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Abstract

In the past decade, the rapid proliferation of computers and networked communication technologies has offered the opportunity to experience a new kind of space, a space that is real but immaterial, where the imaginary can be shown without the need or support of concrete matter. We are entering a new era in our everyday interaction with the world, "an era of electronically extended bodies living at intersection points of the physical and virtual worlds" (Mitchell, 1995, p.24). This thesis operates in an unstable zone that bridges these two realms. The research applies theoretical findings into the production of an experiential system, a system that operates across the corporeality of the physical environment and the metaphysical realm of a cyber-spatial environment. The research proposes that Cyberspace can be conceptualised as a representation of spatial experience figured upon 'being-in-the-world' (a phenomenological paradigm). It aims to locate, define and operate within and across the liminal zone, the threshold between corporeal space experience and computer meditated space. This zone, in terms of spatiality, is framed as the experience of the interface, the dematerialising horizon of human being and place (Perella, 1995). Interface becomes the point of departure from corporeal into the metaphysical dimensions of cyber-spatiality.

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How can we give thanks for this endowment, the gift of being able to think what is most thought-provoking, more fittingly than by giving thought to the most thought-provoking? The supreme thanks, then would be thinking? And the profoundest thanklessness, thoughtlessness? Real thanks, then, never consists in that we ourselves come bearing gifts, and merely repay gift with gift. Pure thanks is rather that we simply think - think what is really and solely given, what is there to be thought (Heidegger, 1968, p. 143).

Contents

Introduction

In the past decade, the rapid proliferation of computers and networked communication technologies has opened up a new opportunity that did not exist in the past: the opportunity to experience a new kind of space, a space that is real but immaterial, where the imaginary can be shown without the need or support of concrete matter. We are entering a new era in our everyday interaction with the world, "an era of electronically extended bodies living at intersection points of the physical and virtual worlds" (Mitchell, 1995, p.24). A new kind of space merging with our common sense of reality, the reality of experiencing the computer meditated domain of Cyberspace.

The deployment of network communication technologies has seen access points to the computer meditated space of Cyberspace integrated into the built environment. Under the latent paradigm of "ubiquitous computing" (Weiser, 1991) it is proposed that access points of interface technologies, "weave themselves into the fabric of everyday life until they are indistinguishable from it" (Weiser, 1991, p.94). The first signs of living in a ubiquitous computing environment can be recognised within media based cultures, in our everyday interaction with the world. A world that involves operating in a state of parallel spatial flux between digital and corporeal domains. We can be contacted at both physical and digital addresses, our digital shadows are cast into 'information space' each and every instance we complete an electronic transaction, pass through foreign countries, or enter digitally

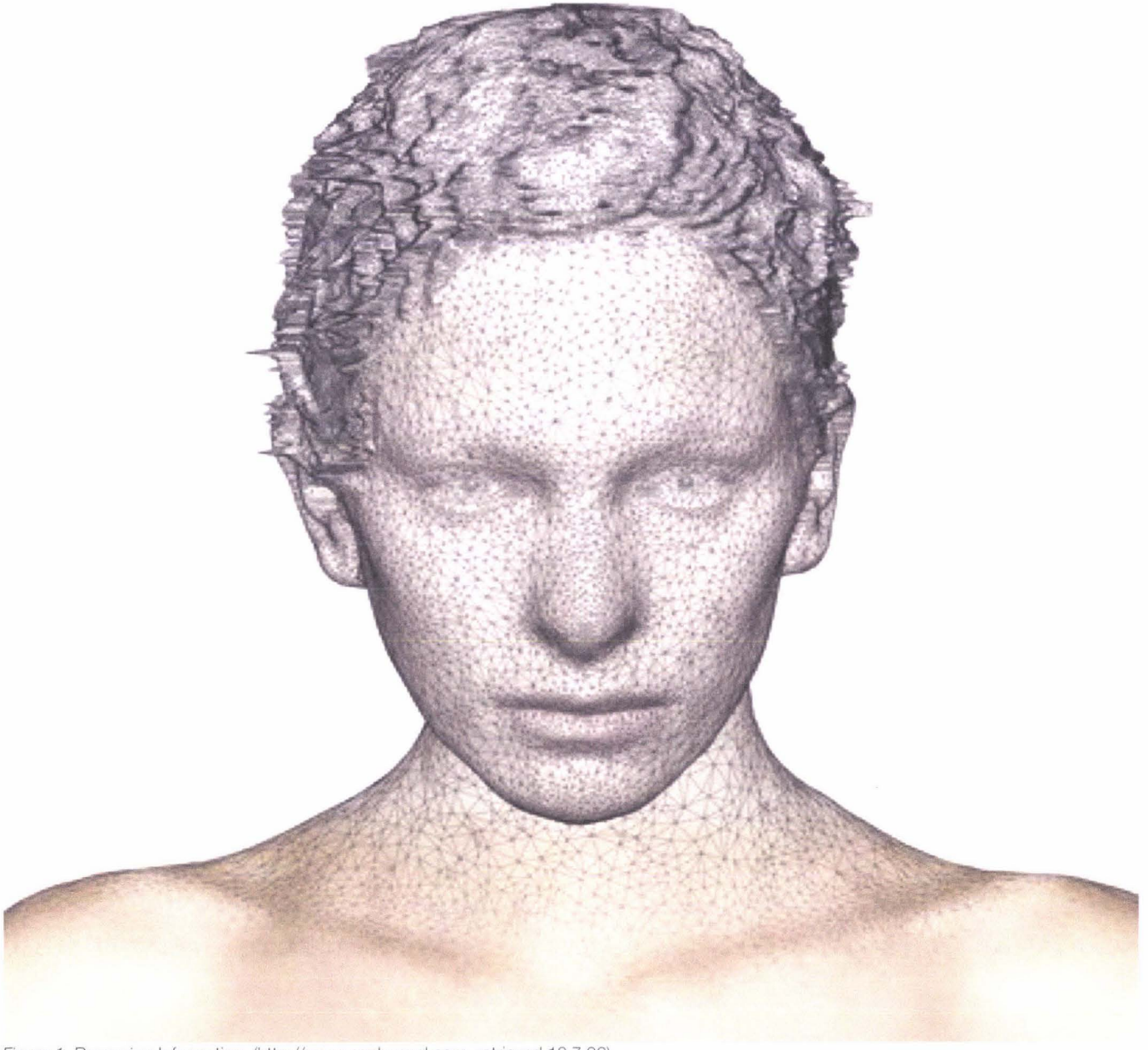

Figure 1. Becoming Information, (http://www.cgchannel.com, retrieved 10.7.06).

primed buildings. We are "increasingly dependant on such technology to sustain our social and cultural reality. They are part of being human in our time" (Anders, 2001 p59). Beyond individualistic experience, Cyberspace also offers a communal mind space, a collaborative environment within which we are perpetually active. We are being entertained 'there,' we are educated 'there', we meet 'there' and we have sex 'there'. These intangible, but real social experiences take place within the virtuality of computer meditated space. We have reached a point within media-based societies where we "live between two realms: our physical environment and Cyberspace" (Ishii, Ullmer, 1997, p.4).

As we enter this era of parallel spatial realities, everyday experience occurs in environments outside of corporeal space at an increasing rate. Cyberspace has evolved into more than just another means of communication; it has become a destination in and of itself, emerging as an alternative kind of space where everyday economic, cultural, educational and other human activities occur. It is has become destination without physical location.

Entering the dis-location of Cyberspace, we leave our bodies behind, as Cyberspace has no inherent concern for the corporeal. Our increasing involvement within this parallel space suggests that we are continuing to rupture out of our bodies as "we are thrown into new spatiotemporal terms compounding an already dualist-schizo condition" (Perella, 1995, p.84).

Within this new form of virtual space, we continue to apply understandings of corporeal world experience. Our use of spatial metaphors in our everyday encounters with the information space of bits and bytes suggests that spatial thought based on established conceptions of space, time and body form the foundation for our understanding of these new digital environments (Lakoff, Johnson, 1980). When operating within a digital environment, we attempt to locate and navigate the spatial and incorporeal qualities of intangible matter using cognitive metaphors to grasp conditions that appear to be similar to corporeal experience but in fact lack matter in the traditional sense. The notion of 'opening' a folder, of personalising our 'desktops', 'closing' a 'window' and 'moving' a file are all metaphors demonstrating this transfer. All be it on the flatness of a two dimensional graphical user interface (GUI), these metaphors attempt to give the virtual experience in the digital realm a substance or a location, if not in concrete space, then at least in the space of the mind. Despite our dual spatial citizenship, the absence of seamless couplings between these parallel existences leaves a great divide between the worlds of bits and atoms. At the present, we are torn between these parallel but disjoint spaces (Ishii, Ullmer 1997).

This thesis operates in an unstable zone that bridges these two realms. The research applies theoretical findings into the production of an experiential system, a system that operates across the corporeality of the physical environment and the metaphysical realm of a cyber-spatial environment. The research proposes that Cyberspace can be conceptualised as a

representation of spatial experience figured upon 'being-in-the-world' (a phenomenological paradigm). It aims to locate, define and operate within and across the liminal zone, the threshold between corporeal space experience and computer meditated space. This zone, in terms of spatiality, is framed as the experience of the interface, the dematerialising horizon of human being and place (Perella, 1995). Interface becomes the point of departure from the corporeal into the metaphysical dimensions of cyber-spatiality.

> The virtuality of the space of computing, and of inscription more generally, is transforming at least in part how we understand what it is to be in space and time (Grosz, 2001 p.87).

The purpose of this thesis is not to question what is real, nor attempt to answer the age-old question of what defines space, but to explore the spatiality of "Being", that of Heidegger's "Dasein" (Being-there) in light of contemporary digital technology. It aims to blend operations specific to a cyber spatial experience with that of corporeal space experience, in essence, creating a hybrid spatial environment. Framing the potential of a convergent spatial experience of virtuality and actuality, of digital destination and corporeal location.

The issue of cyber-spatiality is emerging as a concern to spatial and environmental designers. Our dual involvement with parallel spaces offers new opportunities to extend

our understanding of space. It requires a shift of thinking and signals an inquiry regarding the substance of experiential understandings of both physical and virtual environments. No longer limited to the traditional building blocks of space, the tangible matter of bricks and mortar, we must now make room for the virtuality of bits and bytes, each struggling to assert its position within the latent deployment of network technologies. The existing and predominant fields of spatial design (interior design and architecture) operate between and across these two realms and in doing so, they expose the potential for a new field of spatial enquiry.

New modes of cyber-spatial exploration are apparent in the works and writings of prominent architectural theorists Peter Anders, Stephen Perella and Michael Benedikt. Anders (1999) theories highlight the latent phenomenon and notion of hybrid spatiality, where actual space is becoming infiltrated by the virtuality of networked communications, creating blended spatial environments. Perella's (2001) theories explore current media technologie's potential to transform architectural surface into event, a condition he describes as hypersurface. What is evident in both their theories is a shift of thinking from traditional the Cartesian construct of space; a shift towards the construct of spatial environments that allow the leakage of the virtuality of cyber-spatiality, both inwards and outwards concurrently. They conceive the convergence of Cyberspace and corporeal space, as an entirely new way of inhabiting and designing space (Perella, 2001, Anders, 1999).

This new mode of architectural theory, that suggests the merging of physical and digital spaces is what Benedikt (1993) refers to as "a new study to which we ought to give the name spatiology", He defines this new term as a study that operates across "...the physical space of our streets and buildings and natural landscapes, and 'Cyberspace' defined as the electronic space of data and representations generated, organized, and presented consistently to all viewers connected to a set of globally-networked computers" (Benedikt, 1993, p.16). This thesis adopts this new mode of study, to be spatiology in practice, with inquiries into both cyber-spatiality and the corporeal space of actuality. It is an inquiry that examines the relationship between human experience and information technology.

