Internet-based telephony. Communication may be about the virtual environment, but it is, debatably, not inside it.

It is true that games are also *peopled* by virtual characters pretending to be avatars of actual people, but these virtual characters are typically too limited to create a strong sense of social presence. The bots (computer scripted agents) found in computer games are often added to virtual environments, but their most meaningful interaction is to stalk. Bots imply a social agency, but they actually function as an extra cognitive load to make the game more challenging. Further, both these bots and the avatars of the human players lack close up facial expressions (Benford et al. 1995; Fabri et al. 2004) and the environments do not provide fuzzy peripheral senses (Fraser et al. 1999), social role recognition (Ducheneaut and Moore, 2004), or general social awareness (Prasolova-Førland and Divitini, 2003; Prasolova-Førland, 2004). The inability of characters inside virtual environments to express themselves is compounded by the computer display; a typical screen interface can create tunnel vision which reduces awareness of others (Yang, 2002).

The Past and Place

A virtual place may have the ability to transform current cultural knowledge and behavior to one more appropriate to a place no longer available or accessible to us. This is one answer to those who argue collaborative virtual environments are overrated, being too limited to address real-world problems (Pekkola, 2002). Pekkola and others are working from the understandable but restricted notion that group-work by definition means currently living, co-present and fully autonomous human participants. A notion of place typically includes a notion of time and it is important not just to help support or direct current work activity, but also to help people interpret past activities and the intangible heritage of extant communities.

Many in the social sciences actively interpret remains and ruins (Ashworth and Graham, 2005). For them, virtual places should recapture or remix the past. Place for them can be collaborative, but it must also be mark-able, potentially suggestive and expressive (in order to demonstrate to others various experiences). For example, Frachetti (2006) noted that "Most archaeologists are interested in the locations of human activity-which generally translates into a focus on mark-able places" and that archaeologists themselves are less and less able to work alone due to the increasing power of applied technology. Ideally, virtual environments may help such people to create hypothetical or counterfactual places, meet virtually in these places with colleagues to discuss them, work in these recreations to understand limitations forced on their predecessors, or develop experiential ways to entice a potential new audience to both admire the content and the methods of their area of research.

However, these academic disciplines are typically book-based and do not see that an academic publication is also a simplification and metaphorical extension of the remains and ruins it describes. These academic publications presuppose a vast domain of knowledge, a certain learned yet creative technique of extrapolation and they do not cover the experiential detective work of experts that visit the real site. Virtual environment technology could perhaps help fill this experiential lacuna, but typically, virtual environments are not complex in their interactional history, the past and the present do not intermingle as they do in real places, the many conscious and subconscious ways that people leave traces in the world are not conveyed in static 3D models. Creating a form of persistent individual *knowledge space* is difficult with current and easily accessible technology (Corbit and DeVarco, 2000).

Teaching history and related social sciences through simulating traditional forms of 'learning by doing' is an understudied research area but of importance to a richer understanding of place (Roussos et al. 1997; Kirner et al. 2001). However, the actual spatial implications of *siting* learning tasks in a virtual environment is still an area largely un-researched, as typical evaluation of virtual environments have been relatively context-free, designed for user freedom and forward looking creativity. The ethnographic techniques used by researchers may be effective in recording activity, but they do not directly indicate the potential mental transformations of perspective that result from being subjectively immersed in a different type of cultural presence (Benford et al. 2002).

Nor is it a given that the best possible way of experiencing the *pastness* of a place is as an immutable godlike viewer, for we learn about places through being spatially and historically *thrown*. A notion that a collaborative virtual environment allows a visitor to do what they want encourages a tourist rather than an inhabitant mentality.

While some may suggest that social agency enhances engagement, it may actually destroy the cultural presence of that place. In at least this respect, culture is not the same as society. This type

of collaborative virtual environment to be successful must be able to communicate its values through its *artifactual* quality, as it has been shaped by a particular social agency, which may no longer be present, only imagined. In this case, constraints and not liquid freedom are necessary to gain an understanding of the place. In some modern multiplayer online games, for example, the players are forced to interact with each other in order to advance (Ducheneaut and Moore, 2004). Some of the most popular collaborative environments are a hybrid of game and meeting-place; where constraints actually increase the enjoyment of the experience.

Conclusion

Philosophers have already argued for some time that, our notions of reality are actually cultural notions of a constructed reality (Peschl and Riegler, 2001), yet Virtual Reality is often held up in direct opposition to perceived reality and hence is seen to be inferior, terrifying, or less meaningful. Research has often attempted to delude people into thinking they are in the real world; it has not used the transformative possibilities of Virtual Reality technology to show different forms of perceived reality. Such a notion can be highly limiting in terms of enhancing learning. Hence digital simulation of objects will not by themselves enable meaningful content that contextually places a virtual environment in an engaging way. Yet by controlling and thematically restricting the interface and agency of the user, designers could disseminate different cultural forms of knowledge, rather than attempt to convey in the user's own terms, a worldview he or she already has.

The idea of creating three types of place and evaluating how interactive and engaging they are and how well they aid learning is an interesting line of research. The simple classification is dangerous if applied prescriptively, but it does attempt to match types of virtual environments with the intentions of their designers. It may also go some way to explaining why certain types of virtual environments such as games are engaging, but they are not meaningful cultural experiences. For culture implies materially embodied beliefs that could identity yet outlive a maker and designer; play, on the other hand, suggests an eternal changing of form without thought as to the consequences.

Virtual heritage and historical environments pose more difficulties than games and but they also raise interesting questions for theories of place and social interaction. An overriding problem continually emerges; how can co-participants meaningfully learn about a past place that appears to have been currently or previously inhabited by others, without distracting each other or destroying a distinctive, appropriate and unique sense of historical or social immersion.

It is much more difficult to create a virtual place that brings the past alive without destroying it (Champion 2004), but even creating a sense of place through digital media is a worthy challenge. One thought that I would like to leave with the reader, is that the virtual is not purely the visual, nor is it solely the digital. The virtual is that which could well be and when we cross its threshold, as Don Quijote did, windmills transform into giants. When virtual environments develop these magical thresholds, they too may be considered to be places.

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Acknowledgments

Spirit of Place and Sense of Place in Virtual Realities

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Abstract

About forty years ago, when print media were still in their ascendancy, Marshall McLuhan argued that all media are extensions of the senses and that the rational view of the world associated with print is being replaced by a world-view associated with electronic media that stresses feelings and emotions (McLuhan, 1964). In 2003 researchers from the School of Information Management Sciences at Berkeley estimated that five exabytes (five billion gigabytes) of information had been generated in the previous year, equivalent to 37,000 times the holdings of the Library of Congress and that 92.00% of this was on magnetic media, mostly hard disks, while only 0.01% was in print (http://www.sims.berkeley.edu, 2003). This SIMS estimate could be wrong by several orders of magnitude and it would still be clear that the era of the printed word is waning rapidly. We are well-advised to pay attention to McLuhan's suggestion that electronic media change how we think and how we feel.

Sense of place and virtual reality are both inextricably caught up in this cultural-technological upheaval. I have written about the concept of 'place' from a phenomenological perspective for many years and have achieved a reasonable understanding of its subtleties, but I have a limited knowledge of digital virtual reality and its technical attributes. Nevertheless, it seems to me that a mutual interaction is at work between what might be called 'real' place and virtual places, that digital virtual reality shares characteristics with other electronic media and that our experiences of real places are being changed those same media. This essay explores these issues particularly from the perspective of the distinction between spirit of place and sense of place.

Keywords: Sense of place, spirit of place, geography, virtual reality, authenticity.

Place and Existence

In his *Discourse on Method* Descartes brought into doubt everything except thought itself and concluded that thinking was the essence of existence. Modern concepts of objectivity have followed from his theoretical separation of mind from matter and body. Yet Descartes notes early in the *Discourse* (1967, Discourse 2) that he began his meditations in Germany and specifically in a room heated by an enclosed stove. Everything, even pure thought, has to happen somewhere, in a place. No matter how much we might like to ignore it, the fact is that existence is place-bound. It can also be said that place is existence-bound, an expression of intense human interaction with the world.

A life without places is as unimaginable as a life without other people. We all were born, live and will die in towns, neighborhoods, villages or cities that have names and which are filled with memories, associations and meanings. Places are so completely taken for granted that they need

no definition. They are the complex, obvious contexts of daily life, filled with buildings, cars, relatives, plants, smells, sounds, friends, strangers, obligations and possibilities.

This complex everydayness makes an abstract analysis of the concept of place unproductive because it will inevitably assume away the complexities. However, a phenomenological exploration that proceeds from the manifold ways places are experienced is helpful. This discloses at least three interwoven elements of place, each irreducible to the others. There is a physical setting or landscape of buildings, streets, hills, rivers and other features. Secondly, there are the activities that occur within this physical setting, such as shopping, working in offices, manufacturing, gardening, jogging and the daily routines of commuting. Thirdly, places are territories of meanings, meanings that arise from the experiences of living, working or visiting somewhere, appreciating its architecture, being familiar with its routines, knowing its people and having responsibilities towards it. At their most intense these meanings involve a sense of being someone who belongs to this specific place and whose own identity is irrevocably tied to its landscapes and activities.

The depth of the meanings that places have for us are informed both by the qualities of their settings, which I will refer to as spirit or identity of place and by our sense of place, or ability to appreciate those qualities. In everyday experience spirit and sense of place are inextricably intertwined, but it is helpful to distinguish them so that their relevance for virtual places can be made clear.

Spirit of Place

The term 'spirit of place' is a translation of the Latin genius loci. For the Romans, as for many other cultures, the world was a sacred space occupied by a pantheon of gods and spirits. Every forest grove, mountain, river, village and town was the home of its own spirit that gave identity to that place by its presence and its actions. With the progress of civilization the gods of places have lost most of their powers, so the expression 'spirit of place' now has a mostly secular meaning that refers to the distinctive identity of somewhere.

Spirit of place mostly has to do with natural landmarks or remarkable built forms. Thus Venice and within it St Mark's piazza, have a powerful spirit of place; so do Lower Manhattan, most of the old towns of Provence, the Rocky Mountains and Machu Picchu. A place with distinctive spirit or identity is attractive – literally so, because it often attracts artists and tourists - though the reasons for attractiveness seems to be impossible to pin down. The architect Christopher Alexander (1979) systematically tried to do just this. He considered things such as scale, the use of local building materials, the shapes of spaces, color, picturesqueness, order and harmony, but concluded that while these are all important, none is essential. So he chose to use the enigmatic term "the quality without a name" to characterize places that we recognize as attractive and distinctive but can't say exactly why. He also argued that the ability to create this elusive quality had been pushed aside by the rational and placeless processes of modernism.

Spirit of place is both an inherent and an emergent property. This is to say that while it seems to lie within landforms and built forms, it also arises incrementally through the accumulation of physical changes and associations that come from somewhere being lived in for a long time. It is not immutable. Prior to the 17th century the European Alps were considered hideously ugly and sensitive travelers closed their carriage curtains to avoid seeing them. And even the blandest suburban subdivision will in time develop a distinct identity, at least for its residents. Only

infrequently and in remarkable instances does spirit of place seem to be a product of deliberate design – the Taj Mahal, a Capability Brown landscape garden, or Frank Lloyd Wright's *Falling Water* might be rare examples. More commonly, a designer concerned with spirit of place might aim to create layouts and a built environment that will encourage its emergence, in other words to set the scene for its development.

Sense of Place

The term 'spirit of place' is a rather awkward and unfamiliar expression. I have used it because 'sense of place' is, confusingly, often used to refer to precisely what I have just described as the spirit of place. I think 'sense of place' is better reserved to refer to the ability to grasp and appreciate the distinctive qualities of places. There is a strong connection between the two – thus somewhere with a powerful spirit of place will help to engender a strong sense of place and a community with a strong sense of place is more likely to effect changes that will create a remarkable spirit of place. Nevertheless, the distinction between the two terms is, I think, useful for understanding and designing places both virtual and real.

