Pluralistic Presence: Practising embodiment with my avatar

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Introduction

The theoretical flaws in the Cartesian modelling of the physical/virtual binary have been exposed. Twenty years on, the 1990s cyberpunk remains unable to leave reality behind, and the sensuous body retains its ontological claim as the locus of perceptual experience. Yet if the sensory and the digital are mutually imbricated then how is that experience manifested in 'my' body? Or, as cyberneticist Frank Biocca asked in his essay on *The Cyborg's Dilemma* (1995), 'where am "*I*" present?'

Digital performance encompasses a vast array of practices, with many differing relationships between human and technology. This chapter concerns itself specifically with telematic performance, in which the performer's body is represented in a remote location by a virtual image or avatar that acts as a conduit for communication. Analogies can be readily drawn with computing gaming, where the avatar acts as the player's representation in a virtual world. Often players describe their avatar's physical actions from a first-person perspective, for example, 'I am running', even though the player is simply pressing the 'W' on the computer keyboard. The intense physical activity of pounding feet and pumping arms is displaced by the single touch of a finger. The heart does not beat faster, and the skin does not sweat. The body appears displaced from the action, despite the player's claim for experiential ownership of the act.

Art historian John Roberts describes the theory of de-skilling in general productive labour, where technology displaces the hand 'from a conception of labour as sensuous totalizing practice' and turns it into repetitive, valueless action (2007: 89). Yet, Roberts explains:

> In art the hand suffers a similar displacement, but, importantly, unlike productive labour artistic labour does not suffer a diminishment of sensuousness and value.
> (2007: 89)

His claim is that the use of tools in art-making does not simply devalue the art product due to reduction in the use of traditional craft-based skills. Artistic labour does not fundamentally alter in its experiential nature because of the distancing of the artist's hand from the work. Instead, it demands a different analysis of the 'place and function of the hand' (89) in the making of such work. Similarly, in this chapter we argue that despite the sense in which the technology might be seen to distance the body from the experience of performing, telematic performers vigorously deny any diminishment of sensuality and physical engagement. We will examine the relationship between human and avatar to consider the place and function of the body in telematic performance, drawing upon digital performance and phenomenology to present our case against the myth of disembodiment.

Illustrations

The discussion in this chapter is illustrated with examples from two projects: *Telematic Dreaming* (1992-present) and *Projecting Performance* (2006-8). *Telematic*

Dreaming was the first in a series of interactive telematic installations by Paul Sermon, and has existed in several forms over the past twenty years (see Fig. 1). The technology has been upgraded, but the concept remains as relevant now as it was then. This chapter concentrates specifically on one instance in 1994, when dance researcher Susan Kozel performed in the installation for four weeks. Two beds were located in remote spaces. Bed A was covered with a blue-screen sheet on which Kozel lay. This bed was filmed from directly overhead by a single camera, and there were three monitors arranged around its sides. Bed B was in a public gallery. Kozel's image was relayed from the camera above Bed A to a projector above Bed B, so the gallery visitors could see her image projected onto Bed B. There were three cameras around Bed B, relaying back to the monitors around Bed A, so Kozel could see when the visitors approached the bed and interacted with her projected image. She could then respond to what she saw happening to her image. There were no instructions or expectations. Some people passed through the gallery, whilst others stopped to sit, lie or interact with Kozel. Critically there was no audio connection, so communication relied on non-verbal modes that encouraged physical engagement. Kozel captured her experience in a phenomenological analysis that provides a detailed insight into the relationship between her body and her avatar (Kozel 2007). Her account forms a key reference point for this chapter.