The following text draws from the fields of embodied cognition, philosophy, and architectural theory. In particular, it focuses on the experience of 'being-in-the-virtual' as a means of framing Martin Heidegger's ontological philosophies within the realm of cyber-spatiality. It enquires into the phenomenon of computer-meditated space within a Cyberspace environment in order to extend the notion of "being-there" (Heidegger, 1927) via explorations of the cyber-spatial phenomenon associated with Collaborative Virtual Environments (CVE). It does so using design as a research tool, activity and form of presentation.

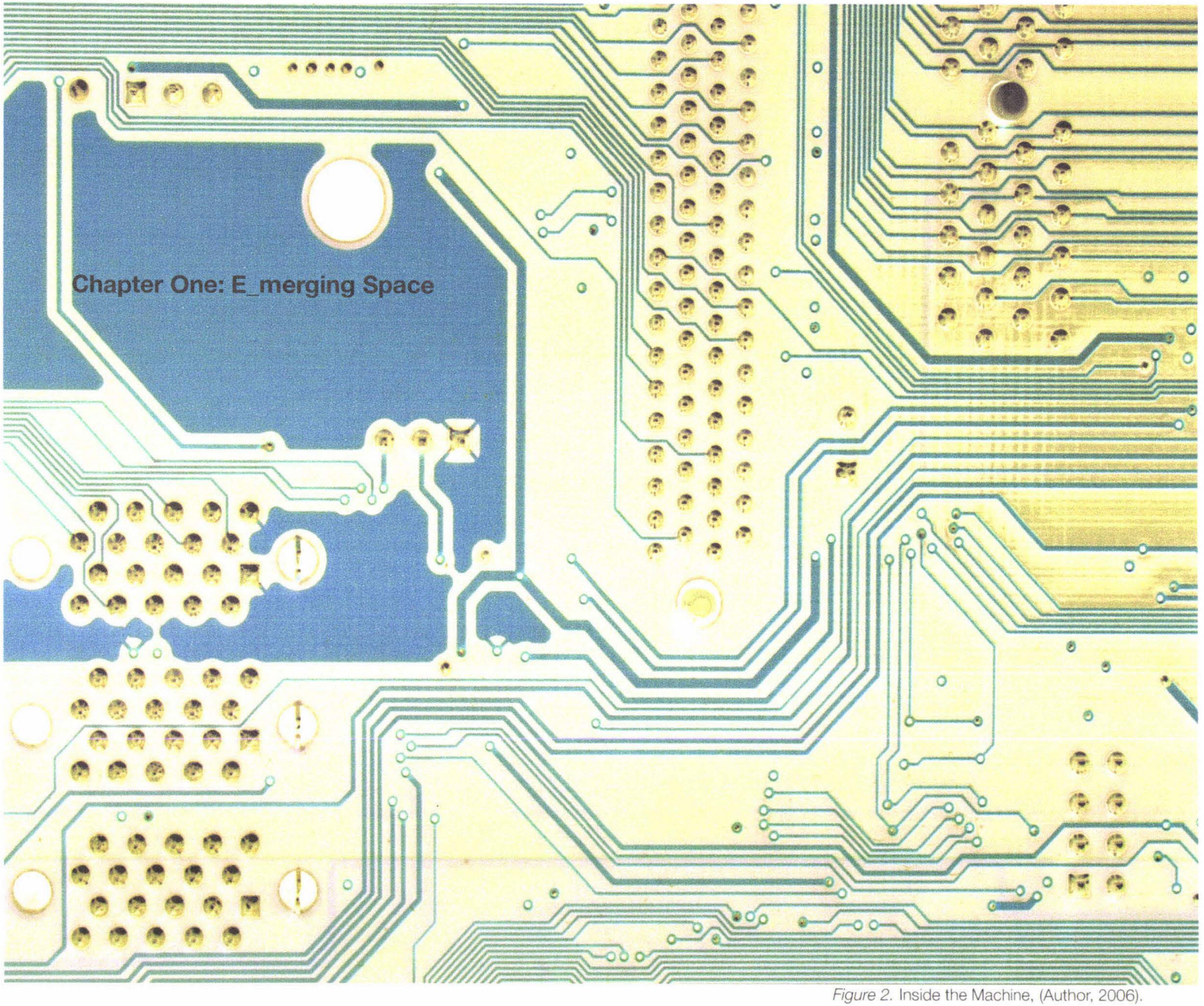

Figure 2. Inside the Machine, (Author, 2006).

First Steps

Computer meditated space of the World Wide Web was barely in its infancy when William Gibson introduced the now widely adopted term Cyberspace in his 1984 novel Neuromancer. This fictional novel places the act of everyday human experience into a world that is parallel to, and yet outside of, the corporeal space that humans inhabit; it is a world where human conscious can 'jack into' a networked computer matrix (Gibson, 1984).

> Cyberspace: A consensual hallucination experienced daily by billions of legitimate operators in every nation, by children being taught mathematical concepts. A graphic representation of data abstracted from the banks of every computer in the human system, unthinkable complexity (Gibson, Neuromancer, 1984, p.33).

The decade following Gibson's novel was witness to the rise of the Internet by virtue of the development of virtual reality systems and investigations into artificial intelligence. It saw the term 'Cyberspace' become an everyday reference to the ether that flows between computer terminals that are 'jacked into' the global network of the World Wide Web. We now stand at a point in time where the act of experiencing Cyberspace becomes an everyday occurrence and practical necessity within media based cultures. From the work place to social activities and entertainment we find ourselves increasingly immersing ourselves into an alternative kind of space. These occurrences are "becoming such a norm that the original wonder of Cyberspace so present in the early cyberpunk fiction of the 1980s are almost completely lost" (Manovich, 2001 p.76).

As our participation in Cyberspace burgeons into our everyday existence, our participation within corporeal space begins to be affected. The amount of time we spend in Cyberspace is impacting on social interactions within the corporeal space of actuality. Research by Nie Norman (2003) concluded "Internet use has a strong negative impact on time (outside Cyberspace) spent with friends and family as well as time spent on social activities" (Norman, 2003, p.36). This is not to say that that we are not still participating in social activities, but we are in fact just engaging in alternate forms of social activities within Cyberspace. The profound effects of such new socialization has raised the inevitable debate of 'bad Cyberspace' versus 'good Cyberspace'.

On one side there are the utopian thinkers who believe that participation in Cyberspace leads to increasing levels of socialization and hence, it strengthens social relationships by creating another medium of communication to friends and family. They believe that it establishes new relationships through social encounters (Salaff, 1998). On the other side, there are the protagonists who conclude that Cyberspace participation can be socially isolating because time within Cyberspace is often taken at the expense of social activities and face-to-face interpersonal interactions (Wellman, 2000). Although its important to acknowledge the proponents and protagonists of Cyberspaces effects and influences on society, this dissertation chooses not to enter that debate, but instead, acknowledges that the computer meditated space of Cyberspace is in fact, by its effect, a subject that requires specific consideration and design in its integration into our 'being-in-the-world'.

> We shall never experience our relationship to the essence of technology so long as we merely conceive and push forward the technological. Everywhere we remain unfree and chained to technology, whether we passionately affirm or deny it. But we are delivered over to it in the worst possible way when we regard it as something neutral; for this conception of it, to which today we particularly like to do homage, makes us utterly blind to the essence of technology (Heidegger, 1977, p. 4).

The Matter of Cyberspace

The notion of cyber-spatiality undermines conventional notions of space, inherently non-physical. Cyberspace is "replete with violations of the logic of everyday space and time: disappearance, underworlds, phantoms, warp-speed travel, mirrors and doors to alternate worlds, zero gravity, flattening and reconstitution, wormholes, scale inversions, and so on" (Benedikt, 1993 p.29). Considering that this thesis has developed out of a core concern for spatial design, more specifically interior design, a discipline deeply concerned with material, form and physical processes, how does one approach the subject of cyber spatiality? The absence of physical matter within cyber-spatiality makes it a slippery subject. It is important here to reflect upon existing theories of space in relation to cyber-spatiality, in order to position this thesis within a conceptual framework of spatial philosophy.

The history of philosophy is replete with various theories of space that go beyond the scope of this paper. It is important here to reflect upon the three predominant philosophic positions, so as to position the notion of cyber-spatiality. To adopt a relational position, such as that put forward by Leibniz, space is no more than relations between objects or a property of objects. In Leibniz's words, space is "something merely relative" and it is an "order of coexistences" (Alexander, 1984). In other words, there is no space if there are no objects. To adopt the absolute theory of space, as proposed by philosophers such as Newton or Samuel Clarke, would hold that space has a homogeneous structure of its own and exists independently of things. For absolute theory, space serves as the ultimate framework for the positions and motions of objects and the relative space within it, space acts a 'container' or 'arena'; objects and events occur 'in' space, but space itself is independent of them (Alexander, 1984).

Despite their differences, both the absolute and relational theories assume that space has some kind of objective, physical reality (Arisaka, 1995). Lacking any physical reality, Cyberspace consists purely as the translation of data and information manifested as image. It therefore becomes difficult to justify the notion cyber-spatiality at all within traditional models of space. And if one further considers, "that thoughts and images only exist in the brain, Cyberspace then emerges as nothing but an extension of our mental space. It is actually an extension of our consciousness" (Anders, 2001, p.78). The matter of Cyberspace manifests itself purely as metaphysical experience. "The essence of technology is by no means anything technological...Technology is a way of revealing" (Heidegger, 1962, p.12).

Phenomenology in Cyberspace

The phenomenological philosophy of space established in the early 20th century offers an alternate view to the previous theories of space. Edmund Husserl (1859-1938), the founder of modern phenomenology, claimed that the world does not simply exist as such, but that the world appears, and the structure of appearance is made possible by the human subject (Zahavi, 1997). Modern phenomenological philosophy of space states that spatiality has a different character than we know from Cartesian space and its reliance on representation. In accordance to both absolute and relational theories, we comprehend space as three-dimensional. From a phenomenological perspective, the world has a different spatial character that is only secondarily and deficiently experienced as three-dimensional. Space is not *a priori*; it is concerned action of our 'Being' that allows space to be understood. Martin Heidegger (1889-1976) a student of Husserl describes this conception of space as an abstraction stemming from the spatialising conduct of our everyday activities.

Heidegger's basis of space emerges from the ontological experience of "being-in-the-world" (in-der-Welt-sein). He believed that for the human subject, 'Being' (capitalized), is the primordial condition, which allows everything else (beings, with a small 'b') to come into existence. Heidegger gives this condition of the human subject the term 'Dasein", translated as 'being-there" (Heidegger, 1927). Heidegger claims that before anything else, we exist, we are 'there', we are in the world and that is how we conceive the world (Heidegger, 1927). To

stress the importance of this existence, Heidegger gave to Dasein the activity of existing, the term 'being-in-the-world'. Importantly, Heidegger's use of hyphens in this term emphasizes that there is no distance between the world and our selves. We are as much a part of that world as it is part of us. The 'in' is precisely an indicator of involvement. Heidegger claimed that no distance, either physical or mental, should exist between ourselves and the world. The Heideggerian theory of space informs this thesis with the position that our presence or 'being-in' is tied to one's successfully supported action in the environment, indifferent to its status as a virtual or a real environment. Such coupling between perception and action is crucial for determining the extent to which actions are successfully supported. The sense of 'being-in-the-world' or 'being-in-the-virtual' is ultimately dictated by our actions as opposed to a sense of enclosure within a volume.

