

Virtual Imaginations Require Real Bodies
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...[D]reams are manifestations in image form of the energies of the body in conflict with each other...The brain is only one of the organs.
Joseph Campbell, 1987

Mind, Body, and VR

According to Campbell, dreams are the foundations for myth, and both impart a level of consciousness that informs the living world. That consciousness, Campbell explains, exists in the body as well as the mind, and it is only a misconception propagated by the Cartesian point of view that knowing is exclusive to the brain (Campbell, 1987). Thus knowledge and existence are dependent upon our body, and no matter where we go, be it in our dreams, a meditation, imagination, or unexplored frontiers defined by new technologies, our bodies are with us.

Among the new frontiers defined by digital technologies are virtual reality (VR) works of art, also referred to as virtual spaces or virtual environments (VE).¹ Many new media artists are exploring digital technology and the body through means other than VR such as interactive video installations, robotics, WWW art installations, and digital animation. *Body Mécanique* was a recent exhibition at the Wexner center devoted entirely to this notion (see Rogers, 1998). By VR works of art I specifically mean expressive installations that are real time stereoscopic (true three-dimensional display): projections which are immersive, interactive, and adapt to a user's movements in space (Durlach & Mavor, 1995). Within this synthesized digital space, the user interacts with and experiences three-dimensional (3D) spacialized sound and stereoscopic images which are responsive, in many cases, to her or his head and hand movements. Thus, the imagery and sound change as the user alters both head orientation and physical position in the digital environment. The VE may instead, or also, track hand or other body movements,

¹ For the sake of being brief, I will refer to the space created by virtual environment technology as VR or VE throughout this paper. The term VR is problematic and is in fact an oxymoron. The debate over what to call it is not within the realm of this paper.

depending upon the peripherals. These works of art are produced using VR technology such as off the shelf head mounted displays (HMD's) or unique devices that provide a sense of immersion or collect some kind of user input. For a detailed discussion about VR technology, see Kalawsky, 1993.

The term VR is often overused and tends to conjure up grandiose notions that far surpass its capabilities. It is sometimes associated with ideas such as virtual sex, virtual communities, and to some, disembodiment. Those that uphold the notion of disembodiment claim that works of art which embrace VR technology necessarily encourage a state that affirms the Cartesian duality. Propagated in Western culture during the scientific revolution of the seventeenth century, this duality maintains that the mind is separate from and master over the body and knowledge is situated in the brain, thus leaving the physical realities of the Earth, nature, and flesh behind. This coincided with attempts to mechanize the organic and dominate nature, which includes earth, animal and sexual drives, and the body, all identified as female (Merchant, 1980). This view has oozed into contemporary Western culture, still privileging the mind over the body, especially in VR, a space where users can apparently leave their bodies behind and exist in a purely intellectual and rational realm. This split positions the ground for a belief that artworks made with VR tools disembody viewers and propel them into a pure Cyber state.

Although this “Gibsonesque” scenario is rich with metaphors and metaphysical implications, I suggest that any virtual space is an embodied experience because the imagination of the artist and the viewer refer back to the body, to nature, and to the Earth. The mind cannot be separated from the body, rather the two are inextricably intertwined. From the corporeality of Earth and our bodies, we may understand and perceive many more realities, perhaps facilitated by virtual space art installations. In fact, I maintain that even the virtual is real, it is a perception that is a real experience. That perception makes reference to our encounters with the physical and to our flesh.

On Becoming Enlightened

The Enlightened philosophical movement of the seventeenth century, which is characterized by the importance of human logic and reason over the illogical quality of nature, was in part a product of René Descartes' notion of existence, "I think, therefore I am." The Enlightenment theory further assumes that knowledge resides in the rational brain and because it is objective and independent, it is separate from our world and our bodies and is essentially disembodied (Seidler, 1998). Our bodies are thus part of nature, which according to Enlightenment, is something to mechanize and have power over.

Up until the 1600's, Western society valued the parts of the human body and understood that they worked together, the brain included. This was part of an organic philosophy that respected nature as a living organism. Nature was gendered female, it was nurturing and motherly, satisfying the needs of human kind. (Merchant, 1980). However, nature could at times be wild, unpredictable, and the perpetrator of chaos. According to Merchant, it was the role of the scientific revolution to perform two functions on nature, to mechanize it and to control or have power over it. Although seeded through early Christianity and Platonic philosophy, it is at this time when Western ideas made a profound shift away from organic theory and towards Enlightenment, thus marginalizing nature, Earth and the body.

From here, the notion of Enlightenment went on to serve as a basis for many philosophical mutilations of nature, which came to include behaviors and events that were disorderly, irrational, illogical, and emotional. Anything emerging from the body, such as feelings and emotion, were external and thus in opposition to the internal rational mind and consciousness. Experience became something embedded in language and the brain, detached from the corporeal. For a detailed discussion of this transition, see Seidler.