Sense of place is synaesthetic. It combines sight, hearing, smell, movement, touch, memory, imagination and anticipation. It is a faculty that varies widely between individuals. Some are not very interested in the world around them and devote themselves to matters such as fashion or economics; places for them are little more than the incidental backgrounds to other concerns and their sense of place is weak. By comparison, those who attend closely to the character and diversity of the places they encounter and this includes most geographers, have a well-developed sense of place. It may be in part instinctive but I believe sense of place can also be learned and developed through careful observation and openness to and appreciation of the differences between places. And it is a faculty that can be widely shared throughout a community, a shared sense of local history and geography that manifests itself in a combination of pride and commitment to place improvement. Short of some yet-to-be discovered process of social engineering, sense of place cannot be designed.

Electronic Media and Sense of Place

Sense of place is, at least in part, dependent on cultural context. It was, for example, of little interest for architects and planners during the modernist period of the 20th century. It is also dependent on the prevailing medium of communication. There is nothing especially mysterious about this. Communications involve the movement of goods, people and ideas from place to place. They are, McLuhan (1964) proposed, extensions of the senses because they overcome constraints of bodily space and time.

Until about two hundred years ago the vast majority of people lived their whole life in one place and must have developed a deep connection with it, either one of belonging or possibly one of being hopelessly trapped. In the early 21st century, with motor vehicles, air travel and the internet, we move around the world faster and further than any previous generation. Our sense of place has to be very different from that of our predecessors. I think that many of us have traded the previously deep but narrow sense of place for a broader but shallower sense of many places. This is not necessarily a bad thing. An intense and deep sense of place can all to easily contribute to parochialism, the exclusion of strangers and at its most poisoned to xenophobia and ethnic cleansing. Our lives are more cosmopolitan than those of our ancestors, our sense of place may be less intense but it is also much better informed and more open to differences.

There is more than this to the impact of communications on places and sense of place. McLuhan's key argument is that each medium of communication not only carries people or ideas, but also transforms the cultural environment of which it is part. The printed word created an environment in which linear logic and reason flourished and could be widely disseminated. This logic included a detached approach to place-making, clearly expressed in the remark of Descartes that old towns, by which he meant medieval places, were "badly proportioned in comparison with those orderly towns that some engineer designs at will upon some plain…" (Descartes, Discourse 2). This sort of abstract placelessness reached its zenith in the international architecture and urban renewal of the 1950s and 1960s that aimed to undo previous place diversity.

Over the last half century this attack on diversity has been reversed at the same time that electronic media have undermined the authority of the printed word. Electronic media carry information and our extended senses around the globe in a few seconds and then turn them back in on themselves, collapsing time and space and creating a global village in which everything, regardless of how remote and exotic it may have been, now seems somehow familiar and immediate. McLuhan's argument is that as the environment created by media of communication changes, so perceptions and ways of thinking are changed and though the electronic technologies that make the global village possible are based on rigorous logic, they nevertheless engage our feelings and emotions. We live in an age when feelings are in the foreground and reason is in the background.

Even if you find this argument spurious, it is certainly the case that coincident with the recent growth in use of electronic media there has been a huge cultural or post-modern shift that has affected art, literature, philosophy, science, geography, architecture and town planning. In all of these there has been a move away from the objective, rationalist perspective that seeks a uniform account of the world, to a view that acknowledges the validity of many different perspectives.

In terms of place this shift is manifest in the rejection of modernist strategies, such as those for urban renewal that aimed to replace everything old with something new and a reawakening of commitments to locality and the qualities that make places diverse. Consider the world-wide movement to protect heritage, a movement didn't exist before the 1960s, villages in Italy and France that fifty years ago had been almost deserted have been reoccupied because of their strong place identities and even the resorts in Las Vegas have been redesigned to reproduce qualities of Venice, New York, Paris and Egypt. A sense of place informed by electronic media involves an acknowledgment of geographical diversity.

This is no simple reversion to the diversity of the pre-modern world when geographical constraints of distance and transportation meant that most lives were lived in a narrow area and the only option was to use local building materials. The spirits of places generated in that context and now so much admired, were mostly a consequence of technological and economic limitations. In contrast, electronic media, along with modern means for transporting building materials, span the globe. The former geographical constraints have been almost completely transcended, glass and steel reveal nothing of their place of origin and Carrara marble is used everywhere. The modernist reaction to this was a placeless one - develop designs that worked anywhere. Postmodernity has largely dismissed this approach and celebrates diversity. The electronic age presents a deep paradox for place design – electronic and modern communications enhance appreciation of distinctiveness yet simultaneously undermine the factors that have always been instrumental in creating distinctive places.

The Ability to Design Anything and Virtual Places

This paradox is captured by Bruce Mau in his book/exhibition/web site called *Massive Change* (2004), in which he raises the god-like question "Now that we can do anything, what will we do?" Mau offers a manifesto for the power and freedom of design in the new real world, but his question is equally appropriate for the designers of virtual places. He envisions elegant, sustainable designs for almost everything and this may well be possible for new products intended to meet specific needs because those very needs provide constraints – in other words forms follow function. However, function is the aspect of place that is most effectively dealt with using the modernist approaches that have lost acceptability. Freedom of choice in place design seems to lead easily to inauthenticity and the reproduction of simulacra of the most popular place identities from around the world. Thus there are Bavarian developments in Brazil, subdivisions of French chateaus in Malaysia and Italian hill-towns masquerading as shopping malls in Arizona. Identities of new residential and retail developments are often invented by focus groups and presumably the only constraint is that the place theme is sufficiently familiar to be marketable and to make a profit.

In virtual worlds, including those of novels and movies, there is even greater freedom of choice. Not only are there no pre-given heritage and local traditions, there are also no planning bureaucracies, no NIMBY neighbors, no need for sustainability, no budget and no need to make profit. Theoretically, the identities of virtual places depend only on the whims of their designers and they can be as exotic as imagination allows. In practice this is not the case because imagined places have to bear resemblances to real places if they are to be comprehensible. Italo Calvino's *Invisible Cities* (1974) describes impossible settings, but it is nevertheless sufficiently about the forms and landscapes of cities, with which we are all more or less familiar, for his strange cities to acquire substance in our imaginations. Indeed this familiarity has permitted the philosopher Bruno Latour (2004) to create a web site *Paris: Invisible City* that extends Calvino's ideas to an entirely real context.

In novels, as in paintings and movies, generations of writers and artists have worked out conventions for presenting imagined realities that make sense to their audience. The limits of those conventions are often pushed of course, in the way that Calvino does, but these experiments are only possible because they relate to familiar practices. Digital reality is, however, such a recent medium that conventions for presenting virtual places are still being worked out. The fantastic virtual worlds of massively multi-player on-line games that ignore laws of physics, ecology and society can perhaps be regarded as experiments to find conventions of representation.

Electronic media and especially virtual realities, differ from print media because of the manner in which they engage the senses. Novels, like paintings, involve mainly sight and imagination; the reader is imaginatively engaged yet sensually detached. In digital virtual worlds one is both sensually and imaginatively immersed. This raises two issues. One follows from McLuhan's argument that electronic media create a different environment for thinking and perceiving; it is that methods for designing and presenting places developed for other media may have limited relevance. The second is the concern that digital worlds might have such presence that they are experienced as being indistinguishable from reality. I can well imagine that this might be seen as a goal for design but it is actually pointless – I am reminded of the fable about the prince who wanted a map of his kingdom so accurate that it recorded every detail and the cartographers

produced a map that exactly covered his kingdom and smothered everything. Virtual realities with a high degree of presence raise profound questions about the distinction between what is real and what is artificial, about the limits of technology and who controls it, about addiction and about which places are to be simulated for what purposes and whose purposes those are. These are not theoretical questions. In the virtual worlds of massively multiplayer on-line games there are markets in virtual property that trade in real money and there are reports that at least one actual murder has been committed because of the theft of a virtual gaming weapon (Li and Xiaoyang, 2005). The border between real and digital virtual worlds is already porous and the designers of virtual places have a responsibility to be alert to the consequences of this.

The substantial challenges for designing virtual places lie between the extremes of pure fantasy and perfect presence. In this broad zone, virtual reality has to find its own identity as a medium of artistic and technical communication, an identity that might eventually bear little resemblance to any other medium. With this in mind, I think it is appropriate to consider what characteristics of real places might be imported into digital virtual worlds and what might comprise authentic places.

Authenticity and the Relevance of Real Places to Virtual Places

Real places are existential phenomena, the meaningful and rather messy contexts of everyday life. This cannot be true for virtual places, which are not at all fundamental to our being and are not even necessary to the functioning of the Web. I find it difficult to conceive that existential feelings of rootedness and belonging to a place are in any way transferable except perhaps as a type of psychosis or addiction accompanying perfect presence. And in its precise, sacred sense *genius loci* cannot be simulated in virtual worlds any more than it can be created in real ones, because humans do not create gods and spirits.

This fundamental difference in existential character is reflected in the currently limited range of virtual places in comparison with real places. This will probably change, but at present the purposes of virtual realities seem to fall into just a few categories. The ones I can identify are: entertainment and games; education; the exchange of information; academic research; and technical training. For some of these it is necessary to reproduce accurately only those aspects of reality that are related to the specific purpose –thus a virtual environment to resolve architectural problems will emphasize built forms, one for flight training will reproduce flight decks and landing strips. Other things can be left out or treated in as outlines in the background.

However, for education, games and research it is important to design what might be called virtual geographical places, those that capture the manifold qualities of the real world. For these it is important to recognize, as I suggested above, that place-making in the real world in this post-modern era is far from easy and descends easily into inauthenticity.

Authenticity is a difficult concept but one that is unavoidable in a discussion of place-making. In its phenomenological and philosophical sense authenticity refers to an attitude toward existence that fully acknowledges human responsibilities and mortality. Authentic places are those that simultaneously reveal and respond to the qualities of spirit of place and reflect the existential realities of being. The more conventional meaning is that something authentic is original, not a fake or copy. So inauthentic places are those that have no relationship to context or offer the pretense that they are somewhere else. The shopping mall in Scottsdale in Arizona that looks like

a fifteenth century Italian hill town might be fun but it is inauthentic. Superficial copying denies authenticity, both in its existential sense and in the sense of originality.

According to this reasoning virtual places cannot be authentic because to be authentic is to be real. In other words, "authenticity" is simply an inappropriate concept to apply to virtual places.

Virtual places can, however, be more or less accurate reproductions of real places and more or less convincing on their own terms. In due course a virtual geography may develop with places that bear little resemblance to anywhere real but are comprehensible and have great presence within the conventions of virtual reality.

Real and Virtual Place-Making

I have suggested that the real post-modern world poses serious difficulties for authentic place-making and perhaps the best that can be done is to develop physical settings that aim to encourage the emergence of different types of activities and meanings as the setting is lived and worked in. Something similar should apply to virtual place-making – establish a foundation or framework that can then be adapted and modified through participation to create a strong spirit of virtual place.

Place-making, whether real and virtual, can take many forms, some quite superficial and some difficult. It is, for example, relatively easy to play the role of a Cartesian engineer and to lay out grids of streets and lots and to fill them in with what Jane Jacobs (1961) described as "desegregated sortings" of land use – a block for industry, a block for retailing, several blocks for residential uses and so on. And it is no great challenge for a developer of suburban subdivisions to follow well-established practices for leveling terrain and laying out curvilinear streets of houses in instant communities with invented identities such as Hunter's Glen or Foxmeadow Pointe. It has proven far more difficult to recreate the qualities that give rise to a spirit of place in its secular sense, that is, somewhere with strong visual identity, filled with activities and capable of fostering rich associations and meanings. This difficulty is precisely why architects and urban designers such as Jan Gehl, Kevin Lynch, Spiro Kostoff, W.H. Whyte and many others have devoted so much attention to trying to work out the properties of good urban form and what makes some streets and public spaces vibrant while others are deserted. Their discussions should be as valuable to the designers of virtual places as they are for the designers of real places.

Indeed, virtual place offers possibilities unavailable to urban designers. Real cities are big, expensive, cumbersome things, difficult and slow to change. They are subject to a plethora of bureaucratic regulation, there are tensions between planners and developers, there is never enough public money and single interest protest groups regularly undermine the public interest. In virtual reality these are complications that can be controlled or introduced selectively. It is far easier to experiment with the design of virtual streets and neighborhoods than with the planning of real cities.