Chapter Two: Being-in-the-Virtual

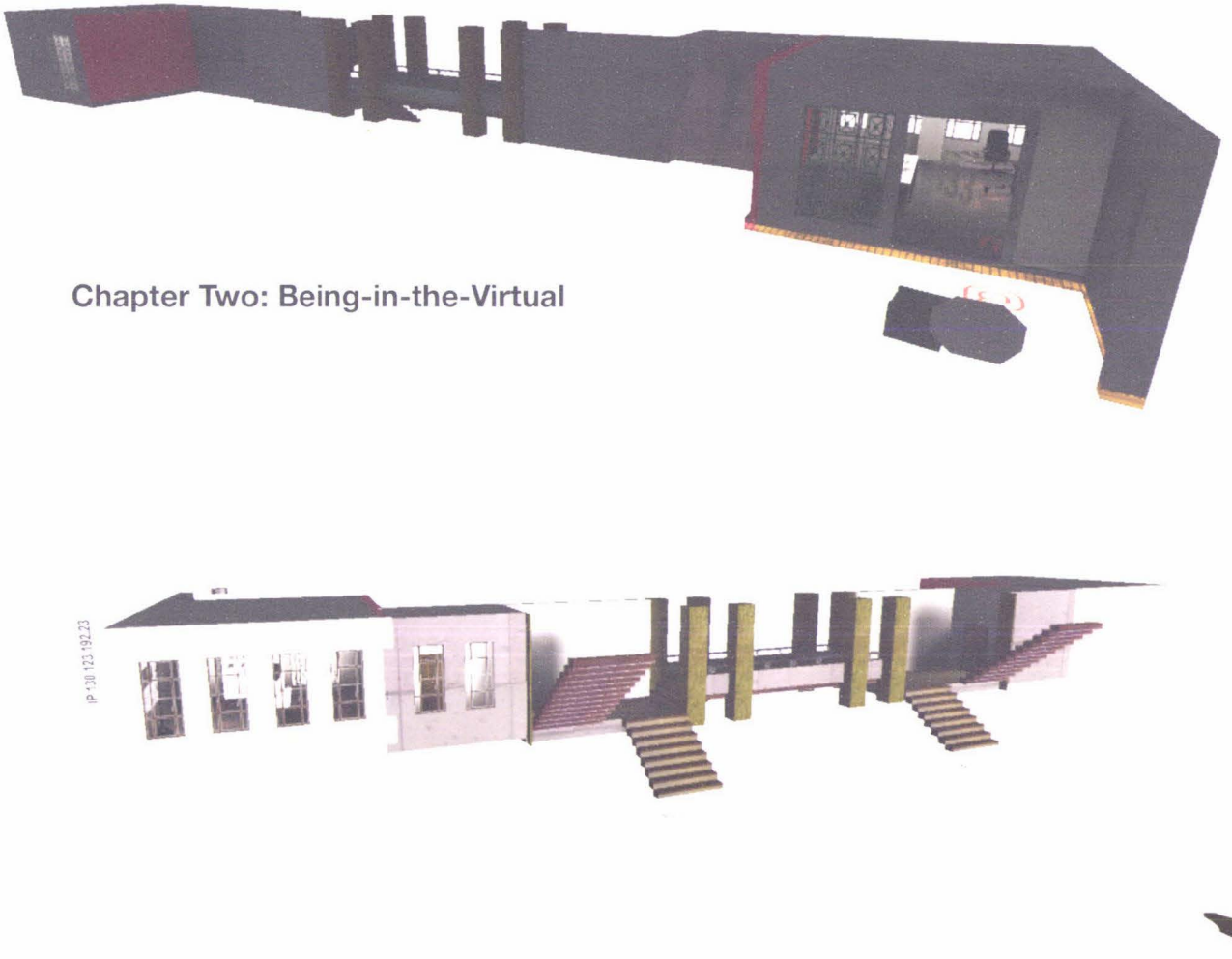

Figure 3. Outside In, Screen shot compilation from virtual environment, (Author, 2006).

Virtually Being-there

> As a user experience, the feeling of 'being there', or presence, is not intrinsically bound to any specific type of technology – it is a product of the mind. (Riva, 2003, p.9)

The following text elaborates on Heidegger's spatial philosophy, framing it within the context of cyber-spatial activity. In doing so, it highlights how our everyday immersion within the corporeal world extends to cyber-spatiality as evidence of this phenomenological paradigm. This chapter also serves to briefly outline Heideggerian terminology in order to elaborate points located in the later part of this thesis. This is not an easy task; Heidegger's writing is well recognised for its complexity and his creative invention of vocabulary to signify concepts. It should be acknowledged here that the scope of this thesis does not allow sufficient justice to Heidegger's seminal writings. However, the insight they lend towards information technology are prescient.

It is hard to imagine operating within a media-based culture without access to email or web-based information. With Heidegger's writings predating the proliferation of information technology into everyday, it becomes pertinent at this point to question how we ontologically understand Cyberspace: "It seems obvious that a world with information technology is somehow different from a world without information technology. But what is the difference?

"... The answer is...to a large extent in one's particular, implicit or explicit ontology of information technology itself" (Introna, 2005, p.6). The suggestion here is that a Heideggerian position of space extended to cyber spatiality, can offer insight into the ontological nature of our 'being-with' information.

Heidegger's phenomenological spatial philosophy distinguishes three differing modes of space within our common conception of the 'being-in-the-world', regions (Gegend), and Dasein's spatiality which are divided into de-severance (Ent-fernung) and directionality (Ausrichtung), (Arisaka, 1995). Heidegger nominates the term "world-space" as our common sense conception of space. With the advent of networked information space in the last decade also becoming part of our common conception of reality, we can consider Cyberspace to be included within the scope of Heidegger's world-space. Heidegger positions world-space as generally conceived as a 'container' for entities. If we accept this position, there is perhaps little difference to the common conception of Cyberspace as a 'container' for the digital entities of files, mail messages, graphics, etc. However, this assumption reflects a relational perspective of space whereby Cyberspace is simply a receptacle for digital information. To adopt such a position would provide no insight into our ontological understanding of entities within it. Heidegger however does not assert that space fundamentally is as an object; world-space is, in Heidegger's terminology, space conceived as vorhanden (present-at-hand).

> Every entity that is "to hand" has a different closeness, which is not to be ascertained by measuring distances. This closeness regulates itself in terms of circumspectively "calculative" manipulating and using. At the same time what is close in this way gets established by the circumspection of concern, with regard to the direction in which the equipment is accessible at any time. When this closeness of equipment has been given directionality, this signifies not merely that the equipment has its position [Stelle] in space as present-at-hand somewhere, but also that as equipment it has been essentially fitted up and installed, set up and put to rights. (Heidegger, 1962, p.135)

Heidegger's World-space is founded on the spatiality of Being-in-the-world. It is through the nearness or farness of things revealed in specific regions, that we first become familiar with that which we (later) represent to ourselves as "space." It is because we act, going to places and reaching for things to use, that we can understand farness and nearness, and on that basis develop a representation of world-space at all.

Within Heidegger's world-space, space is conceived not in a measurable Cartesian sense, but derived from action towards entities we concern ourselves with. As such, it is founded on a more basic space-of-action. For Heidegger this space-of-action consists of regions (Gegend), and Dasein's spatiality (space as Existentiale) which are divided into de-severance (Ent-fernung) and directionality (Ausrichtung). It is precisely Heidegger's dissection and re-categorisation of our common conception of world-space that offer an insight into our ontological understanding and active participation with in cyber-spatial realms.

Functioning Cyber-spatially

Heidegger refers to the type of space we deal with in our daily activity as 'functional' or zuhanden (ready-to-hand). The places where we go about our daily activities, work, socialization, entertainment, education etc, in corporeal space such as the theatre, the office, the classroom and so on, have distinctly different regions which organize our activities and determine the locations of available 'equipment'. And while current active Cyberspace participation is commonly experienced in limited ways via a monitor screen, we are accessing this new form of 'functional' space filled with instances of another form of daily life through email clients, chat rooms, webpages's online games, etc.

Heidegger's regions differ from space viewed as a 'container' in that regions are the 'referential' system of our context of activities. "This is to say that regions are essentially indexical. The indexical "here" does not identify a point A in a neutral, container-like space, but rather, our spatial activities determine a 'here' with respect to the things we deal with and the way we move" (Kisiel, 1985 p.231). Regions within Cyberspace can be deemed to be the software with which we perform differing operations and activities whether they are chat room software, word-processing software, gaming software or image manipulation software. Regions are inherently organized by activities, which emanate from a centre of action. The perspective in a region is finite to the participant, possibility emerges from the centre of action. A Cyberspace example would focus on a single 'window' performing operations

within it. "Heidegger wants to claim that referential functionality is an inherent feature of space itself, and not just a human characteristic added to a container-like space" (Kisiel, 1985, p134). What Heidegger is trying to capture is the difference between the nominal expression 'we exist in space' and the adverbial expression, 'we exist spatially'. He wants to describe spatiality as a mode of our existence, rather than conceiving space as an independent entity (Kisiel, 1985). The importance of Heidegger's theory here when applied to the notion cyber-spatial embodiment, is that the corporeal body is not a priori for space experience, but that it is through our given activity within an environment, (digital or corporeal) that we experience spatial reality.

Spatial Transparency

> We encounter a room not as something 'between four walls' in a geometrical spatial sense, but as equipment for residing. (Heidegger, 1962, p68-9)

When referring to cyber-spatial activities we often refer to going to a web page, reaching another level within a game, finding a new tool within a piece of software or moving a file. Heidegger's reference to equipment in his writings of 'Being and Time' (1954) can be extended here to our cyber-spatial negotiations with digital entities.
Heidegger nominates the term 'equipment' to all entities that exist in world space as, he adopts a reductive example to exemplify this point stating: "the bench is in the lecture room,

the lecture room is in the university, the university is in the city, and so on, until we can say the bench 'is' in world space" (Heidegger, 1962, p.236). Under this framework all things are not considered to exist as independent entities, but as 'potential' to become equipment at Dasein disposal (present-to-hand). For Heidegger however it is not the mere 'potential' of equipment in space that reveals its spatial nature, it is through our concerned use of the equipment itself that it is genuinely revealed, a condition he nominates the term 'ready-to-hand'.

> Equipment can genuinely show itself only in dealings cut to its own measure (hammering with a hammer, for example); but in such dealings an entity of this kind is not grasped thematically as an occurring Thing, nor is the equipment-structure known as such even in the act of use (Heidegger, 1962, p. 98).

Heidegger's description of the nature of equipment should be understood as 'use', that of concerned action. He emphasises that we should not think of this use theoretically. He uses the example of the hammer to frame his concept: It is not by looking at a hammer that reveals it's 'being' as equipment, but the hammering itself. No matter how hard I look at something I can never disclose it's ready-to-handiness, for as soon as something is called to my attention then it becomes 'present-to-hand' (Heidegger, 1962). When we are involved in concerned action with the hammer it becomes one with us in action. It becomes transparent, or as Polanyi states, tools form "part of ourselves, the operating persons. We pour ourselves into them and assimilate them as parts of our own existence" (Polanyi, 1962, p.59).

The notion of transparency when dealing with digital 'equipment' can be observed when first concerning ourselves with a new piece of software (region). The software contains certain tools that perform specific actions. They are always 'present-to-hand', but it is not until we they reveal their functions under concerned action that they become 'ready-to-hand' (Heidegger, 1927). Ihde (1990) reflects upon this notion: "In embodied relations with technology, the technology must first be learned and understood before it can withdraw and become part of the everyday experience, and goes on to state, ...Once the technology is learnt it is seldom noticed, as one of the characteristics of embodied relationships to technology is the symbiosis of human and artifact in different use situations" (Ihde, 1990, p.72).