With the privileging of mind over matter driving Western culture, it is no wonder that the quest for disembodiment, especially that of knowledge, existence, and experience, has manifest itself in the digital realm. There is a desire to use new technology to enter a

pure state of consciousness, one that leaves the body behind. *Mind children* by Hans Moravec, head of the Carnegie-Mellon Mobile Robot Laboratory, is an example of this desire in which he fantasizes about a future when life as silicon replaces that of the organic. He envisions a time when a robot will surgically remove, then implant the information from a human brain onto a computer, thus disposing of the body and imparting immortality to consciousness (1988). Even though it is far from clear how this vision will be manifested using technology, the desire to privilege the mind over the body using technology is. This Enlightened point of view is the driving force behind the notion that VR works of art facilitate a disembodied experience.

Certainly, VR technology provides a new experience for the user, but is that experience completely unconnected with the body? An HMD provides visual and auditory stimulations that are not quite in sync with how the user has experienced his or her world in the past. The user adapts to this new set of cues in accordance with the rest of his or her body. Simon Penny presents a number of studies that show how humans and animals adapt to new visual and sensorimotor cues (1994). The ones that are most prevalent are those in which the participant makes a temporary adjustment in cognition, much like a user in a VE would experience. He points out that the key to understanding cognition in VR is whether this kind of adaptation is perceptual or proprioceptive. Proprioception gives us the sense that we are in our bodies, where the boundaries of our bodies reside, and how we situate our body in space. We sense this via receptors in our muscles, joints, skin, and other body parts. One essential difference between perception and proprioception is that the former refers to how we make sense of our world and ourselves given incoming data via our five basic senses, while the latter is based on internally stored information distributed throughout our body; memory in our tissues. Adaptation requires both; our senses attempt to understand incoming data by referring back to schema stored throughout our body, schema created through physically lived experiences. Surely, VR produces many kinds of new sensations, but how we make sense of them depends on what we have stored in our

bodies and mind. Even if we imagine or sense our body missing, it still exists, for without it, we would not be able to imagine.

Piaget's cognitive development theory addresses how the thinking process grows through action with the environment, which refers back to stored knowledge (1971). He said *activity* with the environment forces people to make changes in their thinking processes. Because a viewer of a VE work of art experiences different motor and perceptual constraints from anything they have thus far learned, the viewer experiences what Piaget called *assimilation* and *accommodation*, both part of *activity*. *Assimilation* is when we fit new information into what we already know and *accommodation* is when we alter schemes to make sense of new experiences that don't fit with what we have stored. Both functions require us to physically act with the environment as well as refer back to physically lived experiences. VE technology is not presently capable of creating an exact replica of our physical world; it presents instead a new experience, a simulation of nothing. Applying the theory of *assimilation* and *accommodation* to comprehending this new experience, it is clear that our understanding depends on the stored accumulation of knowledge that we have developed through lived experiences. Negotiation of the new space presented by VR works of art is thus a team effort of the body parts, its tissues and organs within, including the brain. The mind simply directs consciousness towards an end, but it works in concert with the consciousness of the body (Campbell, 1988).

Experience, feelings, emotion, and the body

Embedded in our Enlightened culture is the notion that experience and emotion are not sources of knowledge, rather they live in language. This structuralist belief was seeded in the Cartesian notion that knowing, anything we are, our perceptions and our existence, are solely rational and part of the mind, void of the body. Contrary to this creed is Piaget's *assimilation* and *accommodation* theory, as well as John Dewey's idea that we learn, thus accumulate knowledge through experience. The learning is continuous as we work and

feel through a living world. He said “Experience occurs continuously, because the interaction of live creature and environing conditions is involved in the very process of living (Dewey, 1934, p. 35).” When we enter a VR work of art, we encounter an abundance of emotions and feelings through our experience, one that is a continuation of our lives up until that moment.

John Dewey said that experience is not something that is situated exclusively in the rational mind, rather it is the set of intelligent actions that we make in our world, actions which include emotions and meaning that in turn feed our knowledge, which ultimately exists in our entire self, going far beyond language. The world in a VR installation is another space to understand, and in so doing, we engage ourselves in intelligent actions that elicit thoughts, feelings, and emotion, which are all part of knowledge.

From the perspective of the Cartesian duality, emotion is situated in the domain of the body. However, emotions and feelings are part of knowing because consciousness resides over the entire body. Clearly, knowledge and existence include irrational and illogical thought working together with logic and rational thought. A user immersed in a VR art installation negotiates new experiences that weave thoughts from the mind and body together with emotion and physical sensations. Although most VR works do not tie force feedback to the interaction of the visual objects, the user still feels the bodily sensations of being on Earth; gravity, friction, temperature, the weight of the HMD, and the strain on his or her feet, to name a few. As pointed out by Dewey, Piaget, and Campbell, these sensations, along with emotion and feeling, all work together with the mind and the new visual experiences in order to produce thought and knowledge.