Imagination and Sense of Virtual Place

The description of a place, regardless of whether it is fictional or real and regardless of whether it is in a novel or a computer, requires an act of selection. It is impossible to describe every detail, so authors choose elements of somewhere and rely on a combination of their own powers of representation and the imaginative abilities of their audience to fill in the gaps to create a whole

image of a place. Similarly the design of a virtual place involves an act of selection by the designer and an act of imagination to complete the details. Since virtual places are three-dimensional they offer more information than is possible in a movie or a novel and this might suggest that they need less imaginative input. However, many digital virtual places are interactive, can be explored from different directions and modified by those who encounter them. The exploration and modification of virtual places require an active and creative exercise of imagination. This may be a different sort of imagination from that used in reading novels but it is no less important. Virtual places don't have readers or viewers – they have participants. The original author of a virtual place in some fashion has to anticipate how participation might occur and to provide suitable cues and possibilities for it, though in a fully interactive virtual place, as in a real place, the imaginative involvement of participants will lead to changes that can in no way be anticipated. There are few rules or guidelines for this and the most compelling virtual places might be regarded as continuously changing works of art that reflect the combined imaginations of those who are simultaneously participants and authors.

A sense of virtual place will develop through such participation and engagement and it should not be unlike a sense of real place. It will involve many senses and emotions because it is mediated electronically, it will vary between individuals and it will also have a community expression. A sense of virtual place is, I suspect, an accurate description of the connection that the millions of players of on-line games have with their chosen virtual worlds. If this connection becomes obsessive and it has for some, then this can become dysfunctional. But for those who choose to explore different virtual worlds, a sense of virtual place can be considered a variant of and an addition to the current distributed sense of real place that simultaneously acknowledges geographical diversity and seeks ways to make places with compelling identities.

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Thinking through Virtual Reality: Place, Non-Place and Situated Cognition

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Abstract

Critics and researchers apply various criteria to evaluate the efficacy of VR, including the conformity of VR environments to the character of place. I wish to add a further test: do VR environments enable thought? The paper thus applies to VR the controversial proposition advanced by Clark and others that thinking, i.e. human cognitive processes, are situated and spatial. As a further term in this mix I introduce the concept of non-place, as elucidated by Augé and propose that non-places can be characterized as unthinking spaces, i.e. spaces that provide little assistance to the thought processes of their occupants. Perhaps non-places only offer the possibilities afforded by a kind of cognitively impoverished instrumentalism. The conclusion from these propositions is that it is instructive to couch the problematics of VR environments in terms of non-places that do not easily accommodate thought, or thoughtful interaction, were it not that thought thrives on transitions, thresholds and boundary conditions between the strange and the familiar.

Keywords: Human cognition, place, non-place.

Virtual reality (VR) frequently aims for fully immersive, digitally-mediated experiences that convince us that we are in a physical space in the same way that we are in our living room, walking down the street, or talking with friends in the pub (Benedikt, 1994; Heim, 1998; Champion and Dave, 2002). (Here I distinguish VR from lower-aspirational, task-specific simulations, as exhibited in the case of flight simulators for training.) There are interesting mappings to be explored between experiences of VR and concepts of space and place as expounded by architects, human geographers and anthropologists (Relph, 1976; Norberg-Schulz, 1980; Meyrowitz, 1985). In spite of their claims to sociability, claims summarized by Champion and Dave (Champion and Dave, 2002), VR environments are far removed from the meaningful places of everyday habitation. To complete the comparison with architecture, geography and anthropology, we need to consider VR in relation to the controversial spatial category of non-places.

Non-Place

According to Marc Augé, non-places are the generic spaces and globalized environments we experience as airports, motorway underpasses, carparks and other custom-designed and left-over spaces of mass production, consumption and global capital . In contrast to traditional places, where orientation and belonging are predicated on localized inhabitation, non-places are designed or under-designed, to be experienced by transitory and mobile agents: shoppers, commuters, corporate nomads, tourists, itinerants, the homeless, migrants and virtual workers. Non-places are frequently beleaguered with directions and instructions: do not park here, exit in the event of fire, no entry, please have your passport ready.

Mobile workers increasingly find themselves in these non-places, as they complete correspondence, reports, or drawings on the train, the airport lounge, the coffee shop and travel to meetings and conferences. In turn, aspects of non-place are brought back into the office or studio, if they have one. The office is sometimes an adjunct to peripatetic working in non-place, or subservient to the exigencies of time zones, global commerce and international regularization.

Non-places at their least accommodating also include dysfunctional environments in which people queue for poor service in badly-run, inadequately designed and impersonal bureaucratic settings. Environments in which the only imperative for human interaction is to effect a commercial transaction also qualify as non-places. Related non-places include those settings whose architecture and hardware speak of conviviality, efficiency and care, but which betray a scarcely concealed indifference to people and their welfare. These observations are corroborated by our recent studies of non-places in which we conducted on-site workshops at a superstore, airport and immigration office (Coyne, 2005; Coyne, 2006; http://ace.caad.ed.ac.uk/NonPlace). Clearly, the concept of non-place opens up new and interesting spatial categories that resonate with certain aspects, desirable and otherwise, of contemporary environments.

Of course, Augé's ideas about non-place have been subjected to critique. In an interesting article on the service stops of the M1, quintessential non-places, Merriman identifies problems with the disciplinary differences within Augé's commentary, his overstatement of the newness of the phenomena he labels as non-place and his failure to appreciate the complex relationships between the material and the social in the constitution of place. Augé's critics are quick to point out that "individuals such as maintenance workers, security guards, shoppers or business travelers often do see spaces such as supermarkets, motorways and airports as places" (Merriman, 2004), replete with identity, meaningful interaction and nostalgic recollection.

Non-place is an ill-defined and ambiguous category. It is clearly a contested category. So are the concepts of virtual reality and place. Non-place arguably serves as a palliative to the romantic approval of and nostalgia for, place, as idealized by several urban theorists (Alexander, et al., 1977; Norberg-Schulz, 1980; Cullen, 1995; Rogers and Gumuchdjian, 1997). Non-place constitutes the "reality" for many of us, at least for some of the time. Non-place fits as a category for those situations, experienced by most of us, in which we are not at a lively Mediterranean waterfront café, nor surrounded by cobbles, ironwork and patinated sandstone as depicted in so many reflections that take as their starting point the celebration of place.

For digital environments, in many cases, the detachment, coarse graphics and the desperate nature of anonymous social intercourse (Castells, 2001), promoted in chat rooms and multi-user games (Kline, et al., 2003), suggest social dislocation and placelessness, indicative of non-place. The vacancy, violence and artificiality of some computer game worlds similarly speak of the disconnected, the placeless and the uncanny (Coyne, 2005), at least to non-participants. People cope with physical non-places and some people seem to thrive in them. Aspects of VR seem to resonate with concepts of non-place.

Complaints about VR

Technical challenges to VR are summarized by Champion and Dave (Champion and Dave, 2002). We can add that the concerns that VR seems to address are becoming more diffused as an aspect of human-computer interaction design in general, as we think of mobile systems and ubiquitous computing (Weiser, 1991), for which the dominant philosophy is one of embodiment

and situated action (Suchman, 1987; Dourish, 2001). Where credence at all is granted to VR, from the embodied point of view, the technologies that we label VR implicate a series of embodied, equipmental practices that require skills in particular modes of perception, projection and interpretation. The practices of use of the particular VR equipment contribute to the VR experience, which is never achieved through a seamless integration of mind with computer, as if the equipment and the bodies that use it will someday be dissolved. Success in assisting those with mobility impairment through brain-computer connections indicates the requirement for extensive, equipment-dependent training (Friehs, et al., 2004).

Arguably, VR features as an important player in narrative invention whose home territory is science fiction literature and film and well-worn metaphysical speculations debating realism and idealism (Baudrillard and Lancelin, 2004). The concern with VR is also diffused into technical concerns with task-specific simulations, as in the case of flight simulators and environments for training in surgical skills (Wierinck, et al., 2005; Hirst and Wilkins, 2006), the technologies of heads-up displays, robotics and "telepresence." The effectiveness of VR systems in such domains is not really in question here.

Rather, it is the strong claims (Benedikt, 1994; Heim, 1998) made of VR that it is on the way to serving as a generalized, sensory-rich medium that suits a variety of contingencies, as rich as those provided by physical experiences outside of the VR system. It is as if, without adjustment, a flight simulator could suit birdwatchers as well as trainee pilots, or a surgical simulation could be used to dissect a wristwatch or purvey hospital gossip. The ideology of VR celebrates the prospect of a fully-immersive, sensory-rich, complete and general digital environment. Some advocates of this ambition see the main impediment to the progress of VR as the implementation of components that guarantee place. In so far as the success of VR is to be completed through a consideration of the characteristics of space and place, I propose that it needs also to address the characteristics of non-place and non-place as an environment that potentially impedes thought.

Thinking Places

We can address the topic of non-place indirectly through concepts of situated cognition. Champion and Dave outline factors that contribute to a sense of place, at least in virtual environments. These include provision for social agency, the presence of artifacts that can be transformed and dynamic interaction. I would like to add a further consideration of what constitutes "placefulness," that is only partly accounted for by these provisions, namely cognition. Rich, meaningful, or even just everyday places are cognitively enabling. They facilitate thinking.

So, in addition to considerations of non-place, I wish to consider the implications for VR of theories about embodied and embedded action, particularly as expounded with great clarity by Clark (Clark, 1997; Clark, 2001; Clark, 2003) in the context of studies in neuroscience and robotics. Clark focuses less on space than on the claims made of the material brain as the organ of reason. He cites experiments that show how the task of the human brain is mainly to make connections, complete patterns and draw on the elaborate "scaffolding" we call society, culture and context: "Advanced reason is thus above all the realm of the scaffolded brain: the brain in its bodily context, interacting with a complex world of physical and social structures" (Clark, 1997).

What is the mechanism of thought? For these theorists, the role of the thinking agent, the brain is to "support a succession of iterated, local, pattern-completing responses" (Clark, 1997). On the

one hand this sounds like a very reductive formulation: thought as pattern completion. But it elevates the importance of the environment. Thinking, reasoning and acting are co-implicated in the embodied and increasingly equipment-rich environments we inhabit. Thought is "out there" as much as it is in the head or the body.

Similar arguments have been advanced about the distributed nature of memory by Rosenfield (Rosenfield, 1988). Memory and cognition are situated and by extension, they are spatial. There are interesting implications here in how we think of space: less as a container than as a social enabler within a cognitive scaffolding. The corollary is that our thinking apparatus is perplexed and confounded in environments in which the cognitive scaffolding is deficient, as in environments that tax the resilience of the human organism, spaces devoid of sensory and cognitive stimulation. Clearly, if places implicate, assist and abet thought, then VR spaces ought to do the same.

What does a theoretical shift from the transcendent and disembodied to the cognitive scaffolding of our cultural, spatial and equipmental context imply for VR research? The "situated" response is often to dismiss VR as founded on poor models of human experience and cognition, as giving undue emphasis to "internal representations" and replacing the body with a series of digital conduits to channel sense data. There is a case to be made that equipmentally-mediated environments (such as provided in VR) contribute to work, creativity and play and therefore to cognition in general. But not in the ways expected. Theories of situated cognition have implications for how we work and think in situations permeated by ubiquitous devices and technologies.

As elaborated by Champion and Dave, we commonly presume that the test for VR is whether the immersed participant is successfully convinced that she is in a space. Does the VR environment look and feel real? The question also expands to how the environment sounds? In other words the test pertains to the senses, understood as discrete and reliant on the provision of high-fidelity sense data and prioritizing vision.

Theories of situated cognition suggest a different test. Outside of the task domain of the VR simulation, can you think in this space (or through this space)? If the space represented is architectural, e.g. a virtual airport lounge, could you settle down to read a book, mark up a report, rehearse your next meeting, muse on the future of shopping, start to categorize passengers, or plan your next holiday. If you could, would it be abetted by the VR space, or in resistance to it? This is a variant of a more general formulation: does the VR environment support human practices? Taking on board the views of the situated cognitivists, that thought is action-oriented, environment-complicit and spatial, the test becomes: can you think with this space? Does a VR environment constitute a thinking place? Could you be stimulated, informed, or distracted in a virtual airport in the same way as when you are at Stansted? But perhaps Stansted airport is a non-place, the users of which are already under the sway of cognitive deficit.