From a Heideggerian position of spatiality the aforementioned examples can serve to suggest that we ontologically negotiate Cyberspace in a similar manner as we do corporeal space. It is through our concerned actions within a digital realm that we become one with its world (Being-in-the-world). It is precisely the embodiment of relations with technology that serve to suggest my notion of 'Being-in-the-virtual'.

Dwelling in

> The next step on this path would be the question: what is the state of dwelling in our precarious age? (Heidegger, 1962 p 93.)

As the everyday is infiltrated by current Cyberspace participation, we are in fact beginning to dwell in digitally constructed space, an act of 'being-in-the-virtual'. Heidegger's writings, "Building, Dwelling, Thinking" (1952) offer insight into the notion of dwelling within Cyberspace.

> When we speak of dwelling we usually think of an activity that man performs alongside many other activities. We work here and dwell there. We do not merely dwell, (that would be virtual inactivity), we practice a profession, we do business, we travel and lodge on the way, now here, now there (Heidegger, 1952, p.129).

Heidegger is asserting that dwelling is not just the manner in which we exist 'in' space, but to dwell is to be in action, to be practicing activities of the everyday. The active participation in cyber-spatial activities of work, entertainment, education and socialization suggest that within Heidegger's definition, we posses the capacity to 'dwell' in Cyberspace.

The recent development of collaborative virtual environments (CVE) offer an example of the

notion of cyber spatial 'dwelling'. The advent of this phenomenon can be seen in virtual environments of Active Worlds at http://www.activeworlds.com and Second Life at http://www.secondlife.com. These new environments allow multiple, geographically isolated, users to explore digital environments concurrently, with each user represented within the environment by an 'avatar,' a 3D representation of themself. Maher defines these types of virtual environments as virtual architecture: "Virtual architecture is a networked spatial environment designed using the metaphor of physical architecture, from which virtual architecture inherits many visual and spatial characteristics" (Maher, 2004, p.2). Maher's paper 'Generating Virtual Architecture With Style' (2002) focuses on the direct use of architectural metaphor to sustain an environment capable of being navigated. In the 'The Conceptual Structure of Information Space' (2000) Maglio and Matlock (1999) also lay claim to the benefits of using metaphor in a less direct manner: "....the power of spatial metaphors for information presentation is not merely the result of people's ability to use spatial metaphors. Rather, its power lies in the fact that people naturally use spatial metaphors, that they cannot help but use them." They go on to state, "It follows that designers should not construct virtual worlds that are merely consistent with ordinary experience and that merely use spatial attributes in task-relevant ways. Rather, the most useful information interfaces will target people's natural spatial understanding" (Maglio, Matlock, 1999, p.6).

The research discussed in this text and the accompanying design work however, supports

another idea: that it is the nature of 'dwelling' within those virtual environments that defines the underlying conceptual structure. The notion of dwelling within a virtual community can be observed within the online Cyberspace community of Active Worlds (http://www.activeworlds.com). Within Active Worlds people are in fact already dwelling in the Heideggerian sense, yet within a virtual world. Inhabitants create their own sense of community. They even go so far as to establish their own monetary currency to form an economic situation, modelled on real world currency. For example, booming real-estate markets are thriving in cyber-space where you can buy your dream virtual land and home. Entrepreneurs establish fashion shops where virtual garments are available for purchase in order to dress your avatar. A virtual 'builder' can be hired to build a virtual home, decorate the walls with images of family and friends. There are virtual weddings complete with guests, cake and presents. Within in the community, you can, in fact, also hire the companionship of an escort not a computer generated artificially intelligent entity, but another citizen who directs their personal avatar and engages in dialogue and activities with you for the prescribed time. The absence of the physical body when dwelling in Cyberspace is of no concern: it has become a space of action filled with the potential for dwelling, that it can be conceptualised as a spatial reality.

Figure 4. Birthday party inside SecondLife, Screen shot, (www.secondlife.com, retrieved 24.7.06).

A Question Concerning Interface

> Questioning builds a way. We would be advised, therefore, above all to pay heed to the way and not to fix our attention on isolated sentences and topics. The way is a way of thinking. ... Thus questioning, we bear witness to the crisis that in our sheer preoccupation with technology we do not yet experience the coming to presence of technology. (Heidegger 1977, p. 3)

The research at this point situates Cyberspace parallel to real space. Phillip Zhai states "a digital world that has a corresponding regularity to the actual world with an arbitrary sensory framework of organizing our experiences, is ontologically as solid as the actual world. Such a world is as real as the actual one except that it is our own creation, and can be recreated at will". He goes on to state, "Cyberspace is ontologically parallel to what we now call the "physical space" since we can interact with objects in it" (Zhai, 1998, p.204). However, what is yet to be addressed here, is the disparity of experience between corporeal space and Cyberspace and its possible lack of unity. Heidegger claims that we are 'thrown' into the world and that our Being-in-the-world is a 'thrownness' (Geworfenheit). To frame current cyber spatial participation within the framework of "being-in-the-world", the issue then emerges that when 'thrown' into Cyberspace, the notion of "being-in-the-virtual', we are thrown-out of corporeal space. To further consider that our everyday experience of Cyberspace participation is currently primarily isolated to the interface of keyboard, mouse

and screen, In Heidegger's terms, this can be then considered the location from where we "take in space", making the farness vanish" by "bringing things close" within a digital environment (Heidegger, 1958). This becomes the access point where Being is 'thrown' into a parallel world of 'Being-in-the virtual'. It is the point of the interface where this "throwness' occurs, as Benedikt states, "It is the interface that mediates the sensorial world of humans and the world of digitalized information" (Benedikt, 1992, p.42).

Actually becoming Virtual: inside the interface

With the advent of latent technology we are beginning to witness the emergence of new spaces within the built environment where physical and virtual space is blended through interface. In the seminal text, Re-Place-ing Space, (1996) from the field of Human Computer Interaction (HCI), Harrison and Dourish define hybrid space as "...one which comprises of both physical and virtual space, and in action is framed simultaneously by the physical space, the virtual space and the relationship between the two." Harrison discusses the example of a 'media space' where two offices are connected through a live video and audio link: 'When two offices are linked together in a media space, then a hybrid space is created; it involves not only the virtual space of the media connection, but also the real physical space of the two offices" (Harrison, Dourish 1996, p.72). Beyond Harrison's definition, that is limited to live camera feeds, I suggest that the notion of hybrid space can be explored through letting the parallel spaces become superimposed in order to test the extension of physical spaces with

Cyberspace features, in essence, letting space become interface. Architectural theorist Peter Anders discusses the integration of such hybrid spaces in the paper 'Cybrids: Integrating cognitive and physical space in architecture' (1998). It was Anders himself that coined the term Cybrid, which refers to 'an environment or artifact that incorporates both physical space and Cyberspaces. The relationship between these two types of space may be distinct, overlapping or congruent with one another' (Anders, 1999, p195). Ander's definition of a Cybrid system consists of spaces that fuse corporeal and digital reality primarily by reference. You can for example, visit many museums on-line, or in person, and see similar imagery. However, within this model, the experiences are disjointed and there is an absence of unified space experience. For example, you do not see digital visitors wandering around the physical museum (being-in-the-world), nor do you see physical visitors (or even other digital ones) in your digital meanderings (being-in-the-virtual). Although offering similar spatial imagery and content, they are in fact operating in essence, as separate spaces. The issue then arises, that although Cybrid environments may be overlapping or congruent, in their traditional forms, there is lack of unified space experience.

How might one connect the disjointed spaces of corporeal and digital to allow for reciprocal hybridisation? This research proposes that unified spatial experience is possible via the reciprocal hybridisation of corporeal and virtual environments within the framework of Heidegger's 'being-in-the-world'. That through a model based on spatial experience; there is the possibility of extending corporeal space and Anders' definition of Cybrid.

Collaboratively Virtually Being-there

A digital model that utilises virtual space to a offer collaborative spatial experience can be realised in Collaborative Virtual Environments. Briefly mentioned earlier with reference to the online virtual worlds of Active Worlds and Second Life, further elaboration on the precise nature of a CVE is important as a foreshadow of the design component of this research study.

Within a typical CVE, each participant controls their own viewpoint and interacts with others as well as with representations of data within virtual space, an attribute that references the way we experience corporeal space. The primary attribute of a CVE is the notion of shared space, which defines a consistent and common spatial frame of reference. In other words, there exists a mutually available coordinate system through which the relative positions and orientations of different digital objects can be understood. The attribute of shared space is combined with support for independent viewpoints that are represented through avatars which raise the potential to detect when someone is in attendance or present and what that person is seeing from their representation. Such an inference is not the same as actually 'seeing' what another user is 'seeing'; it is a secondary sense of awareness that is coupled with an ability to approximate their visual perspective in relation to our own. This condition of shared space is a direct exploitation of embodied cognitive principles from corporeal space. For example, when viewing an exhibit in a museum where others are present one intuitively

understands that their location within the space offers a different and possibly unique visual perspective of the exhibit compared to that of other viewers. It is this primary sense of sharing space, the establishment of our presence in relation of others, which reaffirms our own presence within a CVE. The exploitation of this is invaluable to the sense of embodied and successful collaboration when participating in a digital environment.

> To be present in Cyberspace is to learn how to be embodied there. To be embodied is to participate. To participate is to know enough about the rules for interaction and movement so that movement and interaction with and within this space is possible. (Markham, 1998, p.24)

Our notion of presence and embodiment within any given environment is inherently linked to our understandings of the corporeal world, that of being-in-the-world (Heidegger). Heidegger's philosophies of Dasein's spatiality (Existentiale), which are divided into de-severance (Ent-fernung) and directionality, can be considered to be the basis of the modern study of embodied cognition (Cowart, 2004). Embodied cognition within the field of Human Computer Interaction (HCI) is a relatively new subject. Harrison and Dourish's seminal paper, Re-Place-ing Space, critically explores our understandings of corporeal space as a basis for CVE design. Their research compresses these understandings to a fundamental set of principles which are always present within our experience of the physical environment: Presence and

Awareness, Proximity and Action, and Relational Orientation and Reciprocity (Dourish, Harrison, 1996, p.61).

These principles operate as a closed set within actuality, each one needing the other to exist in order to perceive space. Dourish and Harrison claim that these key aspects from the physical environment can be exploited in part as a spatial model for use in a CVE. They introduce the argument that a model based solely on these aspects is "too simplistic, it needs to be examined and studied further before it can be put to use in systems design" (Harrison, Dourish, p12, 2000). Dourish in *Where the Action Is: The Foundations of Embodied Interaction* (2001), introduces the paper by noting that "computer science is based entirely on philosophy of the pre-1930's" (Dourish, 2001, p.14), but his motivation for rethinking this state of affairs, for wishing to include in computer science the insights about human cognition and being-in-the-world coming from the phenomenological paradigm, is eminently practical. "We need", he writes, "new ways of interacting with computers, ways that are better tuned to our needs and abilities" (Dourish, 2001 p.2).

With Harrison and Dourish's commentaries being limited to the embodied experience inside the digital environment I am inclined to agree with their suggestion that a CVE, based solely on representational features of space, is somewhat pointless, as Benedikt states "Anything less than infinite computing power will deliver less sensory realism than ordinary reality, and

less than we are apt to want" (Benedikt, 1991, p.23). However the aim of this thesis is to operate across corporeal space and computer meditated space, not to remain held within any one domain. My suggestion here is that within a Cybrid model in practice the principles of Presence and Awareness, Proximity and Action, and Relational Orientation and Reciprocity (Dourish, Harrison, 1999), become invaluable in order for reciprocal actions to successfully operate across the domains of the digital and corporeal.