Figure 1: *Telematic Dreaming* by Paul Sermon

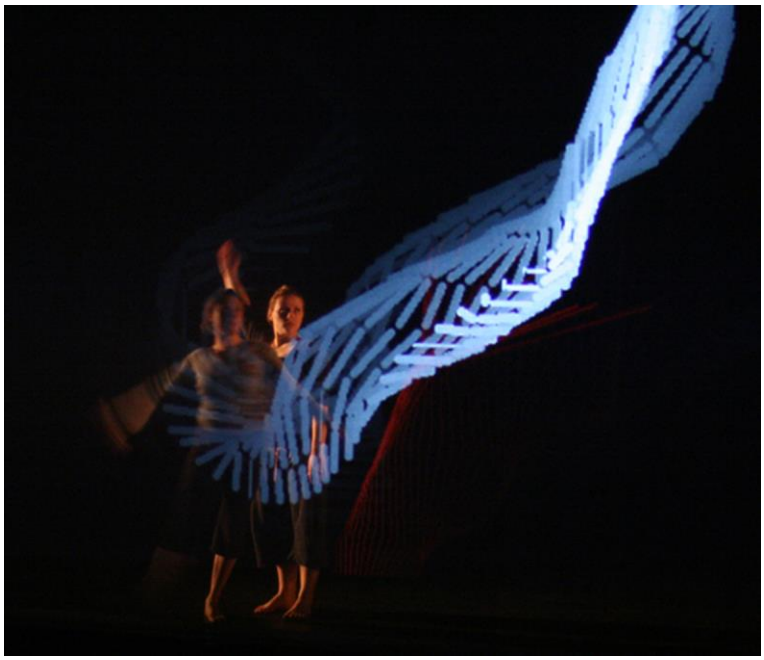
(Copyright: Paul Sermon)

In our second example, the avatar is not a direct representation of the human body. *Projecting Performance* was a research project working with dance, scenography and

technology. [1] As the project leader, Popat brings to this chapter personal experiences and data that illustrate our argument. *Projecting Performance* involved digital 'sprites'; computer-generated abstract images front-projected onto a gauze stretched across the stage. These sprites were manipulated by off-stage performer-operators using graphics tablets and pens. They functioned as avatars, enabling the performer-operators to interact with onstage dancers (see Fig. 2). The performer-operator was positioned in front of the stage so that she could see and control her sprite avatar onstage with the dancer. The dancer was positioned behind (upstage from) the gauze, so that she could see the sprite, approach it and interact with it. The sprites were designed and created in Macromedia Director, with behaviours modelled on springs and masses to give them small amounts of internal motion.

Figure 2: *Projecting Performance* dancers and digital sprite

(Copyright: Sita Popat & Scott Palmer)



In both of these examples, the physical body of the performer is not within the visual field of the spectator. In *Telematic Dreaming* Kozel was in different room, and in *Projecting Performance* the performer-operator was hidden in the darkened auditorium. The technological interface produces a virtual avatar that represents the performer in a different location from her body. It is the nature of the relationship between this avatar and the performer's body that we will now examine.

Ownership and Agency

New media philosopher Mark Hansen (2006) acknowledges the essential function of embodied agency in the construction of all types of reality. He argues against distinctions between physical and virtual realms, proposing instead a 'mixed reality paradigm' in which the body retains its ontological claim as the centre of perceptual experience. In *Telematic Dreaming,* Sermon seeks to reinforce perceptions of embodied presence by maintaining identical proportions between the physical body and its virtual counterpart (Dinkla & Leeker 2002). This creates a visual harmony within which one can more easily construct meaningful relationships between those bodies. However, Hansen suggests that this ability to construct a visual narrative is not the most important factor in establishing embodied agency. He proposes that 'motor activity – not representationalist verisimilitude – holds the key to fluid and functional crossings between virtual and physical realms' (2006: 2). Neurological studies have shown that agency depends on 'higher-order intentions to perform an action, the motor commands issued, and proprioceptive feedback', and furthermore 'a sense of agency has a tendency to increase body ownership' (Gregersen & Grodal 2009: 67). Feedback loops that link intention-action-proprioceptive feedback are

critical to the achievement of embodied agency, creating a sense of self-efficacy in the virtual world, or indeed any world.