Non-Space and Cognition

Before continuing to question VR in the light of situated cognition, it is helpful to consider non-place through the same criteria. Place constitutes a rich sensory environment imbued with memories, significance and meaning. Places are also spaces in which things happen, the domain of praxis. This active doing implicates thought. We don't only think about places, but we think through them. Places seem to function cognitively.

The question of the cognitive attributes of space has a history that precedes speculations in neuroscience. Buildings have long been regarded as embodying meanings, communicating meanings and serving as signs and semiotic systems (Jencks and Baird (eds), 1969). Frescoes, stained glass, statuary and ornamentation have obvious educative functions in both sacred and secular architecture (Jones, 2000). Adrian Snodgrass has examined the cognitive functioning of the mandala in terms of metaphor (Snodgrass and Coyne, 2006). Frances Yates also indicates the ancient legacy by which orators would use the environment around them to structure and remember the main points of an argument (Yates, 1966).

This recourse to spatial mnemonics was not purely instrumental. There was also a sense of participating in the divine order. In fact, for Plato, the concept of Intellect was of a supra-individual and divine stratum of coherence into which all of humanity could connect. Thought (as Intellect) was understood spatially as a passage to a transcendent condition. There is also the persistent legacy of the Romantics drawing on the environment for personal inspiration. The Romantic grand tour was an occasion enjoyed by creative individuals to study, contemplate and mine foreign and unfamiliar territory. For the newly mobile British bourgeoisie, continental Europe was at one time a territory "to think with," a role also extended to "the Orient." As outcomes of the colonial impulse, museums, galleries and specimen gardens fulfill a similar role. Spaces aid thought in the obvious case where the scholar seeks out specific information, such as mummification practices in Egypt, or the leaf pattern of a Banksia oblongifolia.

But such environments also function as places in which thoughtful associations can be made and one could participate in a sense of Platonic ordering and participate more fully in the Thought of humankind (Hooper-Greenhill, 1992). Thought, with a capital "T," as a faculty that goes beyond the mere thinking of an individual agent, was also a preoccupation of Hegel and Heidegger. Hence, Heidegger's enigmatic conflation of building, dwelling and thinking (Heidegger, 1971). My case for a consideration of "spatial/placial cognitivism" could be mounted with recourse to cultural considerations alone: philosophy, language, meaning, symbol and interpretation. However, it is appropriate to deploy the fine-grained, materialistic theories of situated cognition when considering the instrumental, fine-grained medium of VR. Both draw on concepts of computation.

Cognitive Apparatus

Let us return to propositions about the way cognition might operate. According to cognitive theorists (Gregory and Zangwill, 1987), classical theories of cognition (as advanced by Descartes) position thought, mind and cognition firmly within the organ of the brain. It all happens inside, with the environment providing the distractions or noise, or the environmental conditions that keep the body in a comfortable state so that the brain can get on with its work. Thought is resident in the brain, which is contained within space. Situated cognition however advance a series of propositions that push cognition further and further into the environment. As evidence for their thesis Clark and Brooks cite experiments that show how "lazy" the brain is in accomplishing even simple cognitive tasks and how dependent it is on its environment.

The theories draw on mechanisms of timing and subtle inflection. In the case of mobility, a fish flicks against eddies formed by rocks to swim faster than it could by brute strength (Clark, 1997). This is not a reasoned contrivance by the animal; it is simply built into its physiology. Similarly, when animals walk they (we) use gravity and tilt their bodies, perpetually intercepting a falling

movement with a minimal and efficient intervention that produces mobility. The body is designed so that gravity does much of the work. Cognition is similarly opportunistic. We use various tools to "cheat" our way through calculation, navigation and other cognitively demanding tasks. Measuring implements, calculators and the tools of writing are obvious examples.

Kevin Lynch's work on the role of mental maps in navigating cities (Lynch, 1960) is often cited as a way of understanding VR. In terms of the language of situated cognition, landmarks are even more ubiquitous and necessary than suggested by Lynch and constitute wayfinding cheats to save on the need for cognitively expensive "internal maps" of our environment. In fact, debates within the literature around situated cognition commonly focus on the need or otherwise for "internal" representations. The strictly situated position maintains that we do not have and do not require mental representations of objects in order to think. Or, if we do, the representations are less like maps than task-specific templates (Clark, 1997).

The language used by these researchers into the philosophy of robotics is not architectural, though they admit an interest in the theories of Martin Heidegger and Merleau-Ponty, who address the human condition as primarily one of being thrown into the world, or "being-in-the-world." Extending (and contorting) the phenomenologists' metaphor of thrownness, like the fish that throws itself against the currents, we exploit states of cognitive instability to maneuver, or be carried along by thought.

What are the implications of situated cognition for architecture? There is clearly no simple correspondence between environment and thought. The theories of situated cognition do not suggest direct mappings between thoughts and architectural interventions. So we can dismiss the idea that architects can create places that make the inhabitants more intelligent, thoughtful, passive, active, better behaved or creative. To assert as much is to buy into long-discredited theories of environmental determinism (Dehaene, 2002). Environment and cognition involves a much looser fit.

How do theories of situated cognition inform concepts of work? Imagine a student or clerk working on an accounting problem in the reading room of a grandly designed neo-classical library. A naïve cognitivist would assert that the knowledge, or at least the information, is all in the books. The space is incidental and contributes little to the work task, other than providing comfort and convenience. According to a slightly more sophisticated view, the worker observes the paintings, wall friezes and configuration of pilasters and performs a pattern completion exercise to infer a thought about tabulations and flows that may or may not be relevant to solving the problem at hand. Here the environment acts as a source of associations, metaphors and stimuli through which to think. Drawing assistance from the environment in this way no doubt occurs, but this account already assumes cognitive autonomy on the part of the worker.

Situated cognition presents the more radical proposition that our environment is already structured in a way that assists certain outcomes. In other words, the spatial operation of cognition is reflected in the fact that we are culturally predisposed towards libraries as places of contemplation and inspiration; our entire perception of such spaces is culturally loaded; the objects around us, natural and otherwise, are caught up in networks of interconnections, about which any particular instance provides a reminder. Sitting in a library while reconciling the office accounts suggests a certain coupling between thought and environment, especially when we reflect that the library and its history are brought about by the same social and cultural processes. Through our participation in culture we are as much at home with spreadsheets as libraries and

the physicality of the library is just one part of this cultural scaffolding within which thought is constructed.

Furthermore, if we consider thought in a manner similar to the optimally mobile fish, opportunistically flicking its way through a submarine rock garden, then we can imagine thought deploying similar spatial gymnastics. Perhaps when "we bounce ideas around," we are not so much the agents of this process as one of the rocks, or the current that is as much at the mercy of the configuration of the rocks as determining their configuration. We can leave it to the neuroscientists to elaborate further on the mechanism and further establish the complicity of space, environment, sociality and culture in thought. What is the role of the books on the library shelves? They serve a similar but substantially more structured and easily comprehensible role, explicable in terms of the instrumental nature of language as a highly sophisticated socially configured system of tools (Reddy, 1979).

Place and Cognition

We can conjecture a simple parallel. Places are those physical environments in which there is a ready complicity between culture, sociability and human practices. In Clark's terms, in a place the cognitive scaffolding is in place, the resources by which the kinds of problems humans frame and resolve are readily to hand. The architecture and the artifacts within it provide the memories, the significations, the signs, the visual and spatial languages and the sounds, through which all the other social, cultural and linguistic components can operate. In other words the ensemble that is place is conducive to the operations of thought, appropriate to the condition in which the human finds herself in that place. For the worker, a place is a space for thinking with, or, in the language of situated cognition, a space in which the cultural, social and physical scaffolding is in place for effective thought to occur, by whatever agency.

My direct alignment of cognitive productivity and place is made independently of the literature on situated cognition, which seems less concerned with place and more concerned with task-oriented problem-solving and techniques for verifying the mechanisms. But the alignment is apt and impacts on how we view VR.

The Cognitive Resistance of Non-Places

So, as an expansion of the discourses of situated cognition we could assert that some environments are resistant (or neutral) to the processes of cognition. Such environments could be described as non-communicative, language-impaired or in some way pathological spaces. In light of the discussion so far the term "non-place" provides a useful descriptor of such environments. Non-places can be thought of as cognitively deficient spaces. They are either the interstitial, underdesigned spaces where nothing much is meant to happen, or they are those over-designed, over-controlled, monosemic or mono-functional spaces in which the chief cognitive demands are following directions, tracking a bureaucratic procedure, or parting with money (Augé, 1995). These spaces tell us what to do, through literal signage and the configuration of circulation routes, gates, controls and counters.

This connection between non-place and cognitive deficit falls outside Augé's ethnographic language of sociability, language and symbol, but the connection fits. The common depiction of non-places in literature and film portray environments populated by people behaving like so many automata, who are so coupled with their mono-tasked environments that they behave like

(mindless) cogs in a machine (e.g. Alphaville, Logan's Run, Brazil), a common perception recalling Marx's denigration of factory labor under capitalism (Marx, 1977).

If we assume the individual as the unquestioned agent of thought then non-places tell us what to think and what not to think. More precisely, in the language of situated cognition, non-places implicate a limited range of human action, being and engagement. Thought is not encouraged beyond the limits of the space's own particular cognitive project, typically limited to basic wayfinding, getting crowds from A to B, carrying out certain transactions (purchases) and herding people through a process (such as getting on a plane). Non-places deploy signs and symbols in the supposedly unambiguous language of the command ("wait here"), rather than relying on the rich layering of custom, history and meaning found in places.

A sign saying "wait here" would be superfluous in the vestibule of a cathedral or temple, as the appropriate behavior or action is already inscribed in the architecture and ritual practices of the place. Neither would we require a text saying "think of god," or "consider your finitude" in such places. In fact it could be said that we are already caught up in such thought by virtue of being in the sacred place or participating in its rituals. According to certain ethnologists, such as Eliade (Eliade, 1965), ritual is a kind of thinking that often bypasses the necessity for personal reflection or personalized knowing or belief. By way of contrast, our participation in the un-aspirational thought of non-places operates in a generic way, easily adjusted to the contingencies of the particular process by an adjustment to the signage or technological devices.

You can wear an iPod in a museum or church, but it is interesting to speculate that non-places require personalized digital enhancement to provide the cognitive scaffolding for thought that takes one beyond the thoughts of the space. Perhaps the mobile worker requires the iPod, mobile phone and laptop in order to compensate for the cognitive deficiency of non-places. Stansted might work as a cognitive environment thanks to the presence of the traveler's supplementary hardware: electronic diary, magazine, novel, credit card, iPod, mobile phone. Of course, VR is supplemental in the extreme. VR is all supplement, wherever we are.

VR as Non-Place

It takes little to think of VR environments as quintessential non-places. Their putative non-existence and imaginary, contested or interstitial manifestation qualifies them as such. The utopian, fantastical or violent aspects of computer game environments reinforce this designation. The environments of the game Grand Theft Auto are habitats for anti-social road warriors. VR is non-place in the sense that it is or can be devoid of all that makes for place. If VR functioned to the extent that we could be convinced of its spatiality then it is likely that it would be a place of brittle experience. Finally, VR is also a candidate for non-place in the sense that it might be construed as cognitively deficient, i.e. lacking the apparatus for thought to take place effectively.

In one sense VR has the potential to be cognitively very rich. Information, data and text can certainly be injected into VR, as content. We would be hard pressed to describe a row of books in a library or airport bookshop as constituting cognitive impoverishment, or to discount the cognitive cornucopia of the Internet and the World-Wide Web. But to ascribe VR's cognitive richness to the wealth of data it makes available is a little like conflating the quality of the library building with that of the books it houses. The cognitive richness of a place is not tested by considering the content of its communication channels, but by attending to its material fabric. Arguments against VR from the point of view of situated cognition would assert that VR misses

out on the subtleties of spatiality that enable thought to take place, the spatial inflections and nuances against which ideas bounce their way through place, or carry us along. In the same way that VR gravity has to be programmed and every inflection of avatar muscle calculated to effect real-time simulation, the condition for every thought has to be anticipated in the VR design. Of course, this might be the case for a hypothetical organism that is only reared on VR. In fact the VR experience cannot be considered in isolation. There are transitions to be negotiated. Such transitions implicate thought.

