Rethinking the Virtual

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Repensando o virtual

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Apresentação

Burbules faz uma sÈrie de consideraÁıes para montar um conceito teÛrico do virtual. Primeiro, examina os quatro processos da vinculaÁ„o (interesse, envolvimento, imaginaÁ„o e interaÁ„o) para que ocorra a imers„o, muito importantes para entender-se o potencial educacional da virtualidade. Segundo, aplica o conceito do virtual ‡ discuss„o do espaÁo e do tempo virtuais decorrendo daÌ que, ‡ medida que os espaÁos virtuais tornam-se conhecidos e importantes, passam a ser *lugares* virtuais. Essa transformaÁ„o pode acontecer de duas maneiras: por *arquitetura* e por *mapeamento*, em plausÌvel paralelo aos pontos de vista respectivamente do professor e do aluno. Este trabalho pode ser visto como uma tentativa de desmistificar a virtualidade como sendo exclusivamente tecnolÛgica e de encar·-la como a base de um conceito *educacional*. Destacam-se, neste artigo, os conceitos de *virtualidade*, *lugares virtuais educacionais* e *arquitetura e mapeamento*.

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The Virtual

The term ìvirtual realityî (VR) was reputedly first coined by Jaron Lanier, head of Virtual Programming Language, Inc.[1] It is usually taken to refer to a computer-mediated simulation that is three-dimensional, multisensory, and interactive, so that the userís experience is ìas ifî inhabiting and acting within an external environment. A few typical definitions emphasize these main elements:

> The illusion of participation in a synthetic environmentÖ.VR relies on three-dimensional, stereoscopic, head-tracked display, hand-body tracking and binaural sound.[2]

> A combination of computer and interface devices (goggles, gloves, etc.) that present a user with the illusion of being in a three dimensional world of computer-generated objects.[3]

> Virtual Reality (VR) is minimally defined as a computer generated experience consisting of stereoscopic, real-time, viewer-centered computer graphics. A VR experience may be further, and significantly enriched by the inclusion of spatially located sound, haptics, and smell.[4]

> A computer system used to create an artificial world in which the user has the impression of being in that world and with the ability to navigate through the world and manipulate objects in the world.[5]

> A VR is a computer world that tricks the senses or mind.[6]

There are two main characteristics revealed by these definitions which, I will argue, inhibit a deeper understanding of ìvirtualityî or ìthe virtualî (terms I will prefer here to ìvirtual realityî). The first assumption is to put the matter of technology at the forefront: VR is computer generated; it involves the use of goggles, gloves, or head-tracking devices, etc. *Yet the key feature of the virtual is not the particular technology that produces the sense of immersion, but the sense of immersion itself (whatever might bring it about), which gives the virtual its phenomenological quality of an "as if" experience.*[7] When we think of the virtual in this way, we see that all sorts of things can create this sense of ìas ifî: watching a film, reading a book, listening to music, or just being caught up in a reverie or conversation, for example; all of these can trigger engrossing experiences of multisensory worlds which, when we are immersed in them, fill our experiential horizons. There is nothing necessarily computer-based about such immersive experiences: some writers characterize science fiction literature as a virtual reality; others, shopping malls.[8]

The second assumption of most of these definitions is to characterize VR as a substitute for reality, as an ìillusionî or a ìtrick.î Terms often used in place of ìvirtual realityî include ìsimulated realityî or ìartificial reality.î The problem with this view is that it assumes an overly sharp separation between the ìvirtualî and the ìrealî ó the real seems to be a simple, unproblematic given that we perceive and interact with directly, while the virtual means something more like ìsyntheticî or ìillusory.î[9] Yet any reality we inhabit is to some extent actively filtered, interpreted, constructed, or *made*; it is not merely an unproblematic given, while the virtual is not merely imaginary. *The virtual should not be understood as a simulated reality exposed to us, which we passively observe, but a context where our own active response and involvement are part of what gives the experience its veracity and meaningfulness.* Hence the virtual is better seen as a *medial* concept, neither real nor imaginary, or better, both real *and* imaginary. In this sense ìvirtual realityî is a misnomer.

For many critics of technology, this contrasting of the ìsyntheticî world with a more immediately sensible ìrealî or ìauthenticî world begins with arguments derived from Martin

Heideggerís ìThe Question Concerning Technology.î[10] Heidegger contrasts two ways of interacting with the natural world. From the technological standpoint, nature is revealed as a ìstanding reserveî (*Bestand*) a potential resource for humans to control, reshape, and exploit for their purposes. In this context, ìtechnologyî is not a thing, but an attitude toward and relation to the world. We regard natural things in terms of what we can do with them: a river is a potential source of electrical power; a tree is a potential table; a canyon a potential tourist attraction. This attitude and relation, this ìenframingî (*Gestell*), in Heideggerís phenomenology, already transforms the world, even prior to any actions: the tree is changed into a thing-that-can-be-used, and is never again simply a tree, a thing-in-itself. A canyon that you have to pay to go see is in an important sense no longer the same canyon that it was before. On this highly influential view, ìtechnologyî is something intrinsically damaging, even insidious, because it robs us of the capacity to apprehend and appreciate the world simply as it is. This inverts the understanding of technology as something useful and beneficial ó even if it may have dangerous side effects (pollution, say) ó to something inevitably destructive. On this view, it is an all-consuming, all-inclusive mindset that attempts to draw everything into its utilitarian frame of reference. Heideggerís anti-technological views, although not referring to computers at all, have been widely cited in the work of those suspicious of the rise of digital culture.[11]