In *Telematic Dreaming*, the artist recognizes the virtual image because it looks like him, but agency is established because it also echoes his motor activity. When he reaches out to touch a remote participant's hand, he sees his virtual fingers move towards the fleshly fingers, and he watches the participant respond to his movement. The feedback here is a combination of proprioceptive and visual, producing a sense of agency via the intentional movement, causing an effect in a remote location. In contrast to this, the digital sprites in *Projecting Performance* do not resemble the physical bodies of the human operators. A performer-operator sees two star sprites projected onto the gauze in front of her. She knows that one sprite is controlled by her pen and graphics tablet, and the other by the performer-operator beside her. Until she begins to draw, she does not necessarily know which sprite is her avatar. But once she touches her pen to the tablet then the interface is breached, the connection is made, and she sees her sprite respond to her intentions via her motor activity. Her sense of agency in the virtual world is established as she moves her sprite to dance with the performer on the stage. [2]

When I first operated the sprite, I felt instantly immersed in an overwhelming sense that I was actually dancing with the onstage dancer. My prior experience of live operation of lighting in performance had been dominated by the need to push buttons and move faders. Operating the sprite allowed me to partner a dancer in a playful duet on stage - this was an incredibly liberating and creative experience.

Doubling Presence

The nature of Hansen's 'fluid and functional crossings' is not a direct penetration of the virtual with the physical, or vice-versa. According to Gabriella Giannanchi in her book on *Virtual Theatres* (2004), it is a process of doubling. She suggests that the physical and virtual realms meet and intersect at a place that she terms the 'hypersurface', where 'the viewer can *double* their presence and be in both the [physical] and the virtual environments simultaneously' (95, original italics, authors' insertion). Jon Dovey and Helen Kenney (2006: 106) employ a similar analogy:

> It helps us to understand that we are embodied subjects whilst engaged in our experiences of 'virtual reality'. But we are also re-embodied and gain a sense of presence and agency in these virtual spaces through the interface and the avatar.

Being both embodied and re-embodied does not imply a split subject, but rather a doubled subject. The physical body is conjoined with its (identical or non-identical) twin image in the virtual realm, linked by the loops of intention, action and feedback. These loops are powerful in bestowing agency, but they are also fragile, as we will see later. The projected image in *Telematic Dreaming* is perceived as a 'technologically mediated real', infused with an appearance of 'real'-ness by the agency of the performer that is channelled through it (Giannanchi 2004: 106). Similarly, when performer-operators work with the digital sprites in *Projecting Performance*, they routinely report an experience of dis- or trans-location, describing themselves as being on the stage (in/with the sprite) or caught somewhere between the

sprite and their physical bodies (Popat & Palmer 2008). Agency, and thus presence, passes from body to avatar, with motor-activity as its engine to enable interaction in the virtual realm. It seems, then, that Hansen's crossings occur within the human/avatar connection itself.

Kozel (2007: 99) describes her experience of *Telematic Dreaming as* 'one of extending my body, not losing or substituting it'. Digital performance researcher Susan Broadhurst agrees that technology in performance extends the body 'by altering and recreating its embodied experience' (Broadhurst 2007: 24). These descriptions of the extended body chime readily with the well-rehearsed concept of Heidegger's hammer, where the hammer is understood as an extension of the carpenter, and it is to this scenario that philosophy regularly returns in discussion about relationships between the body and technology. The tool is encompassed within 'an equipmental structure that tends to withdraw from our explicit attention' (Leder 1990: 33), as the carpenter focuses attention on the job in hand. Yet the experiences that we have examined so far suggest a tendency for interface porosity to be biased in the direction of 'physical to virtual', where the physical seems to disappear within the virtual avatar. The virtual image in *Telematic Dreaming* becomes infused with the physical; performer-operators recall a sense of being on the stage, with or within the sprite. In telematic performance, the physical body is extended via its avatar, giving virtual access to remote locations so that the image becomes the mode of communication with others. Rather than the tool withdrawing from explicit attention, the physical body withdraws and all attention is focused upon the avatar. Kozel describes moving her hand to her virtual thigh and being taken aback by the bulk of her physical leg when she made contact with it (2007: 100). In one of our videoconference

performance rehearsals, a dancer recalled becoming acutely aware of the touch of a remote performer, whose virtual hand was stroking the image of her face on the screen, but she found it difficult to orientate her physical body to pick up her coffee cup from the table. In both cases, the performer struggles to come to terms with the reassertion or rediscovery of her physical body, after focusing all attention on her avatar. What is the nature of this disappearance, and does it relate to loss of the body? In order to investigate this phenomenon further, it is helpful for a moment to review the nature of embodied experience in the absence of technological extension.