Thresholds as Thought Events

Theories of situated cognition point to close couplings between organism and environment, but rarely refer to abrupt changes in environment. Organisms exploit instability, in motility and cognition, as they flick and fall, using their inbuilt capabilities to arrest a particular movement before it goes too far, or to catch a current, in the ocean, or a sea of thought, that transports it to a new, advantageous condition. Architecture is only too aware of the value of instability, the edge and the threshold in spatial experience (Tschumi, 1994), a theme developed by Snodgrass in an article, "Thinking though the gap" (Snodgrass and Coyne, 2006).

As the surrealists discovered, thought events can have this character, of placing objects out of their usual contexts to produce a set of jarring and unusual relationships (an anvil and a sewing machine, an iPod and a crucifix). The metaphors used by researchers into situated cognition assume a certain stability and evolutionary progression to more elaborate and effective scaffoldings for thought. But the scaffolding can be rattled. No less so than by the worker moving into and out of environments. To place a worker in a new setting, e.g. to design part of a hospital while sitting in a café at the zoo, may certainly take thought into new territory, but it is also the movement itself that provides mobile working with its cognitive opportunities. From the point of view of design, thought happens at the thresholds, which places the mobile worker, as a crosser of thresholds, at a particular advantage. Clark alludes to the boundary aspects of cognition, but when he turns to design readily succumbs to the allure of seamlessly melded technologies (merging of machine with body). From our point of view design is abetted by a more agonistic, conflictual and problematical disposition towards spatial hardware and its edge conditions (Coyne, 2005).

Thought is abetted by movements into and out of place and non-place conditions. In everyday language: we make comparisons. The putative impoverishment of the out-of-town shopping mall reminds us of the richness of the old town. The journeying, catching the park-and-ride bus, being dismayed at the traffic, are not independent of the experience of place, but contribute to it, through comparison and contrast. Once in the town, as examined by both urban formalists (Cullen, 1995) and the Situationists (Zegher and Wigley, 2001), it is generally the contrasts between material conditions that excite thought: where paving gives way to water, the crowd disperses, concrete abuts foliage, shadows contrast with light, security intersects with hazard.

In a similar way, we can surmise that the VR experience is never just an experience in isolation, but the journey to the virtual laboratory, the positioning of the head-mounted display, or the jockeying for a place in the center of the cave. In the dim radiance of the VR spectacle, clarity admits interference, perspective contrasts with flat rendering, animation with stills, sound with sight. If these experiences are unfamiliar, then think of the spectacle of the computer screen and its environs, the expectation, or dread, of opening the computer game file, shutting down the computer, adjusting the seat, massaging a sore neck, the whole embodied experience of using a

technology, remembering it, learning it, positioning it within a social and cultural context and acquiescing to the repetitions it requires (Coyne, 2003).

It is here that, in spite of its deficiencies, the cognitive value of non-place resides and renders it useful: in the contrasts it invokes and participation in the thoughts that play along the boundary condition. VR also invites thought and it achieves this by posing something strange and different. Whether the thoughts it invites are of use to us will simply depend on the circumstance and on how accepting or inured we are to the differences it invokes. In Heideggerian terms, VR acts much as a work of art, as a means of disclosure, a revealing and concealing (Heidegger, 1971; Coyne, et al. 2000).

Conclusion

My aim has been to open VR to a consideration of how it is that we think in space. I have given priority to the distinction between place and non-place advanced by Augé, rather than the distinctions offered by Relph and others about space and place. When the cognitive theorists I have referred to talk of space they are not singling out spatial experience from placial experience (though their discourse would no doubt be enriched by probing this literature).

I suggest that to the extent that thought is situated and therefore spatial (by no means an uncontested position), then we need to pay attention to the cognitive attributes of VR. If non-places are cognitively deficient, i.e. do not adequately abet thought (again, a position that is controversial), then we can further align the discourses of VR with those of non-place. Through the slippage of these contestations we can perhaps think our way through VR. My conclusion is that spaces/places are configured and signed, not just to "convey meaning," as containers for cognitive agents (people), or embodying ideas (or ideologies), but as actively complicit in thought. VR has to be thought through by attending to transitions, boundaries between conditions and thresholds.

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Presence and Flow: Ill-Fitting Clothes for Virtual Worlds

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Much has been written about what virtual worlds are and what they could be, but the theory has not kept pace with the practice. Massive virtual worlds exist /right now/, populated by millions of people, most of whom have a much better appreciation of what being in such a world means than the researchers who are writing about them. This paper is a rebuttal of two commonly given explanations of what goes on in people's heads when they visit virtual worlds and argues in favor of a different interpretation much closer to that related by the gamers themselves: immersion.

Abstract

Virtual worlds are a class of computer game in which large numbers of players access a shared environment simultaneously to have fun. What "having fun" means, however, is not obvious. Players talk about *immersion*, which suggests to some commentators that their fun may derive from the well-known psychological concepts of *presence* and *flow*. However, although these states of mind are indeed important factors in immersion, they do not capture what players themselves understand by the term. To describe fully what players are experiencing requires an examination of identity exploration – an exploration which strongly echoes the structure of ancient myth.

Keywords: Virtual worlds; immersion; presence; flow; hero's journey.

> The visible world is but man turned inside out, that he may be revealed to himself.
> Henry James the Elder
> (Kellog, 1883)

Formal Introduction

Virtual worlds are a form of computer game in which individuals connect over the Internet to a shared space wherein they interact in real time with one another and with the (computer-moderated) environment. In order to do this, they create a personal, virtual body which they inhabit while visiting that environment.

Initially, virtual worlds were text-based and were referred to variously as MUDs, MOOs, MUGs, MU*s[1] and perhaps a dozen other acronyms (Bartle, 2003). Nowadays, most virtual worlds are still textual in nature, but the most populous (and therefore the most important) are graphical; in this context, they are most often referred to as MMORPGs or MMOGs[2].

Virtual worlds have been around for over 25 years, beginning with *MUD1* (Trubshaw and Bartle, 1978). This first virtual world, which could hold no more than 36 players simultaneously, gave birth to an industry which nowadays routinely measures player bases in tens or hundreds of thousands (Woodcock, 2002). The largest commercial virtual world is currently *World of Warcraft,* which surpassed five million players in December 2005 (Blizzard, 2005) – that's a

million more players than the Republic of Ireland has inhabitants. Most of these individuals are paying around US$15 a month[3] in subscription fees.

There are other ways to profit from virtual worlds, though, most notoriously due to the willingness of some players to pay real money for virtual objects – despite the fact that this is rarely sanctioned by the operators of the virtual world in question and is regarded as a form of cheating. In *real-money trading*, a buyer sends an electronic payment to the player in possession of the item they want, whereupon they are handed it in-game. When the volume of this economy is taken as a whole, it exceeds that of real countries such as Jamaica and Namibia (Castronova, 2004) – great news for the arbitrage companies that facilitate such trade[4], if not necessarily for the majority of players (who tend to regard paying for game success with money as cheating).

Although virtual worlds are important for the sizes of their user bases and of their economies, they have other features which make them distinct from traditional computer games. One of these is their demographics: they attract players beyond the stereotypical "16-21 year-old male" core. An ongoing survey of some 35,000 players (Yee, 2005) has discovered that:

- The mean age of players is about 26.
- Some 36% of players are married.
- Some 18% of players are female.[5]

Playing times for virtual worlds are also unusual: Yee's survey found that people spend an *average* of some 22 hours a week in them – that's over 3 hours a day – with over 60% admitting to having played for 10 hours straight at least once. In almost all cases, they concentrate on just their one game of choice, rather than switching between virtual worlds. This is completely unprecedented; even highly compelling classic games such as *Tetris* (Pajitnov, 1985) don't hold the attention of millions of people for this long. Only television has such power and even then people rarely watch the same program every time they sit in front of it.

So virtual worlds attract and hold the attention of non-core gamers for extended periods and in large numbers. The question arises: why? Why are virtual worlds compelling in a way so far beyond that of any other computer game?

Players are quite categorical when asked why they play these games: "because it's fun". But what do they *mean* by "fun"? And why *is* it fun?

The tried-and-tested way of analyzing players' motivation is *player types* (Bartle, 1996). This hypothesis posits that players play for one of four reasons: to explore; to achieve; to socialize; to dominate other players. It was explored as part of Yee's survey and found to hold reasonably well; however, cluster analysis of the responses revealed a further motivation, *immersion*, which seemed to be orthogonal[6] to the other four. This raises a further question: what does "immersion" mean to players?

The remainder of this paper offers an explanation.

Informal Introduction

This special issue of *Techné* addresses many aspects of virtual worlds. I'm coming from the practical side: I design and research virtual worlds for their own sake, because I want to see

people develop yet better ones. I'm pleased for them to be used as objects of research by anthropologists, economists, social theorists, computer scientists or whomever, but our agendas are different. Researchers in these areas want to advance their own fields of study, but I just want better virtual worlds; that's where my emphasis lies.

I do regard these products entirely as worlds; others may debate whether or not *virtual* spaces are *actual* places, but for players and designers there's no conception that they might not be. The six million people who enjoy *World of Warcraft* certainly look upon it as a world and in the face of this any argument to the contrary is pretty well moot. People play these games for two to four hours every day, every week, every month, … I have *MUD2* players who are still going strong after 15 years. Tell *them* that the Dragon Island is not a place and you'll get the same blank look you'd get if you told them London wasn't.

The somewhat technical use of the words "place" and "world" here perhaps needs some explanation. A *world* in this context is a space of interaction the inhabitants of which regard as a mainly self-contained unit – it's not an actual planet. It's used in the same sense as "the Roman world" or "the world of high finance". A *place* is an instantiated such space. Thus, *EverQuest* is a virtual world, but Norrath is a place (the one which the software of *EverQuest* implements). In this terminology, it might be said that *Reality* is a world and our universe is a place implemented within that world.

Note that although the inhabitants[7] of the world self-identify as such, that doesn't mean they can't be aware of other worlds. Ancient Romans knew there were lands beyond their borders, but crucially they didn't define their own world in terms of this. A world contains all the components necessary for its seeming completeness, but it doesn't have to have hermetically-sealed borders.

Virtual worlds can thus be described in terms of how they are implemented (worlds) or how they are experienced by the players (places). The two go hand-in-hand, of course, in that the one leads to the other: change the implementation and you change the player experience. Sometimes, the word *environment* is used to bridge place and world: formally, it is a set of related implementation parameters which can be used as a generator (or recognizer) of bounded player experiences. Virtual world designers use the term when they mean that a place is subject to a coherent functionality leading to an associated collection of experiences, moods or atmosphere. This will usually accord with what players call "an environment", for example a snowy landscape, but it doesn't have to: a designer might refer to a game's economic system as its "trading environment", but players will rarely look at a virtual world deeply enough to use the word that way.

This raises an issue for researchers. If players typically don't know enough about virtual world design to understand what's going on in one they spend 25% of their waking day in, what about the non-players who, for whatever reason, find themselves studying virtual worlds? Certainly they will benefit from much better objectivity than players have, but they'll pay for it with a lack of understanding of the player experience. Even if the determined researcher bites the bullet and actually plays a virtual world extensively[8], they'll still not necessarily understand why things are the way they are. They'd need to spend time talking to a designer to get the necessary insight and few do.[9]

As mentioned earlier, virtual worlds are studied internally (by people who want to increase understanding of virtual worlds) and externally (by people who want to increase understanding of

some other field). Internal researchers – which includes most designers – find themselves reading a great many papers about virtual worlds written by external researchers. Most of these papers are interesting, relevant and useful, but some of them make scant sense from the internal perspective; it's as if the external researchers don't always "get" what virtual worlds are about. They come, they observe, they reach a consensus, then they leave. However, all too often they leave with a misconception which is then propagated throughout their field.