VR works of art are capable of eliciting emotion in the viewer: sometimes joy, often intense fear or sadness. Rita Addison’s *Detour: Brain Deconstruction Ahead* takes viewers on an emotional journey through a car wreck and the resulting brain anomalies. Larry Hodges’ *Phobia* project walks acrophobic patients through VR exposure therapy, eliciting measurable signs of fear and triumph. Margaret Dolinsky’s *Dream Grrrls* immerses

viewers in a dream, part of which references the body. This is yet another way for viewers to reflect back on their own bodily experiences. A dream, according to Campbell, is the energies of the body in conflict with one another, and Dolinsky's installation reminds us of those energies.

No matter how we attempt to explain disembodied experiences, our body still tags along, after all, our entire being is embodied. Perhaps the split between mind and body is finally melding in our psyche and we need a new way to describe the harmony of the human self. According to Keith Devlin, logic has so far been unable to describe the complexities of human thought. To be rational is not necessarily to be logical because rational action cannot be captured by a set of formal rules. Human cognition is a complex mesh of feelings, perceptions, outside influences, and our world (1997). That mesh includes the body and its experiences in any setting, and human cognition in VR is an example of these complexities. If VR truly disembodied the user, then by the Enlightened view, the user's response would be logical and controlled and lack elements of the body such as emotion, perspiration, or other measures of carnal functions. The following works of VR show otherwise.

The Body in VR

Emotion as a bodily response

Emotion is the first thing I think of when I recall Rita Addison's *DETOUR: Brain deconstruction ahead*. This VR work of art is a CAVE installation, a non-conventional VE setup which is a physical room with stereo projections on three walls and the floor. The viewer's orientation is tracked via a head tracker and the navigation is controlled with a wand. Although many can stand in the CAVE at once, only one person drives the view and actions. *DETOUR* was on display during the 1994 Association for Computing Machinery's SIGGRAPH (Special Interest Group, Graphics) convention in Orlando, Florida and is permanently installed at the Electronic Visualization Lab (EVL) at the

University of Illinois in Chicago. This work explores Addison's reality of her mental capacities both before and after a car accident. The presentation leaves the viewer with an understanding of such a transition by putting them through the emotional ordeal of the wreck. In this experience, the viewer feels passion and a connection with the story. Addison gives viewers a first-hand tour of her photographs before the crash, the crash experience, and the resulting perceptual anomalies after the crash. Through this, she intends that the viewers will feel what some of the brain anomalies were like.

According to viewer testimony, Addison was able to reach this goal, evoking emotion and for some, a special understanding for those that live with people who have similar anomalies. When Addison showed *Detour* at SIGGRAPH 94, she noted the effect the work had on the viewers, proof that they in fact reached a point of awe with it. One viewer said, "It's a mixture of art, emotion and technology... It literally left me speechless" (Addison, 1997, p. 3). Ben Delaney expressed a mix of emotions when he experienced the work:

Addison's work starts with the accident, then provides a view of the world as experienced through her modified sensorium. Images and sounds are fleeting, moving and often surreal. The experience, though rather beautiful, is frightening, as being trapped in a Picasso painting might be (Addison, 1997, p. 3).

Delaney's fear was both rational and irrational at once, irrational because the car wreck was not happening to him, but rational because he referred back to his 'normal' experiences with cars and 'normal' perceptions of the world in order to understand and feel the shift.

When I experienced the installation, I felt the broken glass as tingles throughout my flesh because my body reminded me of what broken glass feels like through my past lived experiences. For myself, Delaney, Addison, and other viewers of *DETOUR*, the installation was a lived experience, a continuation of other lived experiences that we understood and knew by using our entire selves.

Anxiety as a bodily response

Another virtual environment that elicits carnal responses is Larry Hodges' *Phobia* project (Hodges, 1995). Although not a work of art, this VE uses standard VR technology, such as an HMD and an electromagnetic head-tracking device. The head-tracker translates the orientation and location of the user's head in space to the computer, which in turn calculates images that are projected to the HMD and coordinated with the viewer's physical perspective. The results from this study are significant because standard VR tools, which have been criticized for their perpetuation of the split between the brain and the body, were used to create an environment to which users responded on a carnal level. Simon Penny argues that the design of these tools were created from an Engineering Worldview which is inherently incompatible with how artists work. For a thorough treatment of this perspective, see Penny, 1997. In short, this view states that many new technologies are created from a logic centered mind, and as I have already pointed out, rational humans are not always logical. Thus the tools do not mesh with the way humans think, especially some of the non-linear processes involved in creating art. Further, tools such as the HMD do not seek to include the body in ways that the CAVE or other unique VR tools do. Although I agree that a holistic approach to the design of some new technological tools is sorely lacking, they cannot aid us in detaching our bodies from our minds.