Attending to the Body

Even without technological accessories, we experience our bodies as both unitary and fragmented, both present and disappearing. The doubling of the hypersurface is perhaps an extension of the daily doubling of the physical world, to which we are well accustomed. Philosopher Shaun Gallagher describes twin processes by which we experience our corporeality: body image and body schema:

> A *body image* consists of a system of perceptions, attitudes and beliefs pertaining to one's own body. In contrast, a *body schema* is a system of sensory-motor capacities that function without awareness or the necessity of perceptual monitoring.
> (Gallagher 2005: 24, original italics)

The body schema is hidden from us, operating holistically as a single unified system that makes possible our interactions with the world through perception, movement and kinaesthetic sensibility (Johnson 2007: 5). By contrast, the body image is the

process by which we perceive ourselves, both physically and conceptually through our own eyes and conceptually through the eyes of others. Body image may be experienced in a 'piecemeal' fashion (Tsakiris et al 2007: 650) where certain parts may be the subject of attention or intention; I may focus upon my foot when I am putting on my sock. Body image can also undergo partial or even complete effacement when my attention is focused away from my body, since normally my body schema continues to keep my processes of perception functioning almost automatically and without conscious control (650). Johnson describes this as part of 'a necessary "background disappearance"', which enables us to engage in a 'fluid, automatic experiencing of the world' (2007: 5), such as reaching out to pick up that coffee cup without considering the sensory-motor skills required to make that movement.

Drawing upon the work of Merleau-Ponty, Drew Leder (1990) examines these processes of bodily disappearance further. He describes how disappearance takes place by using the example of looking at a tree in a field. When he is studying the tree, he pays less attention to the grass or the fence on which he is leaning; the tree is at the centre of his focus, and the rest of the perceptual field recedes from his attention. He relates this experience to the processes within his body:

> Dwelling within the power of sight as my primary mode of world-disclosure, I relegate much of my body to the status of neutral background. This corporeal background, even more than the background of a perceptual field, tends to disappear from explicit awareness.
> (Leder 1990: 25)

Thus, when studying the tree, Leder's attention is focused away from his body and out into the world. His body is in a state of effacement or disappearance, whilst continuing to keep him in a standing position, breathing, etc. Disappearance should not be considered the same as absence, cautions Leder. Instead it is associated with the backgrounding and foregrounding of elements of the corporeal field according to where attention or intention is directed. In this instance, Leder's attention is directed *from* his body *to* the tree, and thus his body is backgrounded and the tree is foregrounded. To introduce technology back into the discussion, Leder might be drawing the tree with a pencil on a sketchpad. His attention would remain focused upon the tree but it is now also upon the pad, comparing the tree and the image that he is drawing. If he is a skilled artist, the pencil will be experienced as an extension of his hand, forming the bridge between his intention to create lines and shading upon the sketchpad, and the actual creation of those lines. His attention is directed *from* his body, *incorporating* the pencil, *to* the sketchpad. Thus we return to Heidegger's hammer.

Katherine Hayles cites cyberneticist Gregory Bates' question as to whether the blind man's stick is part of the man (1999: 84). In cybernetic terms, it is part of the information flow and feedback system by which the man knows the world. Technically the information flow and feedback travels through the stick, taking a fraction of a second for the vibrations to travel the length of the stick. This would lead us to configure the direction of attention and intention as being *from* the man, *via* the stick, *to* the world. From a phenomenological perspective, man and stick essentially become one. The man is familiar with the stick and uses it proprioceptively, usually

without conscious intervention, in order to be in the world. Thus motor-sensory activity is undertaken by man-plus-stick, as the stick is incorporated and hidden within the man's body schema.