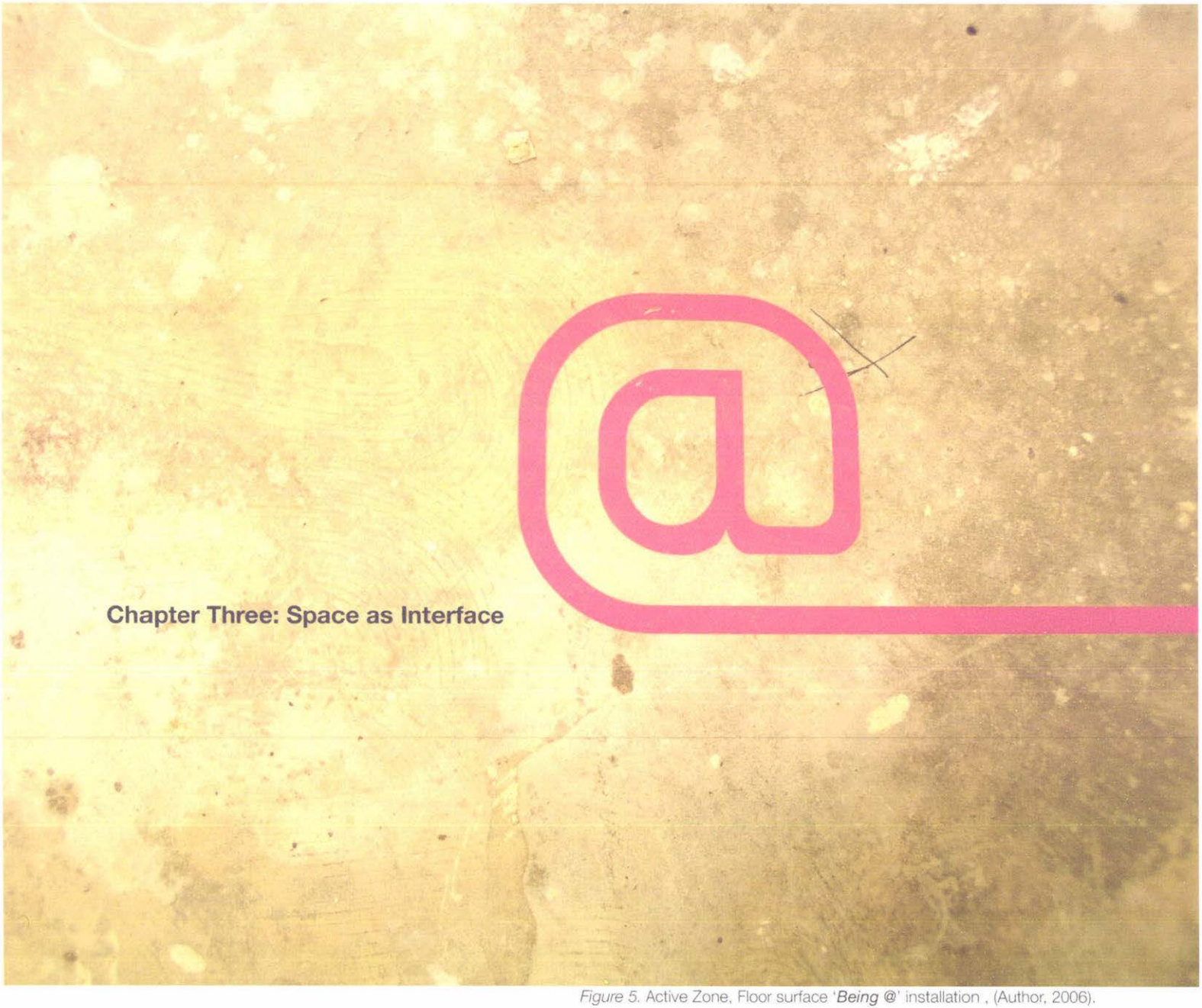

Figure 5. Active Zone, Floor surface '***Being @***' installation , (Author, 2006).

Being @

> Since the concern here is how to design things, it is, however, not enough to criticize existing approaches to interaction design by pointing out their limitations outside their original domain; for such critique to be meaningful, it has to be accompanied with practical examples of alternative approaches to the given problems (Redström, 2001, p. 20).

Being @ is a Cybrid environment in practise, part digital destination in the form of a CVE hosted live online, part corporeal location, existing within geographical coordinates. These two spatial components converge into a hybrid condition, derived from the spatial experience of being-in-the-world. The resulting spatial condition of 'Cybridity' performs as a composite of physical architecture and digital domain, offering a unified spatial experience of corporeal location and digital destination.

The designed components of the research (hardware and software) should be considered to only exist as a whole when performing in unison through the respective digital and corporeal domains of location and destination. In its realization as an installation, the core spatial conditions that Being @ offers, serve to inform the thesis by:

1. Framing the potential of a unified spatial experience through the reciprocal hybridisation of embodied action across virtual and actual environments.

2. Highlighting the disparity of spatial experience between corporeal space (being-in-the-world) and cyber-spatiality (being-the-virtual) existing at the traditional user interface of keyboard, mouse and monitor.

3. Suggesting that through a Cybrid model based on spatial experience, that of 'being-in-the-world', there is the possibility of extending corporeal space, that tangible surface and objects can offer new possibilities of being otherwise.

The installation converges theory, practise and study into a spatial phenomenon. As such, Being @ is regarded as an element of research-through-design, and constitutes the major portion of this research.

The following text isolates and defines certain instances within the research project where Heidegger's spatiality of 'Being' crosses the threshold between actual and virtual. It also observes a reconstitution of Harrison and Dourish's set of principles; Presence and Awareness, Proximity and Action, and Relational Orientation and Reciprocity operating simultaneously across actual and virtual domains, within the instance of a Cybrid spatial condition.

Being @ was realised as an exhibition installation open for public view from 27th to 30th of June 2006 within the location of Dominion Museum Building, Wellington, New Zealand and the destination of server Being@Massey, I.P 203.167.146.50. As a system, Being @ consists of three designed components:

1. A three dimensionally accurate virtual model of the prescribed space, in this case a portion of the Dominion Museum Building, Wellington, New Zealand. (figure 7) This model is constituted as a CVE with the ability to be hosted on a networked server, allowing remote participants access to the digital environment. This component was created using the software developing kit for, the popular online game Half-Life 2.

2. Tangible objects, embedded with Radio Frequency Identification (RFID) tags. (RFID technology has the ability to communicate digital information wirelessly to designated reading devices). The embedded RFID tags have been individually pre-programmed in relation to the respective objects in which they are embedded.(figure 15,16,17)

3 Custom built interface devices that consist of several Passive Infrared (PIR) sensors that have the ability to detect the physical presence of a participant within a prescribed zone. A single proximity Radio Frequency Identification reader, which has been programmed to accept inputs through interaction with RFID 'tagged objects. These interface devices are in turn connected to a PC that acts as the host server for the instance of the digital model performing as a CVE.

The physical site of the exhibition installation spans two architecturally mirrored spaces within the building; these spaces are connected via a mezzanine corridor. These opposing spaces, for clarity of explanation, will be referred to as Room One and Room Two respectively (Figure 6.7).

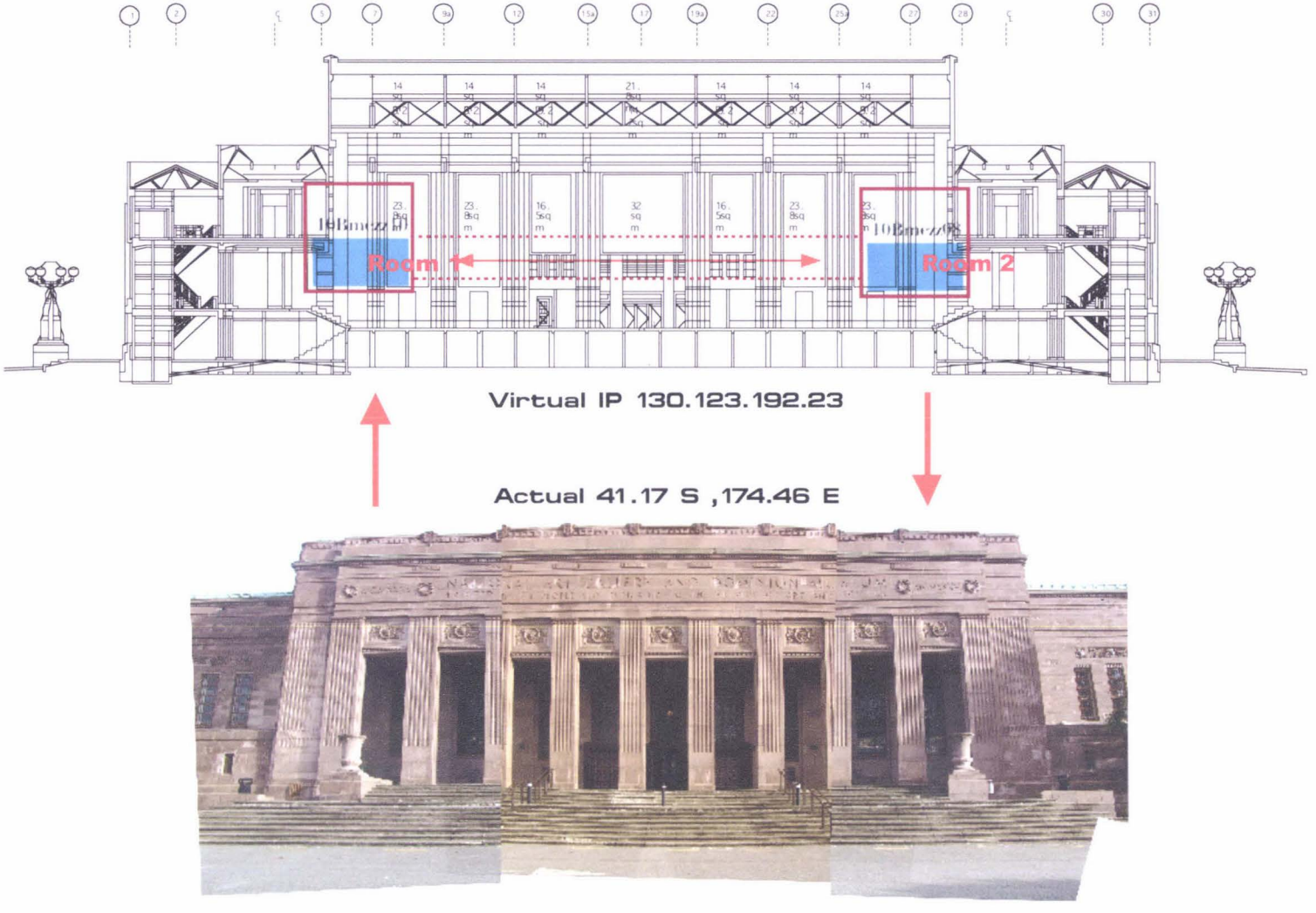

Figure 6. Elevation of site structures,Digital/Physical,
Dominion Museum,Wellington New Zealand '***Being @***' , (Author, 2006).