For example, a flock of researchers from gender studies descended on virtual worlds in the mid-1990s. There were two new variables that virtual worlds introduced into their equations: cross-gender play[10] and virtual sex[11]. The researchers established a viewpoint that fitted what they observed into their existing theories[12] and then they moved on. However, they almost all completely misinterpreted what they were observing[13] and they left with a correspondingly false impression. More recently, researchers into Law and Governance have been battling between those who "get" virtual worlds and those who don't feel there's anything even to "get"[14]. If the latter were to win, we may see laws designed for general use (e.g. intellectual property), being misguidedly applied such that they damage the very things they were supposed to protect.

The purpose of this paper is to critique the way in which external researchers often look at virtual worlds. I'll do this by examining two views of immersion in virtual worlds – those due to *presence* and *flow* – which, although they may be perfectly sound from an external perspective, seem incomplete from an internal perspective.

Presence and flow are generally over-applied to virtual worlds. They are unquestionably factors in making virtual worlds the special places they are, but they don't explain what they are often purported to explain: why people play. Players don't play for the sense of "being there" and they don't play for the sense of "being in the flow". They play because these worlds allow them to become (what they call) immersed. They play because it's *fun*.

So what do they *mean* by "fun"?

Possible Answer: Presence

Anyone who has studied presence will be aware, when playing a virtual world, that they are experiencing the concept in action. Indeed, any non-playing expert observing a virtual world's population will rapidly conclude that these individuals are feeling presence. This is fair enough: they are experiencing it. However, it is wrong to suppose that this is the major factor in their having fun[15].

Presence is, simply put, the perceptual illusion that a mediated experience is not mediated (Held and Durlach, 1992; Lombard and Ditton, 1997). Players of virtual worlds engage in this with great vigor, projecting their identity into their virtual world character[16] to the extent that it seems to them, while playing, as if they were actually in the virtual world.

As with any fairly young field of study, Presence has its issues. To begin with, most of these merely concerned the definition of what "presence" actually was (ISPR, 2000), but with its growing maturity it encountered more serious challenges. For example, the earliest paper to examine the effects of presence in virtual worlds (Towell and Towell, 1997) relied, as with other early papers, on questionnaires to ascertain the degree to which presence was felt among players. However, it has since been forcefully suggested (Slater, 2003) that questionnaires are not a valid

technique for assessing presence, its being too subjective an experience for objective questioning to capture.

This discussion relating to the validity of questionnaires itself arose from something of a schism in Presence research – one which has consequences for the study of virtual worlds, as it concerns *immersion*. There are basically two views (Slater, 1999):

> *System immersion*. Immersion is a measure of how persuasive an environment is. A virtual environment in which objects cast shadows is more immersive than one in which they don't.

> *Immersive response*. Immersion is a measure of how persuaded users of an environment are. A virtual environment in which individuals feel they are present is more immersive than one in which they don't.

Which of these definitions of immersion best matches that employed by players of virtual worlds?

Well, both – and neither. Players don't have a formal definition of what they mean by immersion, they just know when they are (or, more properly, *have been*) immersed. As I said earlier, players do not typically think deeply about *why* they enjoy a virtual world, they just *enjoy* it[17]. A more persuasive environment will help them become immersed more readily, just as will their readiness and ability to be persuaded. Neither definition captures what they mean when they say they're immersed, though.

I'll explain all shortly, but for the moment here *is* what players mean when they talk about immersion: the extent to which the entity in the virtual world which they control is *them*. It's all to do with identity.

Better system immersion can give a better immersive response; both can be factors in becoming immersed, but neither *is* immersion. The virtual environments which are most conducive to becoming immersed are text-based, not graphics-based; graphics are much better to begin with at persuading a player that they're in the virtual world, but once a player overcomes the initial system-immersive barriers of text and begins to use their imagination, text rapidly surpasses graphics in immersive power. This is because players can automatically adapt their imagination to suit. Do objects cast shadows in a textual world? Yes, they do, if they need to: players will supply them in their imaginations if such things are important to them, but if not, well, they won't even be aware that they're missing. In other words, system immersion and immersive response are *the same thing* when the imagination is doing the rendering. This combination is still not immersion, though and it's still not why people play these worlds. It's perhaps a *level* of immersion, but there are levels beyond.

In order to give a sense of what I mean by "level" here, consider daydreams. If you're sitting on a bus looking out of the window, you may daydream yourself to another place. This is not in itself presence, as it's not mediated by technology, although the two are clearly related. It would not be controversial to suggest that a person could become "immersed in a daydream", though (Smith et al. 1998). Of course, as soon as you finish a daydream you snap back to reality.

Now suppose you're in a virtual world and you come to a place that reminds you of some event which happened there. You might start to reminisce about the people involved and some of the

good times you had together, until your mind wanders into a daydream. When you snap out of this daydream, does your mind return to the real world or to the virtual world? If presence were all there was to it, you'd go to the real world – presence doesn't nest within presence. My personal experience, however, is that I snap back to the virtual world. This would *not* happen if immersion were merely persuasive; this happens when immersion is *convincing* – it's a step change, a different level of immersion entirely[18]. There's something more than presence alone that holds players in this state.

Of course, without presence people simply couldn't play virtual worlds. It's a hugely important factor. However, without a computer they couldn't play, either. A computer is not the reason that players have fun in virtual worlds, although it is an essential enabler. The same thing applies to presence.

Possible Answer: Flow

Flow is a mental state into which individuals can slip when performing tasks with just the right amount of challenge that extend just the right amount of skill. In this state, people feel energized, focused and immersed (Csikszentmihalyi, 1990); action and awareness become one and it is regarded as highly pleasurable by those experiencing it.

It could be suggested that criticizing the use of presence to explain immersion (and therefore fun) in virtual worlds is something of a "straw man" argument, because few people have openly said that presence is central to virtual worlds. What they *have* said[19], however, is that immersion is central and, as Presence does lay claim to immersion as a concept, this relationship is therefore a legitimate target. The concept of immersion *is* central to virtual worlds, but not in the form as commonly understood in the Presence community.

Now although presence is rarely put up as a direct explanation for players' having fun, this is *not* the case with flow. Flow is frequently linked to the reasons why people enjoy computer games (Salen and Zimmerman, 2003; Bateman and Boon, 2006), its relationship to immersion being a particularly notable feature (Ermi and Mäyrä 2005; Douglas and Hargadon, 2000). Indeed, there are suggestions that computer games should make themselves easier or harder in order to keep players in a flow state (Hunicke and Chapman, 2004)[20]. If presence can be proposed as an appropriate model for fun in virtual worlds because of their specific properties (*i.e.* the assumption of a virtual body), flow can be regarded as such because of their general properties (*i.e.* these are computer games).

That said, flow does have a special link with virtual worlds because, as with presence, it makes reference to immersion. Flow requires eight elements to be in place before it can be achieved and one of these, "concern for self disappears, but sense of self emerges stronger afterwards" is, in relation to computer games, increasingly read as "immersion" (Sweetser and Wyeth, 2005)[21].

It is very tempting to think that yes, virtual worlds have immersion and immersion is a prerequisite of flow and all the other flow elements fit into place too, so it must be that flow explains why players have fun in virtual worlds. This is reasonable, in that if players in virtual worlds experience flow then they are indeed having fun, but most of the time they experience it little more than they do in real life. Virtual worlds' immersion *enables* flow, but people don't play virtual worlds primarily so as to experience it.

Indeed, there is some evidence (Cheng and Cairns, 2005) that immersion extends *beyond* flow, in that it can maintain across conditions of poor usability. Cheng and Cairns built a computer game using the *Unreal Tournament* engine (Epic, 2003) and deliberately inserted into it what in Presence terms would be immersion-breaking elements such as unrealistic graphics and physics. Players did not change their level of immersion at all as a result of these alterations, however. Irrespective of whether the Presence definition of immersion is valid or not, the changes made to the game certainly reduced its usability to an extent which should have rocked players out of any flow state they were in. That it did not would seem to indicate that they weren't in any flow state in the first place, although they *did* regard themselves as immersed. Thus, while flow may be dependent on immersion, immersion is not dependent on flow; therefore, flow can not be used as an explanation as to why immersion is fun[22].

The kind of immersion experienced by players of first-person shooters (such as *Unreal Tournament*) is a recognized level of immersion in virtual worlds. There are much deeper levels, however, which players are very rarely able achieve outside a virtual world context. As well as this immersion they may *also* experience flow, but flow isn't in general what delivers their fun[23]. As we shall see shortly, actually immersion isn't what delivers it, either, but it *is* a manifestation of what *does* deliver it.

Possible Answer: Flow combined with Presence

Flow arises from immersion in a task; presence from immersion in an environment. These are complimentary definitions, in that you can be immersed in a task while immersed in a virtual environment. Could it be that when players talk about being "immersed", what they are experiencing could be explained by these two forms of immersion working together to form a whole greater than its parts? Towell and Towell mooted such a possible relationship in their early paper on MOOs, particularly with regard to certain types of player, so it is a question worth asking.

Sadly, however, the answer is in the negative. Flow and presence may come together for some few computer games in which the environment is the task (as, perhaps, with Tetris), but they must remain apart if environment and task are separate. In virtual worlds, tasks are undertaken within the context of the environment in the same way they are in the real world; they aren't themselves the environment. Therefore, a flow/presence hybrid model doesn't capture what immersion in a virtual world entails.

Answer: the Hero's Journey

What is going on in the heads of people when they play virtual worlds?

If they knew this, virtual world designers would be able to design better virtual worlds. As it happens, to some degree they do know it, Bartle's player types being the generally accepted model. In its original 1996 formulation, this model posits that players fall into four categories (achiever, explorer, socializer and killer) depending on where they are positioned along two axes (player/world and acting/interacting). Achievers, for example, like acting on the world, whereas socializers prefer interacting with the world.

This model has some problems, however, in that it doesn't explain:

- Why the killer type seems to be made up of two very distinct sub-groups: those who act on other players for "bad" reasons (termed *griefers*) and those who do it for "good" reasons (termed *politicians*). The former might attack you and steal your stuff; the latter might organize a guild and get people to work together for their common benefit.
- Why do players seem to change type over time?
- Where does immersion fit in?

In response to this, Bartle modified his model in 2003 by adding an extra dimension, implicit/explicit. Here, *implicit* means to act without forethought, either because the player doesn't know enough about the virtual world or its players to get a grip on it, or because the player has internalized it to an extent that they don't *need* to think before acting. This immediately solved the griefer/politician issue and it also led to solutions in the other two problem areas; as an 8-type model, it allowed a higher fidelity of understanding of player types.

For example, whereas previously all players who spent most of their time hanging out with each other and talking were lumped together as socializers, now they could be divided into *friends* (people who had been through thick and thin in the heat of virtual battle and knew each other inside out, implicitly) and *networkers* (people who were making acquaintances for a purpose, *e.g.* to gain access to their knowledge, explicitly).

This brought additional benefits. It was always known that players changed types over time, but in the light of the new model it was possible to chart their actual paths. The classic, *main sequence* is to start as a *griefer* (implicit socializer) who tries to find the limits of what is socially possible in the virtual world by attempting to do whatever they can to their fellow players. Having ascertained what is normatively allowed and what isn't, the player becomes a *scientist* (explicit explorer), performing experiments and learning from the results. They string together the primitive actions they have discovered so far and form meaningful sequences that enable them to perform complicated tasks. Armed with enough of these, they advance to become a *planner* (explicit achiever). This takes up the bulk of their time and is where they actually play the game. Eventually, they proceed to become *friends* (implicit socializers), a state born from the camaraderie of people who have come to trust one another over time while under pressure.

In addition to the main sequence, three other sequences were identified: the *socializer sequence* (killer to networker to politician to friend); the *achiever sequence* (opportunist to scientist to planner to hacker); the *minor sequence* (opportunist to networker to planner to friend).

All these paths have an interesting characteristic: players begin as an implicit type (griefer or opportunist – finding what is socially or physically allowed) then progress to an explicit type (networker or scientist – acquiring knowledge), then continue to another explicit type (politician or planner – applying their knowledge to succeed in their formal goal), until finally returning to an implicit type (friend or hacker – retiring with nothing left to prove).

This is all very interesting and would be useful to designers even as it stands. It still doesn't explain *why* players change type along these particular paths, though.