> The experience of the corporeal schema is not fixed or delimited but extendable to the various tools and technologies which may be embodied. Our bodies are always open to and "intertwined" with the world. Technology would imply a reconfiguration of our embodied experience.
> (Broadhurst 2006: 138)

The tool (pencil or stick, in this case) becomes a part of the person's body schema. It is encompassed within his embodied interface with the world in order to increase the capacity of the body to achieve more than it can do in its unextended form. The tool is backgrounded and the effect is foregrounded. In reconfiguring our embodied experience, we might say that the direction of intention is *from* the body *and* the tool, *to* the world. [3]

My first thought of the sprites now is 'breath'. The slow pulsations and naturalistic rhythms. There is something about tiny irregularities, nothing living is ever neat. Natural rhythms vary and shift. Not every breath is the same length and sometimes there is a large difference from breath to breath.

And the Hypersurface

Returning to the hypersurface, we see that the doubling of presence described by Giannachi is closely related to the '*and*' that sits between body and tool in the

previous scenario. As a performer-operator, I sit at the desk with my pen and graphics tablet, operating the projected sprite to interact with an on-stage dancer. One might argue that it is the pen and graphics tablet, not the sprite, which is the equivalent of the artist's pencil. In a way the sprite is closer to the sketch of the tree - the visual realisation of my interaction with the tool. The pen and the graphics tablet function as the hypersurface, the technological interface that extends my body into the remote sprite in the virtual realm. The key point here is the direction in which attention is focused. If I attend to the sprite, the direction of attention is *from* my body *and* the interface *to* the sprite. The interface is backgrounded and the sprite is foregrounded. Then the sprite, the interface and I, as a single agent, perform a duet with the on-stage dancer. My heritage, skills and intentions combine with the qualities and limitations of the pen and graphics tablet, and also with the qualities and limitations of the sprite's programmed behaviour and appearance, to produce my avatar as embodied subject. Attention is directed *from* my body *and* the interface *and* the avatar *to* my dancing partner. The '*and*'s do not indicate a linear relationship, but rather a cluster; body and avatar are conjoined by pen and graphics tablet in order to interact holistically with the world.

In *Telematic Dreaming*, the same relationships occur. Kozel's attention is directed *from* her body *and* the camera/screen *and* her projected image *to* the gallery visitor. In this example the connections might seem more direct, since Kozel's body and her projected avatar were visual doubles. Yet both the camera/screen interface and the avatar still had their particular qualities and limitations. The avatar was confined to the surface of the bed, and it was only a direct representation of Kozel if she remained in horizontal alignment to the overhead camera. Vertical movement distorted the

image, and Kozel (2007: 103) describes how she stood on the bed to make her projected head appear vastly swollen as it approached the lens.

There is another difference in the way that the hypersurface facilitates the connections between physical and virtual in telematic performance. When the carpenter picks up the hammer, her body schema encompasses the hammer. When I dance via my sprite with another performer, my body schema encompasses the sprite. However, unlike the carpenter, simultaneously my body image is replaced by the image of my sprite. I invest my 'real-ness' in my avatar, so that it may re-present my agency in a remote location, and I direct my attention towards it as I would towards my hand or my foot. Kozel reports initial disorientation in *Telematic Dreaming* due to the use of video image rather than mirror image, effectively reversing right and left (2007: 99-100). With time and experience she became accustomed to inhabiting her video image, re-learning her body schema to fit her avatar and replacing her conceptual body image with that of her avatar to the extent that she surprised herself by touching her own flesh rather than her virtual leg. After practising for extended periods in the *Telematic Dreaming* installation, both Kozel and Sermon described 'difficulty in getting back to the unmediated world of their own "real" bodies' (Giannachi 2004: 109). In effect, they struggled to disconnect both body image and body schema from what Kozel calls 'the electric body' (2007: 99), the avatar extension.