The first part of the *Phobia* project sought to cure acrophobic (fear of heights) users of their condition by using VR exposure therapy. Acrophobia is characterized by signs of anxiety around heights, and in some cases, an avoidance of them. In traditional practice, a therapist gradually exposes the patient to greater heights, for example bridges or windows in high buildings, either by asking the patient to imagine the situation, or by taking them into it. VR exposure therapy exposes the patient to the various height situations instead of taking them to specific places (Hodges).

Upon exposing users to the VE, the patients showed outward bodily signs of anxiety, much like those they display when looking out of a high window or down from a bridge. Many of the participants experienced shakiness, perspiration, heart palpitations, fear, weakness in their knees, butterflies, and tightness in their chest. The experience the viewers were having was a continuation of their lived physical experiences with gravity and the rest of their world. Their cognition was a result of a complex mesh which included their present physical, visual, and mental sensations and a reference back to the knowledge stored in their bodies about sensations surrounding height. The result was a response from the body and the mind and measured in sweat and shakes.

The dream and the body in VR

Margaret Dolinsky's *Dream Grrrls* is an immersive CAVE installation about dreams in which the objects encourage the user to participate in the story rather than view it. As Campbell reminds us, dreams are a result of bodily energies, and this work of art uses that very premise as a base for experience. In *Dream Grrrls*, participants begin and end in a labyrinth, a place from where they may enter a number of different worlds, each representing a different type of dreaming.

In one such world, known as *Vessel World*, Dolinsky uses various vessels to represent the body. Dolinsky (1998) sees connections with the vessel and the vagina, especially as a part of the process of love making. The vessel is thus an extension of the vagina in bodily form. The vessels reside in a land she refers to as "a desert island of loneliness" and they appear in diverse ways such as ancient, broken, and transparent. Some vessels reflect parts of the viewer while others hide things from them.

Most intriguing is the vessel whose gaze seems to follow the user wherever she or he goes. When the participant confronts this vessel, it begins to shake and appear to engulf the user, suspending navigational control, and expelling her back to the labyrinth, much like waking from a dream.

According to Dolinsky, the person who wears the head-tracking glasses can fully exploit kinesthetics by moving around, bending down, and lying on the floor. They become active participants in a theater of dreams, consequently having unique experiences that they negotiate in reference to lived experiences from their own past, as well as their dreams. The performance is ultimately complete when participants use their entire self, their present mental and physical sensations, as well as the knowledge stored in their minds and bodies, to interact. Of the body in her work, Dolinsky said, "I like to think that my artwork is completed by the action and reaction of the participants experiencing it. For that they need their mind, body and heart." As with all experience, it includes the entire self, and no matter how we try to ignore the body, the vessel will start shaking to remind us it is there.

Conclusion

As we enter the twenty-first century, humans are beginning to see the need for a broader way to understand the complexities of human cognition and experience. No longer can we hinge on the notion that we exist because we think, that our mind is the owner of our experiences, and that all we know is located in the cerebral cortex. As Earth begins to warm, no longer can we claim to dominate nature and pretend that mechanization of the organic is the supreme solution. We are not in charge and no matter what we create, we cannot raise our mental existence above it. We live in bodies that are entwined in a complex relationship with all our organs, tissues, bones, and energies, including our brain. Technology cannot and will not take that away, especially VR.

VR works of art are defining a new frontier, one that gives participants new experiences to reflect on, including the location of their bodies. As viewers carry the experiences of their lives with them into VR installations, they continue them and adapt to new perceptions which refer to life, their body, and their experiences in it.

The knowledge and emotion embedded in our flesh reminds us to tingle, then cry and tremble when we experience the shattered glass and the outcome of the story in Addison's *Detour*. The perspiration, shaking, fear, butterflies, and tension that patients expressed when they experienced VR exposure therapy in *Phobia* were signs from the body that it was present. Experience is not embedded in language, it exists as we have it, as we put our whole selves into it, and as we recall it through our distributed systems of memory.

We fly through Dolinsky's *Dream Grrrls* because our body knows and remembers what gravity feels like, and we experience these dreams as if they could be our own, the energies of the organs of the body in negotiation. We know because of our body and with our body. Imagination is an extension of knowing, and our imagination triggered by VR works of art depends on our bodies. The VR frontier will help provide new sensations for our minds, bodies, souls, heart, and our entire being to experience and participate in.

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