The answer is that they are undertaking a *hero's journey* (Campbell, 1949). In an examination of myths from across the world, Joseph Campbell famously identified a single thread running through them all, a *monomyth* he called the "hero's journey". Whether the story concerned

Galahad, Buddha, Jason or the Frog Prince, they all followed the same basic line. The hero left the real world for a strange, "other" world of danger and adventure, where they overcame obstacles, achieved their goal and returned, transformed, to the mundane world. Campbell broke the journey down into three phases made up of a total of 17 steps, which are always followed in a very predictable order with only minor variations.

This hero's journey maps one to one onto the experience of players of virtual worlds. Players leave the real world to visit the "other" world of the virtual. There, they follow the steps that Campbell says they should, in the order he says they should, then they leave for the real world again.

There isn't the space to go into complete detail here[24], but the following sequence of steps is the most important section insofar as virtual worlds are concerned:

- *The Belly of the Whale* is the step where the would-be hero is swallowed into the unknown, but emerges reborn into the exciting, "other" world. The symbolism is that of the womb (structures such as caves can also work here); by emerging from its shelter, the hero is undertaking a life-renewing act. In virtual world terms, this corresponds to the character-creation system, in which players fashion a new "self" with which to engage the wonders and dangers that lie just a mouse-click away.
- *The Road of Trials* presents the hero with a series of obstacles. In overcoming, evading or avoiding them, the hero learns the full extent of his[25] limitations in the world in which he has arrived. This corresponds to the opportunist/griefer stage in virtual worlds, where the player pushes at physical and social boundaries so as to discover the parameters that govern what might be done.
- *The Meeting with the Goddess* uses "goddess" as a metaphor for the totality of knowledge. In myth, the hero must consider how his rudimentary understanding and moderate success stacks up against the full glory of what must be known if he is to succeed. Some heroes shrink from the seeming hopelessness of their task, but others are able to come to terms with it and continue, chastened, yet with renewed purpose. In virtual worlds, this is the networker/scientist step, in which the player seeks to acquire the knowledge and skills needed to play, yet in so doing risks finding the prospective task too daunting.
- *Woman as the Temptress* is a motif suggesting temptation. The hero knows what must be done and that he is capable of doing it, but sees that it will take much time, effort and commitment. How much easier his old life was! Indeed, why not return to the warm embrace of the mundane? Which matters most, the real or the remote? For players of virtual worlds, this is a point of commitment: the transition from networker/scientist to politician/planner. The player knows what is required, how long it will take and what awaits at the end. Is this alone sufficient? Or will the player realize that it's the *following* of the path that makes the hero, not the mere recognition of it?
- *Atonement with the Father* is the most important part of the hero's journey, in which the hero finally becomes are that he's the hero he always was but didn't previously acknowledge. In myth, this is achieved by his

defeating the undefeatable (often represented as a father figure) by trusting that the father will accept, rather than destroy, him. The hero has, by reaching this stage, shed his original, flawed personality and reconstructed a new, improved self; all he has to do is accept that he *is* that new self and all will be well. To do this, he has to yield, trusting that the old self (as represented by the father) will agree to the union of identity. In virtual worlds, this corresponds to the politician/planner step and is where the player spends the bulk of their time. The "father" they face is the game designer, the game's achievement metric[26] being the mechanism by which players are judged for their worth. To gain acceptance, the player must "win" this "game" part of their journey. Once the virtual world acknowledges their success, they can cease to play the game and start simply to *be*.

- *Apotheosis* corresponds to the friend/hacker stage in virtual worlds. The hero no longer has anything to prove and is at peace. The virtual world's challenges are no longer important. This is a state of rest.

The hero's journey is one of self-discovery. By undertaking a hero's journey, an individual constructs a new, truer self better able to face life.

In the past, few people were able to undertake an *actual* hero's journey. It took time, money and support unavailable to most of the population. They therefore had to undertake it by proxy, through listening to myths, reading stories – putting themselves in the place of the "hero" and hoping to gain some slight insight into their own situation through doing so.

With virtual worlds, however, ordinary people *can* undertake a hero's journey. They *can* visit an "other" world of danger and adventure, they *can* explore their personality, they *can* discover their true self, they *can* celebrate their identity. They can find out who they *really* are by being someone *virtual*.

What do players find fun in virtual worlds? They find fun whatever will, at that moment, progress them along their hero's journey. *That's* why they play night after night, week after week, month after month, year after year. *That's* why virtual worlds are more compelling than any other form of adult play yet devised. *That's* why flow and presence are but soap bubbles alongside the sky of immersion in which players fly.

At Last, Immersion

So what is immersion?

Immersion is the quality of being your virtual self. As a player advances along their path to self-understanding, what starts as an avatar (a mere image on the screen which is the player's representative) gradually becomes a character (a distinct but internally-consistent self which is the player's representation) until eventually it becomes a persona (the player, in the virtual world). If, as a researcher, you only progress enough to reach the avatar stage of immersion, clearly you are not necessarily going to realize that there are depths beyond that, therefore won't take these into account in your studies. Likewise, if, as a player, you still refer to your in-game character as "he" or "she", even after three years of play, you may find it difficult to accept that there is further to go. If, on the other hand, that's *you* in the virtual world, the same you who's sitting at the

computer looking at the screen, identical, inseparable, OK, *then* you know what immersion *is*.

When players begin to play a virtual world, they create a character and role-play it. The character may be similar or dissimilar; it for the most part won't be identical, however. Through play, the player experiments with their virtual personality. Some things work and these the player takes on board; some things don't and these the player eventually drops. The character gradually changes, but *so does the player*. Eventually, the two align and become one. At this point, the player is *immersed* in the virtual world – as fully as in the real one.

A player's degree of immersion is the correlation between their real and projected self.

Conclusion

I hope to have shown here that virtual worlds are not just another kind of computer game. They are played by different people, for a very different reason – they present a route map for individuals to develop an understanding of their self.

In this context, immersion is a measure of how close a player is to *being* the character they control in the virtual world. Presence's view of immersion can help develop this by removing barriers to belief, but once the player is over the threshold only a minimal amount of persuasiveness is necessary for immersion to be maintained. Flow's version of immersion is important to flow, but not to virtual worlds: players no more experience flow from being immersed in a virtual world than they do from being immersed in Rome. The symptoms of flow and virtual world immersion are superficially similar – "concern for self disappears, but sense of self emerges stronger afterwards" – but the mechanisms are different. Flow affirms self; virtual world immersion both affirms and reinvents it.

To play a virtual world is to hold up a mirror to the soul and to change both reality and reflection until they become one.

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Endnotes

[1] MUD: "Multi-User Dungeon"; MOO: "MUD, Object-Oriented"; MUG: "Multi-User Game". MU* uses the syntactic convention common in Computer Science of using * as a wildcard: "Multi-User <whatever>".

[2] MMORPG: "Massively Multiplayer Online Role-Playing Game"; MMOG: "Massively Multiplayer Online Game". Both of these terms are occasionally reduced to the stem, MMO.

[3] Blizzard's 1.5m subscribers in China are the main exception: they don't pay anywhere near this amount.

[4] The most significant of these are IGE (http://www.ige.com) in the west and ItemBay (http://www.itembay.com/) in the far east.

[5] There are rumours in the industry that *World of Warcraft* may have up to 40% female players in the west, but that its developers (Blizzard) are reluctant to announce so publicly for fear that such news may depress new sign-ups by male and female players alike.

[6] Orthogonal, in the sense that it is independent of the other four categories. Someone strongly motivated to achieve will not be strongly motivated to socialise, however someone strongly motivated to become immersed could also be equally strongly motivated in any of the other categories.

[7] Until Artificial Intelligence greatly improves, for us this means the players.

[8] This assumes they have clearance from an ethics committee with regard to the interactions with other players which will inevitably result (Reid, 1996).

[9] There is a debate current among Game Study theorists concerning the difference between research undertaken by personally playing games (danger: can't see the wood for the trees) versus that undertaken by observing people playing games (danger: can't see the trees for the wood). This paragraph from Jesper Juul (Juul, 2005) sums it up nicely:

> *One of the recurrent events the past few years has been the researcher who questions "formalist" theories of games in favor of "in-context" or "situated" methods. This is a special position, where the speaker argues that other researchers are forcing rigid theories upon a complex world, while the speaker asserts that he or she is studying actual game playing. If the mock picture of*

early game studies was the researcher who had only watched his/her children
playing games but never played him or herself, the standard criticism today is
against those who play themselves rather than study others play.

Note that in this paper I straddle both camps: criticising most of those who don't play for not having a full appreciation of the details, yet also criticising most of those who do play for not having a full appreciation of the abstract. This is because, as a designer, I have to understand both the details and the abstract if I'm to create a coherent whole.

[10] The paper which first brought this practice to the attention of Gender Studies theorists (Bruckman, 1993) was, sadly, recognized more for its observations than for its analysis. This is perhaps because Bruckman took an identity-related approach, which did not sit well with the more politicised slant in vogue in Gender Studies at the time.

[11] Or, to begin with, virtual rape (Dibbell, 1993). It was Sherry Turkle's later discussion of consensual virtual sex (Turkle, 1995) that probably did most to bring the subject back on track.

[12] Essentially, an empowerment model (Döring, 2000).

[13] Many, for example, failed to realise that the arguments used to explain virtual sex in Internet Relay Chat did not all apply to textual virtual worlds. For further examples and a fuller discussion of Gender Studies and virtual worlds, see (Bartle, 2003) pp527-556.

[14] The *State of Play* series of conferences at New York Law School is where much of the early debate has taken place. http://www.nyls.edu/pages/2561.asp

[15] This is not to say that it can't be a factor in regular computer games, for which an analysis of presence can be a useful tool in understanding the nature of their appeal (McMahon, 2003). However, virtual worlds are not regular computer games…

[16] Sometimes, these are referred to as *avatars*. However, strictly speaking an avatar is only a graphical representation of a *character*, which is at a much deeper level of immersion (Bartle, 2001). The term seems to have leaked from virtual worlds into wider fields to mean any virtual body, but this is not how it was originally used. Thus, one problem facing the internal virtual world researcher when reading papers written external to the field is in ascertaining whether the term "avatar" refers to a virtual body or a representation of a virtual body (and whether or not the author is aware that a "virtual body" is not the same as a "character").

[17] This is a smart move on players' part, in that the more you know about the mechanics of a virtual world, the less able you are to appreciate it as a player (although the more able you are to appreciate it as a designer).

[18] Sadly, as you may have noticed, not one which can easily be explained (by me at least) to those who have not experienced it.

[19] For example in Yee's survey.

[20] There are also suggestions that this wouldn't work, because although computer games can modify their challenge level to keep people in a flow state, it can't tell when an individual is in a flow state. Some people like their challenges to be more difficult than others and if a game gets easier when they continually fail at it they find it *too* easy (Bateman, 2005; Charles *et al*, 2005). There is also the problem that people will game the AI, for example by pretending to be a poor driver in a motor-racing game so the AI slows the competing cars down to a crawl, then overtaking them at breathtaking speed on the final bend before the AI can adjust.

[21] Sweetser and Wyeth use *gameflow* rather than *flow*, as they are talking about their game-specific derivative of general flow theory.

[22] The reverse argument – that immersion can be used to explain why flow is fun – is stronger only in the sense that immersion is one of several preconditions necessary for flow.

[23] Indeed, in his *tour de force* analysis of fun from a game designer's perspective, Raph Koster explicitly says *fun isn't flow* (Koster, 2005).

[24] Those who nevertheless wish to see the detail should check out (Bartle 2003), or, for a shorter but more coherent argument, (Bartle, 2005).

[25] I use the word "his" because the hero's journey is described in masculine terms (as the names of some of the steps make abundantly clear). Indeed, there is some debate as to whether women can or need

follow the hero's journey, or whether they follow a separate (but related) heroine's journey (Murdock, 1990). Personally, I don't entirely buy this argument, but there you go.

[26]   Very basically, this can be summarised as: kill stuff to get experience points to go up experience levels to kill bigger stuff.