***And* again…**

The reader will have noticed a growing number of '*ands*' in this explanation of the embodied agent. With each '*and*', there is a further interface to address. The '*and*' between my body and the pen and graphics tablet is directly related to Heidegger's

hammer. The '*and*' between that body/technology pairing and the avatar increases the capacity of the embodied agent but also its complexity, introducing a further layer into the feedback loop between my original intention, my motor activity and its effect. With every enabling '*and*', there is also the potential for severance of the connection, and thus an increasing fragility to the crossings between physical and virtual realms.

We discussed earlier how the body disappears when attention and/or intention is directed elsewhere, courtesy of the body schema's ability to operate quietly and effectively in the background. Leder suggests that it is in moments of dysfunction that the body re-presences itself, often through pain or loss of function due to breakdown or illness. He calls this presencing 'dys-appearance' – an opposite pairing to disappearance. For example, a student may be deeply caught up in listening to a lecture until she becomes aware that her back is aching from sitting in an uncomfortable chair. The severity of the dysfunction can vary considerably, from a persistent itch to a twisted ankle or a serious illness. The body or an aspect thereof is brought into focus through its dysfunctionality, drawing attention away from any external locus and directing it *to* the body. Leder notes that the tool 'participates in the same phenomenological structure' as the body (1990: 83), in that if it functions poorly or breaks then it draws attention to itself. Instead of carpenter *and* hammer attending *to* the nail, the carpenter's attention is directed *to* the broken hammer. The breakdown occurs at the '*and'*, reverting it to a '*to'*; the point of dysfunction is the point to which attention is drawn. The body itself is prone to dysfunction, but its points of technological extension are even more so. The multiple '*and*'s of the human/avatar connection are inherently fragile and liable to dys-appearance. Every '*and'* is a potential '*to'*.

The type and level of dysfunction can vary at each interface just as it can in the body itself. Dys-appearance can be caused by unfamiliarity with the tool, and will often dissipate as the person learns to use the tool sufficiently well to encompass it within her body schema. Digital technologies seem to have endless potential for glitches, breakdowns, and viruses (not unlike bodies), and human error during set-up may be responsible for some of these. Each '*and*' in the human/avatar relationship functions as a lens through which attention/intention must be focused in order to reach its target – the thing it is directed *to*. The feedback loop of intention-action-proprioception-effect can only be completed if all lenses are functioning. If any lens is dysfunctional for any reason then the attention is distracted and stops at that lens, instead of passing through it towards the target. Thus, self-efficacy fails and the individual does not perceive her agency in the avatar.

Kozel describes how her own body drew attention to itself through muscular pain in her neck and back, as she spent long days on the bed in *Telematic Dreaming* (2007: 95). This is a straightforward example of dysfunction at the first base of the human/avatar relationship. She also notes how she lost her connection with her avatar, and thus with the other person, when she lost sight of the monitors around the bed that formed her windows into the virtual realm (2007: 100). The monitors were presenced by their very absence from Kozel's view, severing her connection with her avatar and directing attention towards the (lack of) interface. Yet she also describes a moment when a different kind of dys-appearance took place. Two men attacked her image, hitting the avatar's head and pelvis. Kozel describes how she responded:

> I believe that the extreme violence of the attack caused me to separate my physical self from my virtual self. A split-second after they began to hit me I found myself watching my image in the video monitor, paralyzed with horror at what they were doing to the woman's body – no longer my body. This was the only moment in the entire four weeks when I divorced my two selves […] (Kozel 2007: 98)

This description indicates that the human/avatar relationship had broken down. Kozel suggests that the separation was instigated by her as 'an involuntary act of self-preservation' (2007:98). Yet she also says that she was surprised at this reaction because this was not the first violent response that she had experienced: earlier a man had elbowed her image in the stomach, and she had doubled up even though she felt nothing physically. To a certain extent, our bodies can fill in the gaps between what we see happening to our avatars and the physical responses that we feel. The dancer feels the remote performer stroke her cheek because she sees it on the screen. There is no physical touch to be felt, but her senses tell her that she has been touched. Yet because this feedback is based on extrapolation of the experience from avatar to body, her senses will struggle to deal with new or extreme experiences. Kozel's attention is focused upon the avatar that she no longer encompasses within her body schema, and so no longer experiences as her body image. She is unable to close the feedback loop since her senses do not (and perhaps cannot) create a corresponding physical response to the experience that she sees her avatar undergoing. The dysfunction is both emotional and physical, occurring between Kozel *and* the avatar and causing the avatar to re-presence itself as a separate and alien image even though it remains identical to Kozel herself.