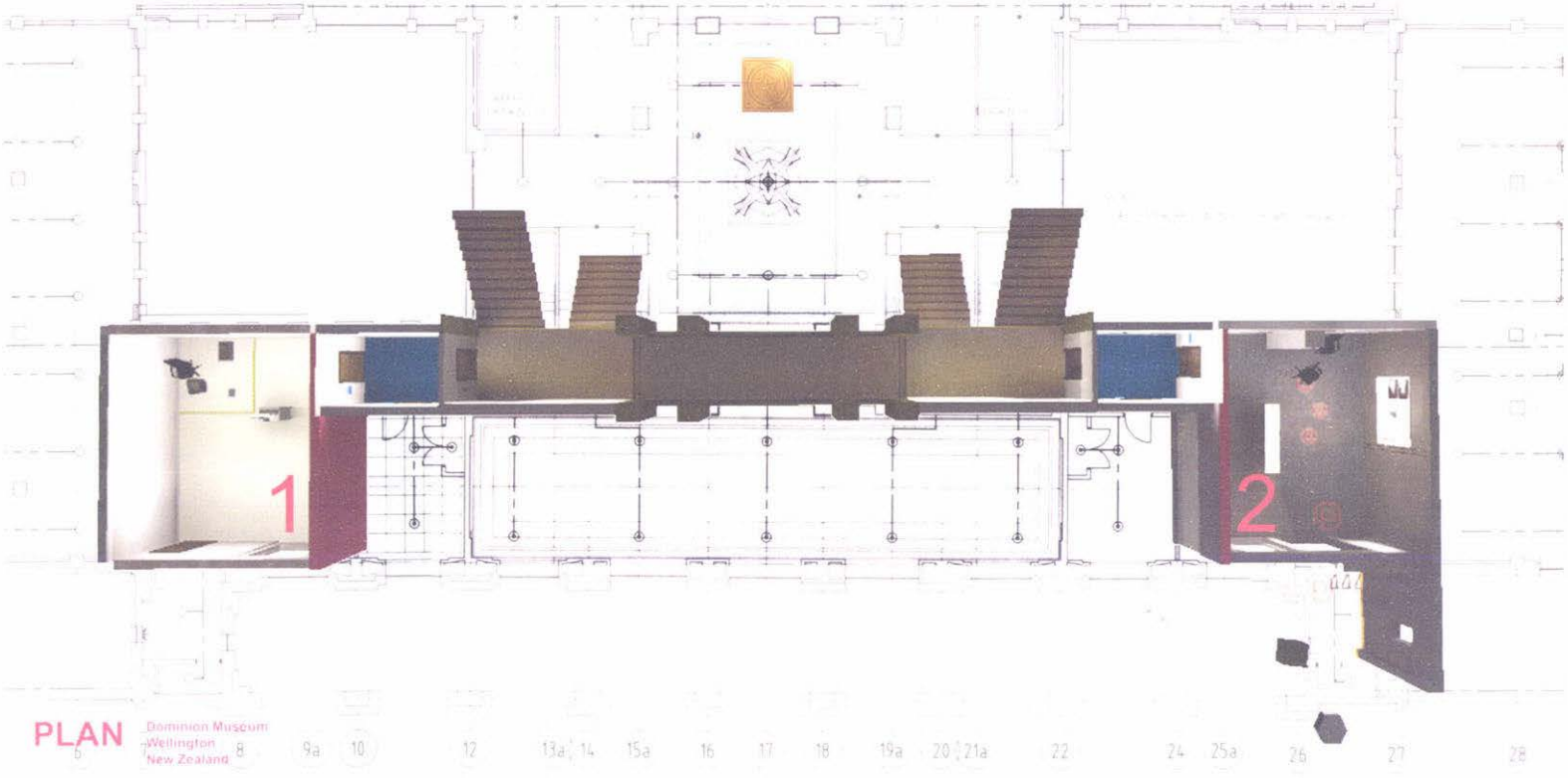

Figure 7. Plan of site,Dominion Museum,Wellington New Zealand '*Being @*' , (Author, 2006).

Figure 8. Room One, Virtual representation '*Being @*' installation, (Author, 2006).

Figure 9. Room Two, Virtual representation '*Being @*' installation, (Author, 2006).

Spatial Dichotomies at the Interface

Room One contains a single PC networked to the CVE with the traditional interface of mouse, keyboard and monitor and several RFID embedded objects consisting of small grass planted cubes, a hammer and a mirrored tablet (figure 8). These RFID objects are placed in arbitrary positions on a display table, with the computer station placed centrally within the space. The room itself and its contents appear ambiguous in nature. The intention of this space is to highlight the disparity that exists between traditional interface experience with Cyberspace and that of corporeal space.

The interaction with Being@ within Room One is offered at two levels of spatial enquiry, that of corporeal and that of cyber-spatial. The order of which is not suggested, instead relying on the explorative nature of active participants. At a corporeal level of spatial enquiry, the objects placed within the room offer no outwardly suggestive clues as to their meanings within the space other than just 'being'; small grass planters appear as such, as does the hammer, with the mirrored tablet acting as a mirror in the typical sense. Ontologically within corporeal space, the objects offer their respective predisposed potentials, a hammer may hammer, grass may grow or die, and a mirror offers the material quality of reflection.

Interaction with the computer station offers the second level of spatial interaction within Room One. The interface devices of mouse, keyboard and monitor allow the participant to

explore a visually accurate three-dimensional model of the room they stand within. Interaction within the cyber-spatial environment of the CVE provides the opportunity to explore the referential spatial boundaries of the room, and to interact with digital representations of the forementioned objects contained within it. Interaction within the CVE offers the ability to reconfigure the placement of the digital entities within digital space. The interaction with the digital entities are not limited to the virtual environment of Room One but throughout the digital representation of the installations physical environment, which encompasses Room Two and the connecting corridor.

What becomes apparent through the juxtaposition of digital and corporeal space, and objects within Room One, is that although they exist with similar spatial characteristics through reference, inherently they are performing as two separate spatial entities. For example, when picking up a digital object there is no apparent effect on its respective representation in corporeal space and vice versa. Another issue that becomes apparent is that a participant can only be fully concerned in action within either corporeal space 'being-in-the-world' or the digital environment 'being-in-the-virtual'; embodied actions are limited to the respective environments and conditions. The threshold of these deferring spatial conditions of "Being," observed within Room One can be considered to taking place precisely at the interface of the mouse, keyboard and monitor.

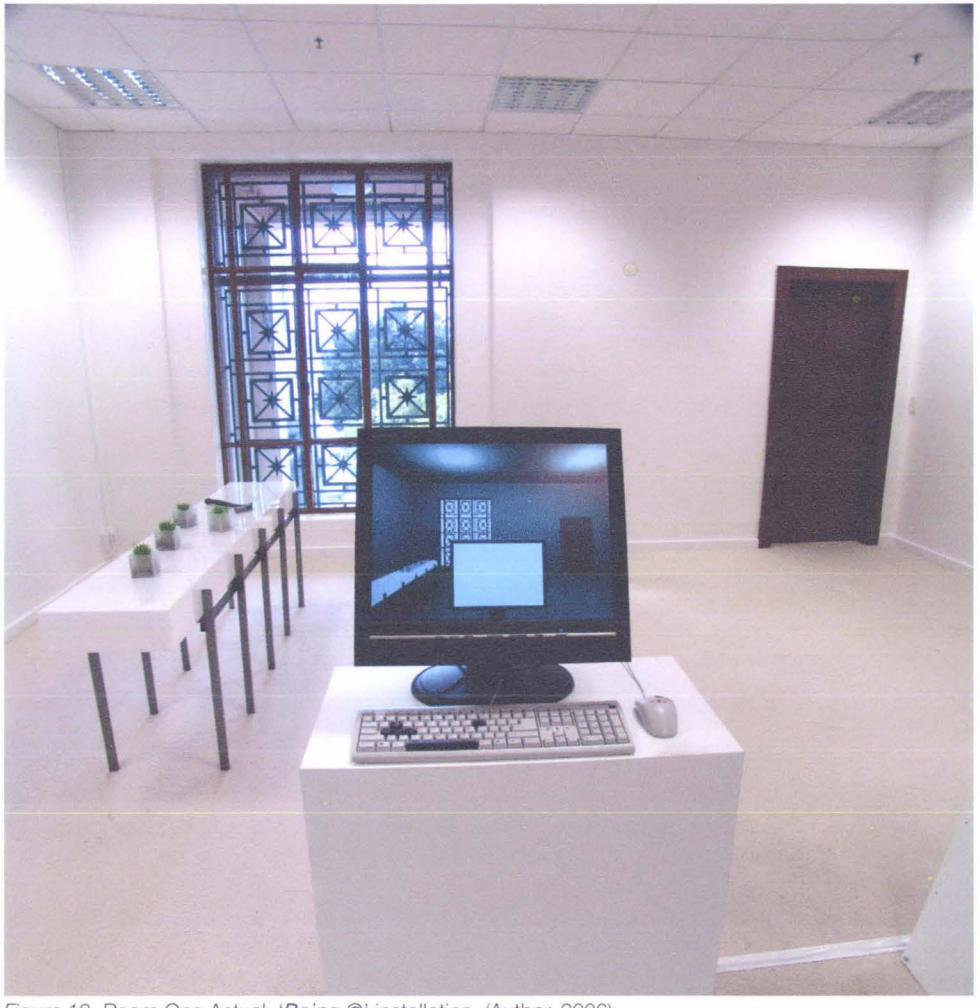

Figure 10. Room One Actual, '***Being @***' installation, (Author, 2006).

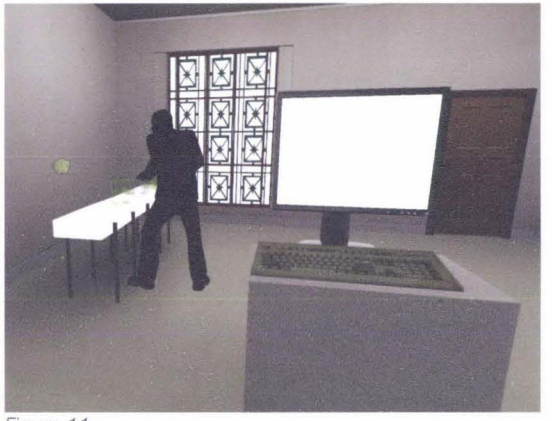

Figure 11

Figure 12

Figure 13

Figure 11,12,13. Room One Virtual, Screen shot of interaction '***Being @***' installation, (Author, 2006).

Figure 14. Room Two, '***Being @***' installation, (Author, 2006).

Figure 15. Hammer, RFID object, (Author, 2006)

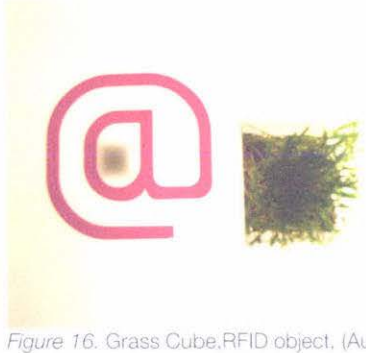

Figure 16. Grass Cube,RFID object, (Author, 2006)

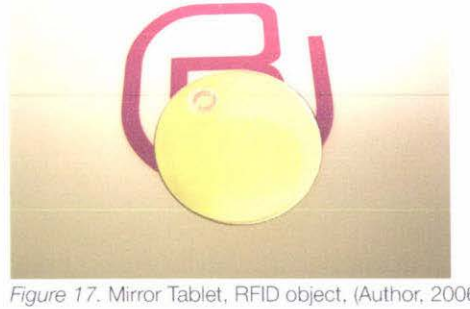

Figure 17. Mirror Tablet, RFID object, (Author, 2006)

Blended Realities

Room Two of the installation is, in its Cartesian dimensions, identical to Room One, containing a visually identical table to that of Room One. This instance of the table differs in that it is embedded with an RFID reader, the position of which is indicated on its surface by a graphic icon. (Figure 14). Various instances of RFID embedded objects are placed within the room with the addition of standard office chair. Positioning of RFID objects to the proximity of the graphic icon on the table allows RFID embedded objects to interface with the installation. The additional interface devices, consisting of four PIR sensors are positioned on the ceiling, with sensors directed towards various locations within the space. These interface devices detect the physical presence of participants through what become active zones within the installation, which are visually identified with graphic icons positioned on the floor (figure 18). There is an absence of any outwardly obvious interface devices that are typically associated with cyber-spatial interaction.