Virtual Heritage: Living in the Past

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Abstract

Virtual Heritage (VH) is the use of electronic media to recreate or interpret culture and cultural artifacts as they are today or as they might have been in the past (Moltenbrey, 2001; Roehl, 1997). By definition, VH applications employ some kind of three dimensional representation; the means used to display it range from still photos to immersive Virtual Reality. Virtual Heritage is a very active area of research and development in both the academic and the commercial realms. (Roehl, 1997; Mitchell and Economou, 2000; Addison, 2000; Stone and Ojika, 2002; Champion, 2004b; Champion and Sekiguichi, 2004; Levy, 2004). Most VH applications are intended for some kind of educational use. While the main activity of virtual heritage is to create ancient artifacts, the real goal is to understand ancient cultures.

Most VH applications are architectural reconstructions, centered on a reconstructed building or monument. However, in the same way that archaeologists and historians study the artifacts because they are the primary cultural evidence we have, VH uses architecture as a frame for recreating ancient cultures. The larger goal of VH is to recreate ancient cultures, not as dead simulations, but as living museums where students/users can enter and understand a culture that is different from their own. The closest analog is the real-world living museums, where actors in period dress occupy a life-size historical setting and interact with the visitors. Ultimately, we would like to see the users themselves creating activities in the virtual space as a way of exploring different cultural viewpoints. For example, students who know about the Virtual Egyptian Temple (Jacobson and Holden, 2005) and the supporting material may attempt to recreate activities there. In doing so, they would learn about what is and is not possible in the architectural and cultural space.

In this paper we will begin by reviewing the issues and tradeoffs around building the architectural models for VH applications. These models are crucial in themselves and many of the issues involved in designing and creating them also apply to the dynamic and interactive aspects of VR. Then, we will touch on issues of how to bring culture to life in VR, the strengths and limitations for VR technology for VH applications. Finally, we will present the Virtual Egyptian Temple, our current project, as a working example.

Keywords: Virtual heritage, digital reconstructions, virtual reality, digital archeology, Egyptian archaeology, temple of Horus

Building the Models

For the researcher, high-quality 3D renderings of existing artifacts can make them accessible to a wider audience while preserving the often fragile originals, (e.g. a Neolithic cave painting). Three dimensional renderings are also an efficient tool for collaborative work, because archaeologists around the world can share them easily. If the artifact itself no longer exists, the act of reconstructing it forces the archaeologist to confront gaps in the evidence and contradictions or

weaknesses in existing theories (Champion, 2001; Frischer, 2003; Levy, 2004). Building a model is also an efficient way to store information on what the original looked like and a good model make a sound basis for scholarly discussions of the artifact. The value of 3D modeling is so well recognized that architects have been constructing 3D models of planned buildings since ancient times and CAD software is now a required tool in most architectural projects.

For educators, a spatial model can be an efficient means of communicating a large amount of visual information. One detailed 3D model can contain as much visual information as a large number of still images. Also, a model leverages the user's natural spatial perception abilities. This is especially important with architectural spaces that are "well-integrated" in the sense that information is encoded in the way the space looks to an observer.

An Egyptian Temple is an extreme example of this, because the hieroglyphics, the larger painted images and the conduct of ceremonies are all tightly integrated with the physical space itself being the main semantic organizing principle. Such an artifact is best viewed with the space intact, from the vantage points from which it was meant to be seen. In addition, users find 3D renderings compelling and a good rendering of a beautiful monument is also beautiful. This helps users accept the technology and engage in the experience. If a 3D model appears to beautiful, it is likely to posses an added degree of perceptual coherence, which in turn can make it a more effective vehicle for information.

However, an archaeological reconstruction is necessarily pieced together from existing evidence which requires many judgments. Depending on the level of conjecture tolerated by the reconstruction project, the builders may produce a reconstruction based on one of several competing theories of what the artifact really looked like. However, the final appearance of a static model is emphatic in the way it presents the model as the way the artifact looked. Uninformed viewers are likely to accept the model as authoritative (Frischer, 2003; Champion, 2004a). A static visual solution, like coding features with colors or with opacity would seriously degrade the appearance and the effectiveness of the model. Temporal solutions, like toggling certain features on and off, are probably best, but they complicate interaction design and are more difficult to implement.

Reconstruction as a Bridge Between Minds

One possible use of VH is by an archeologist is working on a site, so that s/he can use VR to convey his or her mental images of some fragmentary site or object. On a superficial level, this is certainly possible; the Archeologist can simply create a virtual model of the space or object for others to look at. In this way, VR can be a bridge between the expert and the novice, so knowledge can be conveyed to the student. In addition, VR can also be used to assist two-way communication-allowing the students to interact with each other, constructing mutually understood knowledge under the instructor's guidance (Fallman, 1999; Mayer, 2001; Dalgarno, 2001, 2002, Dalgarno et al 2002, Winn, 2003; Moreno, 2002).

However, the novice most needs to understand the meaning of what s/he sees and that is much more difficult to convey. It is possible to add some features to the VR experience which conveys some of the meaning of an archeological site or objects. For example, the student could see a (virtual) person actually using some artifact for its intended purpose, rather than seeing the object along with an explanation. The virtual person could be a simple agent or an avatar controlled by the expert or by another student. Other senses can be used as well. For example, Dr. Karabiber

and his team developed a Virtual Mosque and peopled it with virtual singers. As the agents perform their devotions, singing, the space reverberates as a real Mosque would; doing its part to create the unified sound.

One of the best uses of a virtual model is that it is mental tool to help the student organize the things s/he is learning about the site or artifact. This is an example of *external cognition,* (Hutchins, 1995; Norman, 1998) a term for the way people use the environment itself to think. A simple example is to imagine making soup, where the cook lays out all the ingredients on the cutting board in the same order that s/he will put them into the soup. In this way, the physical space of the cutting board is effectively part of the cook's brain. This fits within J.J. Gibson's idea that the mind/person and his/her environment cannot be defined independently (Gibson, 1979). In this way, the virtual environment is an extension of the user's environment and therefore an extension of the user as an embodied human being.

However, VR alone is not adequate or appropriate for many kinds of lessons the student may need. Like any other media, VR is best used in combination with other media and methods for an integrated learning approach. Nevertheless VR brings unique advantages such as allowing the student to explore places and things that long longer exist or that might be too dangerous or too expensive to visit. It allows the students and instructor interact in a new way, opening many possibilities for collaboration. Most importantly, VR can also bring things to life, especially allowing the user to explore ancient cultures.

Recreating Culture

By recreating or simulating something about an ancient culture, virtual heritage applications are a bridge between the people of the ancient culture and the modern user. The communication is one-way in the sense that the ancients are dead and cannot ask or answer questions, but we can learn about them by interacting with simulations of them and their environs. This leads to a question which is parallel to the expert-novice communication discussed above (Champion, 2006). How can we see a place as the original inhabitants saw it? For example, though the ancient Greek temples are impressive to us, to the ancient Greeks themselves, who actually lived in material poverty and were constantly at war, the temples were even more impressive. They could see the human sacrifice in the stone. Is there a way we can share the local perspective using VR technology?

One way to approach this is to deliberately vary the emphasis on elements. For example, a virtual Parthenon might be made to look preternaturally new and clean, while its surroundings and maybe the (virtual) Greeks in it make to look shabby or impoverished by comparison. One could go a step further and put artificial signposts in the virtual environment like a text message pointing to the Parthenon saying "Very expensive!" This approach is probably not advisable in most cases, because the exaggerations may not work, they definitely obscure or overshadow other information and may have unintended consequences.

A better way is to educate the user in the ancient culture, so s/he learns how to see the (virtual) recreation as the people who created them did. VR can be part of that process. For example, the instructor who employs some virtual ancient Greece application might make sure students see some things which demonstrate the poverty (by our standards) of the ancient Greeks and then helps the student understand the contrast between that and the wealth of the Parthenon. Perhaps a virtual Greek could simply say it in conversation, something like, "We are very proud of our

Parthenon which is made from the finest stone and richer than any mortal's house. We suffered gladly to build it..." and so on. This approach takes time, but students will invest the time if there is a payoff.

One very effective way to use VR to teach students about ancient culture is to have them enter the virtual environment as a shared social space and have them role-play members of that society. Under the guidance of an instructor, they could steadily refine their interactions, learning how to live "in" the ancient culture. Automated (or intelligent) agents could also be part of the community, performing simple tasks or even important roles. The accuracy and richness of the environment will have an important influence on the students' efforts.

The Temple

We present the Virtual Egyptian Temple, which we developed, as our primary example of understanding an ancient culture through recreating the cultural space.

Figure 14: The Virtual Egyptian Temple and the High Priest

The temple has no real-world analog, although it is constructed mostly from elements of the Temples of Horus at Edfu (Arnold, 1999) and at Medinet Habu (Oriental Institute Publications, 1930). Its purpose is to embody the key features of the typical New Kingdom period Egyptian temple in a way that is accessible to students. The temple consists of four major areas, the exterior (Pylon), the Courtyard, the Hypostyle Hall and the inner Sanctuary, arranged in that order and separated by gateways. Compared to a real temple, the model is simple, having only enough detail to represent the key features required. For example, there is only one of each of the four types of areas, while an actual temple might have had several Courtyards and Hypostyle Halls. Similarly, the hieroglyphics are larger than they would be in an actual temple to make them more legible. Nevertheless, the scale and proportions of the spaces are correct, hieroglyphics make the appropriate statements, the images are in proper locations and so on. In this way, the physical form and dimensions of the temple symbolize the archetypal elements of the ancient Egyptian culture, which evolved over many millennia.

The Egyptians built temples like this to be "read" at three levels of understanding. The first level was for the common people, who were illiterate, but who could understand the ideas depicted on the walls and the symbolism of the temple's overall structure and general grandeur. For literate Egyptians, the hieroglyphics on the temple itself and on objects within it provided a second level of knowledge. Finally, to the priests and royal family, highly educated people who studied theology intensively, the temple revealed a further meta-level of meaning and symbolism. This meta-level brought together all the elements and dimensions of knowledge and intelligence in a direct form which could be passed from one generation to the next.

Temples of this type are some of the best examples of such a knowledge scheme to survive from the ancient world They worked extremely well as long as there was an educational system to make the keys available. In fact, many of the endeavors of the Western Hermeticists and Alchemists who inspired our Renaissance and Enlightenment were attempts to discover the lost "higher" meanings hidden in these ancient ruins. The key to much of this meta-knowledge turns out to be embodied in a simple but very high-level, multi-meaning system, based on a very sophisticated form of playfulness. In this scheme, images and pictorial words are much more than they seem and the complex relationships between picture-words, the images near them and the rituals and other activities being performed nearby, inspire a form of kinesthesia that offer higher insights to the performer.

The temple and applications of its type illustrate an interesting symmetry. Using the Virtual Reality as part of a human and humane learning process is a thoroughly modern techné. And yet, we are using VR to simulate a temple, which is the technology for an ancient techné', so that students can study it as the ancients did. We do this to understand the deeper truths about ourselves that motivate us. In this way the ancient and modern contain each other perfectly.

Future Challenges

The great challenge facing VR authors is to provide the conditions whereby users have experiences which are both intellectually and emotionally engaging. In terms of choosing the themes or topics for the application, this is much the same challenge faced by authors in other media. How to bring to the audience something that is both new, but recognizable in human terms and make it something they can care about. For example, a good fiction writer can make a story come alive by presenting a dilemma that is all too familiar in human condition (e.g. Romeo and Juliet). The VR author can do much the same. The difference being that the users themselves can be the characters in the drama.

Furthermore, users should learn something in the VR that they can use in real life. Educators call this *learning transfer* (Bloom, 1956) and it is the ultimate test of the usefulness for any educational activity. The student could learn something impersonal (e.g. how to fly a jet), or social (e.g. how to get along with the other users), or explore a potential aspect of their own personal identity. This last point is very important and often overlooked; a critical part of personal growth is playtesting personal responses to external stimuli. Virtual reality can potentially afford children and adults a safe place to have experiences that would not otherwise be possible or practical.

This leads us to the question of whether and how computer technology, often inhumane and inorganic, can support comfortable and naturalistic interactions for people, between each other

and this brave new world around them. VR provides an opportunity for this, but as with other media, it can be trivialized and made to carry empty messages, or, it can be a new way to meaningfully broaden the human experience. Perhaps it would be better to think of VR as providing a virtual space with unique properties into which we, the real people, can extend our lives and society--not to replace the real world but to enlarge it and discover it anew.

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