Dys-appearance is not necessarily limited to dysfunction. There were several different sprite designs in the *Projecting Performance* portfolio, and individual performer-operators developed their own preferences for particular sprite designs. Each sprite had its inherent behavioural qualities and movement style that governed aspects of the way it moved, even when controlled by a performer-operator. Most people preferred the sprite that they found most intuitive to operate. They found that the programmed behaviour of other sprites tended to be distracting, undergoing dys-appearance by attracting attention to undesired or unexpected behaviours. This was not necessarily an effect of lack of practice or familiarity with the tool, although experience did increase facility. The issue appeared instead to be the combination of the movement styles of the performer-operator *and* the sprite. The '*and*' here is not a simple case of one-plus-one. The key is that process of contamination at the hypersurface. The movement of the performer-operator and the sprite intermingle in order to create the projected technologically-mediated entity that dances with the onstage performer. Physical and virtual contaminate each other as the performer-operator's actions are doubled in the two realms. Her agency infuses the sprite and they dance together, more fundamentally connected than dancing partners. As Hansen noted, motor-activity is central to the crossings between realms. In order for the performer-operator's intention as a dancer to be fulfilled, *the visual feedback from her avatar's movement must correspond with her kinaesthetic experience.* [4]

> *I tend to think a great deal about pathways through space defined by my centre of gravity, and rearrangements of my distal parts about that centre. This is a way of thinking which I think is very martial arts derived. The Star sprite taps into that way of thinking - it`s a simplified representation of one of my core kinaesthetic/proprioceptive tendencies.*

***And* Finally**

Leder suggests that Cartesian dualism has been perpetuated in Western philosophy by '*the body's own tendency towards self-concealment* that allows for the possibility of its neglect or deprecation' (1990: 69, original italics). We propose here that the same tendency is responsible for the myth of disembodiment brought about by perceptions of a physical/virtual binary. Just as Roberts' distanced hand in art-making does not result in a lack of sensuousness and value in the artwork, so the distanced body in telematic performance does not result in a disembodied experience. Acknowledgement of the primacy of motor activity in creating agency leads us to realize that our bodies were never really absent or even genuinely distanced in either case.

The avatar itself is a digital entity. *My* avatar is the digital entity infused with *my* agency, driven via the engine of *my* motor-activity at the interface. Cross-contamination at the hypersurface results in the avatar as the sum of human and technological features: a 'lived' posthuman body, part flesh, part technology, located simultaneously in two remote sites. The flow of information and feedback between body and avatar through the umbilical cord of the interface means that neither is fully physical and neither is entirely virtual, since the embodied agent spans the two subjects, with one foot in each metaphorical camp. This is the mixed reality paradigm in Mark Hansen's terms, where motor activity 'holds the key to fluid and functional crossings between virtual and physical realms' (2006: 2). The embodied subject is the

vehicle within which those crossings take place. To offer an answer to Biocca's question, 'I' am present wherever I have agency.

Notes

1. *Projecting Performance* (2006-8) was funded by the Arts and Humanities Research Council. Project team: Sita Popat and Scott Palmer (University of Leeds), Kit Monkman and Tom Wexler (KMA Ltd). Further information at http://www.leeds.ac.uk/paci/projectingperformance/home.html

2. In textbox: Scott Palmer, scenography researcher on *Projecting Performance*, talks about his experiences of working with the sprite as a performer-operator (February 2011).

3. In textbox: Bobby Byrne, dancer and PhD student, describes his experiences of dancing with and operating the sprites (October 2010).

4. In textbox: As Note 3.

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