Room Two performs as a hybrid spatial condition with two selected portions of the CVE approximated and overlayed through projection (via data projectors) onto the corresponding architectural surface relative to both the virtual environment and the actual environment. Hence a digital overlay occurs where the virtual environment is formed into actual environment. These blended overlays form the notion of hybrid shared space between the corporeal space and the digital space. This shared space can be experience at two levels, the first as the isolated cyber-spatial experience of a participant through interaction with

the computer station in Room One, or in fact the same cyber-spatial experience can occur with any computer station that is logged onto the server hosting the CVE. The second level offered is a blended spatial experience, which requires being physically present within the corporeal space of Room Two.

Shared Spatial Realities

Interaction from the actual environment into the virtual environment within Room Two is instigated spatially through the positioning of the body over graphical icons that indicate the active interface zones within Room Two. Interaction with these active zones triggers a corresponding action instantaneously within the CVE. These actions perform differing inflections to the graphic properties of the digital overlayed surface (figure 18). What is occurring here is the notion of shared space, realised through reciprocal action. With the inflection of the digital surface performed by a participant present in corporeal space in turn being observed by a participant within the digital space.

The virtual participant can manipulate the same instance of surface inflection, through the negotiation of their digital representation of body (Avatar) over the equivalent icons within the virtual environment. The corresponding inflection occurs through a projection into actual space. Essentially what is occurring is the shared experience of the same temporal existence of information, occurring instantaneously within the cyber-spatial destination of the virtual environment and corporeal location within actual space. The corresponding existence of a referential spatial language of interaction allows the corporeal dimensions of space within Room Two to perform as interface. Space becomes interface.

Actually Virtually Being-with

Within the Cybrid environment of Room Two and the digital space of the CVE there occurs instances where participants become aware of the presence of others outside their respective domains. This awareness in the digital environment occurs in each instance an action is performed by a participant within the active zones in corporeal space. The awareness occurs with a digital representation of an avatar being introduced into the virtual environment in the corresponding position were the action was initiated. This offers virtual participants the awareness of the presence of others. A similar awareness occurs within corporeal space; a silhouette of virtual participants avatar is cast upon the projection as they move across or perform actions onto the shared surface. (Figure 18,19) Such reciprocal casting of the digital representations occurring simultaneously to a given actions, is an invocation of Harrison and Dourish's principle of 'presence and awareness', that the sense of other people's presence and the ongoing awareness of activity allows us the ability to structure our own activity.

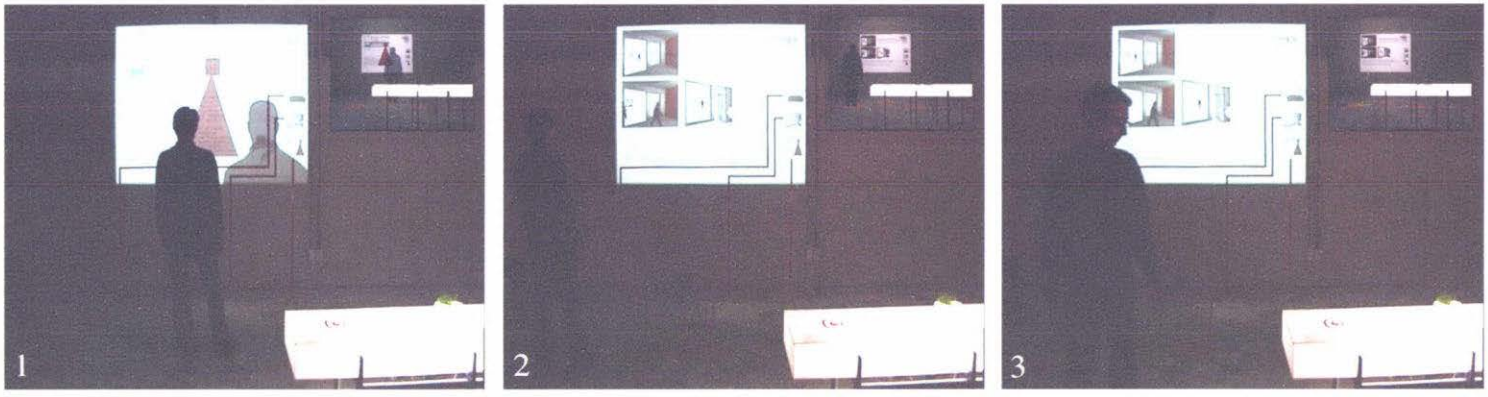

Figure 18. Shared Surface, Cybrid interaction sequence 'Being @', (Author, 2006)

Figure 19. Shared Surface Virtual, interaction sequence 'Being @', (Author, 2006)

Acting out of Space

The second surface projection within Room Two can be considered to be the threshold between the corporeal and the digital space of the installation. Performing as a window into the digital space outside of the CVE's representation of the site. The avatars of virtual participants can be witnessed approaching the surface then dissolving into the hybrid environment, only coming back into presence either through their interaction with the opposing projection, or upon their exit outwards through the window. (Figure 21)

This second surface also performs as the zone where RFID embedded objects have the ability to reveal alternate digital otherness. Objects appearing across the installation spaces of Room One and Room Two, when placed in proximity to the icon on the table perform preprogrammed actions into the digital environment. Grass planted cubes reveal themselves in the form of digitally textured boxes, and in turn have the ability to be picked up and shifted by virtual participants. The RFID embedded hammer through its interaction in turn reveals itself as having the ability to deconstruct the digital matter of the respective boxes. The mirrored tablets offer their alternate meaning in the form of a digital reflection on the opposing surface projection. When placed in proximity to the graphic icon on the table a digital reflection of the participants corresponding representation in the digital environment is revealed. (Figure 20)

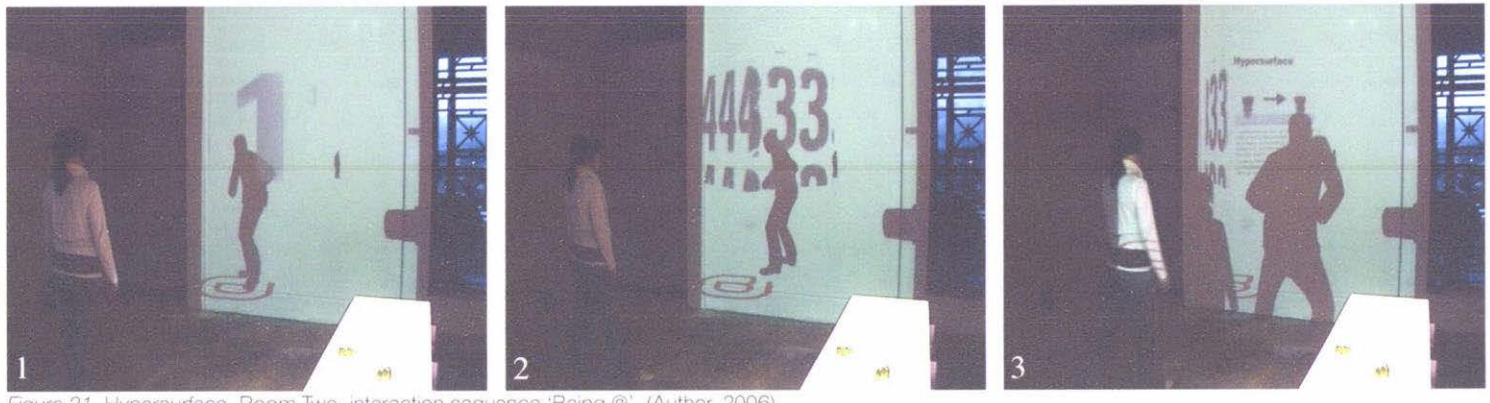

Figure 21. Hypersurface, Room Two, interaction sequence 'Being @', (Author, 2006)

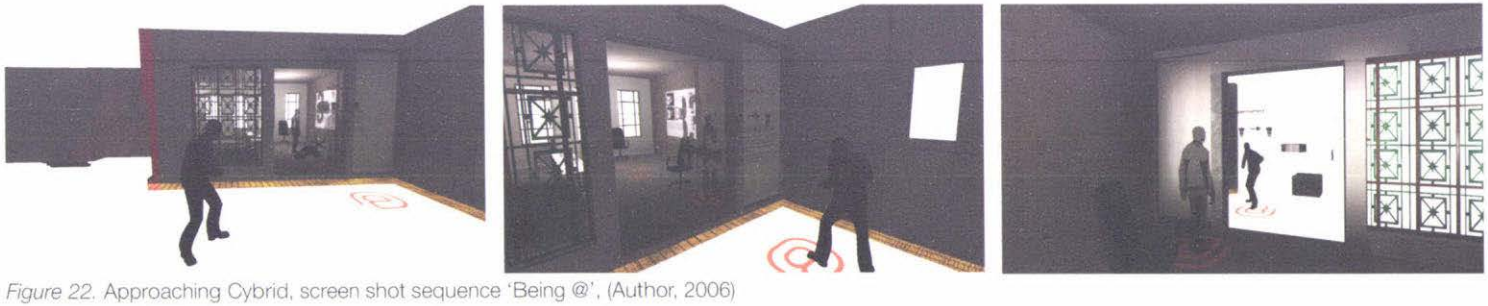

Figure 22. Approaching Cybrid, screen shot sequence 'Being @', (Author, 2006)

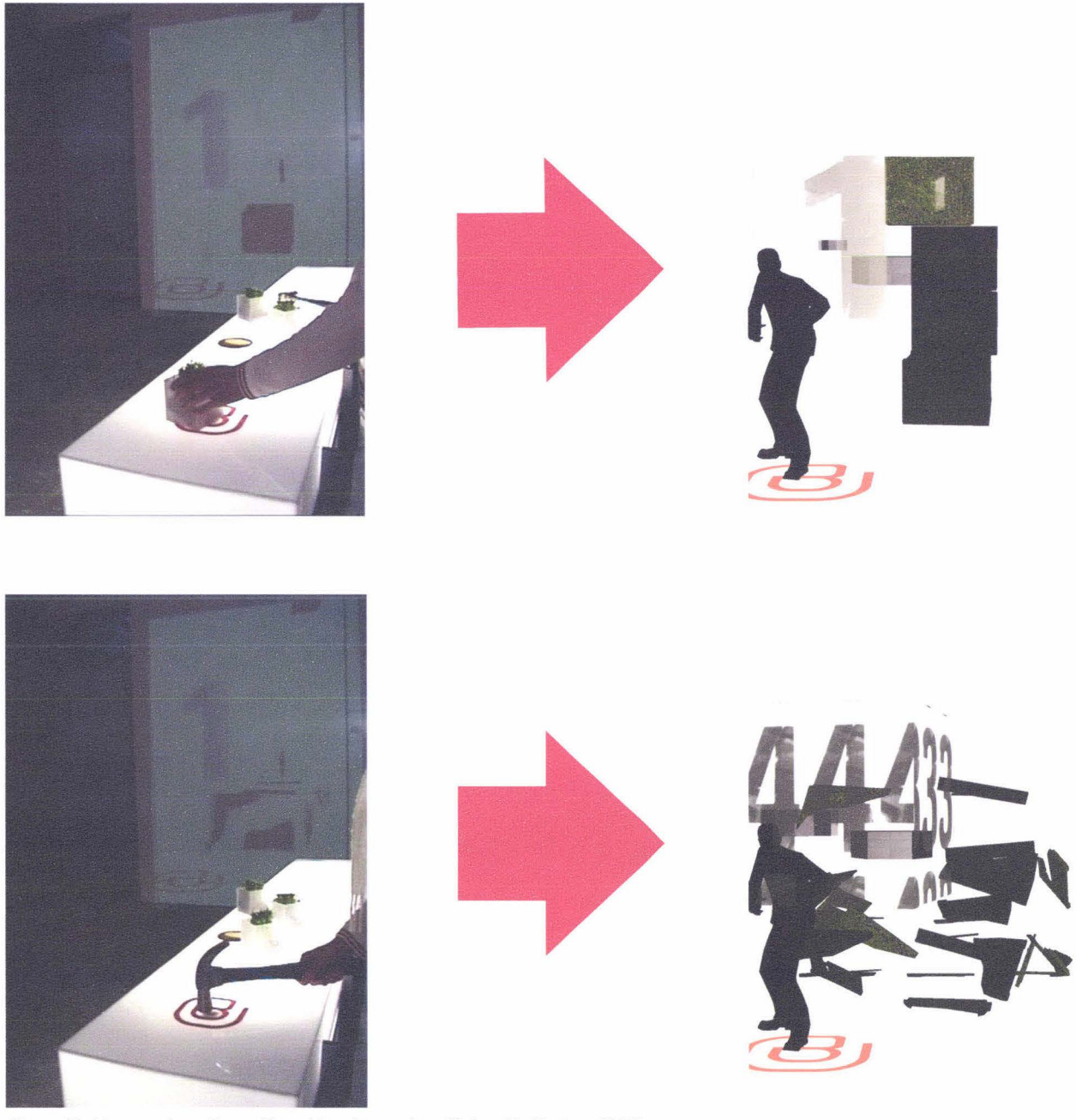

Figure 20. Hypersurface, Room Two object interaction 'Being @', (Author, 2006).

Operating as a window the second surface also provides an insight to the unified spatial language of the respective domains, there is a unity of spatial orientation, up is up, down is down. With the CVE server operating over a duration of the installation, it is possible to infer that someone has been present within digital space in the same manner that tangible objects retain their relative position in corporeal space, so is such within the CVE. If I was to move a digital object to a set location then later discover upon my return it had been moved, there is the awareness that someone has been present. These unified qualities of spatial language within the Cybrid can be considered to be a direct translation of Harrison and Dourish's second principle of Relational orientation and reciprocity whereby as we experience the everyday world, it is filled not only with the artefacts, but also with other people and with signs of their activity. Knowing that the world is structured for others in just the same way as it is for ourselves, we can use this understanding to orient our own behaviour for other people's use (Harrison, Dourish 1997).

Through the event of shared space, the convergence of actual and virtual, the architectural surface itself reveals its potential to become other. An event that Steven Perella has theorised as occurring with media based cultures proliferation of the placement media technology onto surface . Perella defines this notion of architectural surface potential to become other as; "hypersurface" a union of "hyper," which "implies agency reconfigured by digital culture," and "surface," which is the enfolding of substances into differentiated topologies"

(Perella, 1999, p.42). In other terms, Perella writes, "Hypersurfaces are a reconfiguration of both the human subject and the world of objects, a rethinking of Cartesian space and phenomenological grounds for perception" (Perella, 2000, p.7). This potential for collaboration across the corporeal boundary into the virtual is prescient in Heidegger's claim that "A space is something that has been made room for, a boundary is not that at which something stops but the boundary is that from which something begins its presencing" (Heidegger, 1971, p.84).

The link of ephemeral media, the space and physical object creates a new conceptual entity. This kind of Cybrid entity inhabits the physical and the digital domain at the same time, challenging notions of physical presence, ownership and time. Physical matter and digital bytes are converging into new cultural products. Body and information are forming new relationships, while the environment takes the role of the enabling interface.

It should be made clear that the realisation of a Cybrid environment, such as within Room Two of Being @ should not be considered to sit within the framework of 'virtual reality' (V.R). Virtual Realty systems as commonly conceived require the user to consciously remove them selves from one environment (corporeal) into another (digital). When donning electronic goggles or wearing digitally primed suits, there is given the sense of embodiment and presence in the virtual realm, but only at the removal of any external stimuli from the

corporeal environment. This type of cyber spatial experience should be considered to be framed within my notion of 'Being-in-the-virtual'. What a Cybrid spatial condition offers when realised through a spatial interface, based on reciprocal actions through digital and corporeal domains, is a sense of 'Being' closer to that of 'being-in-the-world'.

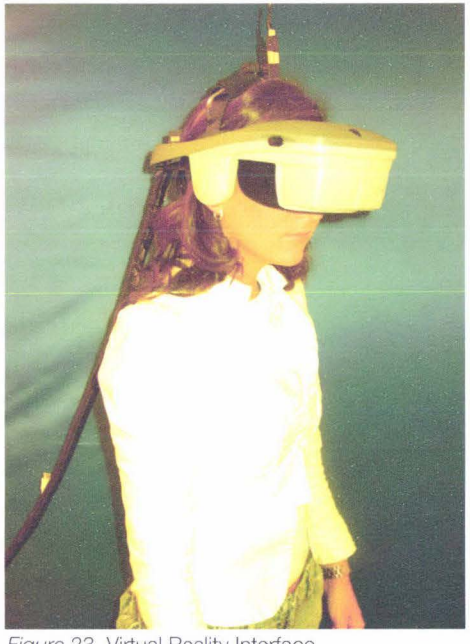

Figure 23. Virtual Reality Interface, (www.stanford.edu/group/vhil/labtour/01.jpg,retrieved 10,6,06).

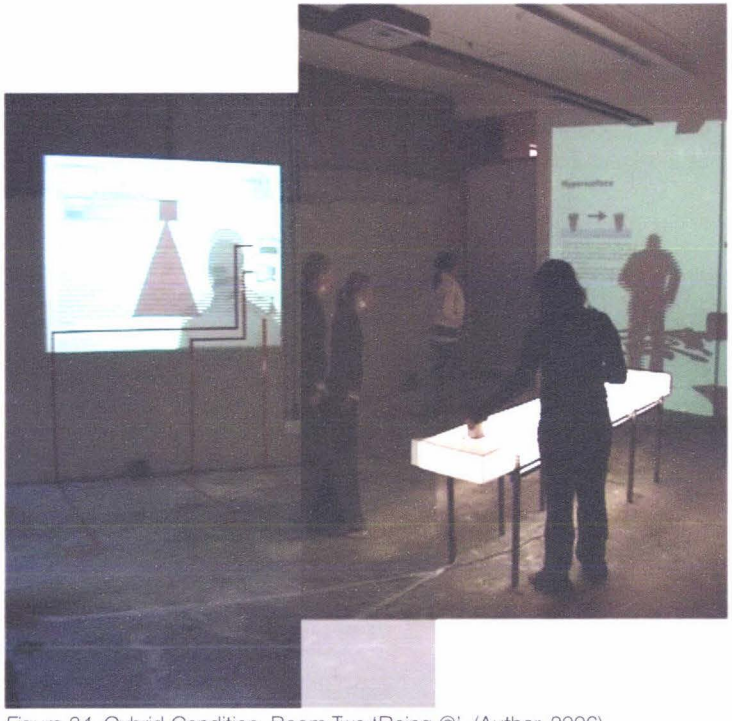

Figure 24. Cybrid Condition, Room Two 'Being @', (Author, 2006).

Conclusion

This research has outlined two differing ways of 'Being' in our everyday experience within media based cultures, one of 'being-in-the-world' based on a Heidegger's spatial philosophies, and the extended notion of 'being-in-the-virtual' that occurs when 'thrown' into cyber-spatial experience. Both notions raise the question: what is our state of 'Being' when experiencing a Cybrid spatial condition?

One response to this question considers the experience of a Cybrid spatial condition as one and the same as the experience of 'being-in-the-world'. That any form of division is erroneous as Perella claims, "The notion of the division between real and virtual, an operative division, is illusory. The virtual is an extension of ourselves into a manufactured and constructed space. It is not a separate space but an extrusion of being" (Perella, 2002, p.32), a claim Perella makes regarding cyber-spatial participation generally. This research has outlined however that general interactions with Cyberspace, can be considered to be experienced in the manner of 'being-in-the-virtual'. That existing forms of cyber-spatial participation require the transgression of 'Being' into a separate space. However, the experience of a Cybrid spatial condition, as shown within the installation Being @, it is possible to experience both corporeal and digital domains simultaneously. There is the potential for a spatial modality of 'Being' to occur concurrently in corporeal location and digital destination.

To accept this modality of 'Being' within a blended spatial experience of corporeal and digital, as fitting seamlessly into Heidegger's frame work of "Being-in-the-world" is far too

simplistic, and to do so would be to do an injustice to Heidegger's philosophy of "Being". The suggestion I would like to propose here, is that the notion of 'Being' within a Cybrid spatial condition is the invocation of another modality of 'being-in-the-world', another sense of being human, that Heidegger ponders upon in his writing *The Question concerning Technology* (1962). As a mode, which Heidegger nominates under the name of the incalculable, he writes:

> This becoming incalculable remains the invisible shadow that is cast around all things everywhere when man has been transformed into subjectum and the world into picture. By means of this shadow the modern world extends itself out into a space withdrawn from representation, and so lends to the incalculable the determinateness peculiar to it, as well as an historical uniqueness. This shadow, however, points to something else, which it is denied to us of today to know (Heidegger, 1962, p.173).

We are yet to witness the full implications of becoming 'incalculable' in a built environment surrounded by a myriad of network capable devices and interfaces within the latent paradigm of Ubiquitous Computing as Heidegger states "it is denied to of today to know" (Heidegger, 1962, p.173).

Where to from here? What are the implications of living in a world of Ubiquitous Computing? Negroponte predicts that soon we "will socialize in digital neighborhoods in which physical space will be irrelevant and time will play a different role" (Negroponte, 1995, p. 7). Eventually,

space will diminish to nothing at all, and the "digital planet will look and feel like the head of a pin" (p. 6) We are all ready witnessing this prediction in the virtual worlds of SecondLife and ActiveWorlds.My hope, however, is that as spatial designers we will seek to shift away from the common conception that we are staring through a window into Cyberspace. Instead suggesting that the window's been broken, and that cyber spatiality has the potentiality to spill out into corporeal space. And as Benedikt (1993) suggests " Just as printing did not replace but displaced writing, and writing did not replace but displaced storytelling, and just as movies did not replace theater, or television movies . . . Cyberspace will not replace either objective reality of dreaming and thinking in their historical modes. Cyberspace will not replace art museums, concerts, parks, or sidewalk jugglers; nor sex, books, buildings, or radio." But that "Each of these earlier media and activities will move over a little, as it were, free-indeed obliged-to become more themselves, more involved in their own artistry and usefulness." (Benedikt, 1993, p.32)

This research should be considered to have placed itself conceptually and in practice, well within the fields of human computer interaction, (HCI), ontological philosophy, embodied cognition and, last but not least, the core discipline of spatial design. With the aim of the thesis to frame the potential of operating in both virtual and physical space simultaneously, it could be considered that the practice of spatial design is gifted at this point in time with a critically important role to play in the future of ubiquitous computing integration into the built environment.

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