Heidegger contrasts with the technological attitude a more direct, immediate, and in some ways almost mystical engagement with the natural world, in which its being becomes apparent to us on its own terms, not on ours. The world that presents itself *to* us, not as a potential object *for* us, is the authentic, natural reality that grounds all being. Here again, we see an influential idea that has shaped environmental movements and other back-to-nature trends ó and at a broad level, the dichotomy Heidegger is drawing makes some sense: we know that there are real-estate developers who look over a wooded valley and see it only as a potential site for a new subdivision; or engineers who boat down rivers looking only for a good place to build a dam. We have seen the decimation that occurs when society begins consuming non-renewable natural resources, when humans regard the world as a domain somehow given to them for their exclusive use, as opposed to an ecological system of which humans, like all natural beings, are a part, and to which we must be ultimately responsible.

At the same time, it must be said, this dichotomy is overdrawn. Heideggerís view of technology is too encompassing, too deterministic, and his view of nature too romantic. The origin of human culture is itself grounded in the first tools, the first attempts to harvest and later to grow food, the first attempts to build shelter. If this is inherently an assault on nature, then there never was a pure, authentic engagement with it ó†nor ever could be (because on this view, the ìtechnologicalî attitude is just as much expressed in ìrenewableî resource use, low-energy-consuming lifestyles, the adoption of ìnaturalî foods and fibers, etc.). On the other side, whenever Heidegger does try to explain what a non-technological engagement with nature would look like, his language becomes allusive and quasi-mystical. Nearly all of us have a sense of those moments when a sunset, a surging river, a breathtaking vista, overwhelm us with their purity and power, but presumably even real-estate developers and engineers can experience these too (and then get back to work planning their next ground-breaking).

In the context of computers and digital culture, this bifurcation of the synthetic and the real has obscured a deeper understanding of what is changing in the ways that we make and explore our worlds, mediated by and through new technologies. Very rarely, if ever, is there a ìdirect perceptionî of anything; we actively observe, select, filter, and interpret our experiences in all sorts of ways that construct distinct and sometimes idiosyncratic *versions* of the world. Some of these mediations are overtly technological in nature: eyeglasses, cameras, telescopes ó or, more subtly, concepts, categories, theories, and assumptions. The world we perceive is always already a world we ìmakeî to some extent.[12] This understanding, then, complicates the picture expressed in quotes like, ìthe more completely ëvirtual,í the more completely ëmadeí our lives become, the more obsessively we search to rediscover something simply given, something authentic.î[13] There is something to this view, of course; but matters are not so simple. As I noted, the virtual is a *medial* concept, between the patently made and the apparently real.

I do not think I need to review here all the recent theoretical work that challenges the easy distinction between representation and reality.[14] The boundaries of our ìrealî selves, ìrealî lives, ìrealî experiences are already fluid and contingent. An excellent discussion of some of these issues in the context of new technologies is Sherry Turkleís book, *Life on the Screen*, published in 1995.[15] For many of the people she interviewed, the Internet is a place they inhabit, not simply a tool they use; some users spend so much of their day working, playing, interacting, exploring, and creating online that this becomes their primary mode of existence ó†what we call ìordinary lifeî or ìreal lifeî is not what is most important or ìrealî to them. Plugged in, logged on, immersed in, what they are doing for hours at a stretch, for these folks it is no exaggeration to say that they *live* in a virtual world. What is most striking in reading these accounts is how these people report their *preference* for the online world; they say it is more ìrealî to them, more important to them, and where they feel their authentic selves get expressed. One important dimension of this change is how people inhabit the virtual space; often by constructing online identities (ìavatarsî) that are different ó sometimes dramatically different ó from their ordinary selves (a man representing himself as a woman; a shy woman representing herself as sexually aggressive; a black person ìpassingî as white, or vice versa; a soft-spoken dweeb posing as a heavily muscled superhero). These are not in any simple sense ìsubstitutesî for their ìrealî selves ó performances, fantasies, or role playing ó because these people often say that they *prefer* their online selves, and even say that these avatars are *more truly* who they are, or feel themselves to be, than their apparent identities. As Turkle notes, this trend is part and parcel of broader social and cultural trends that highlight the constructed and non-essentialist nature of personal identity.[16] Either one can discount these peopleís views as deluded or pathological, or one must acknowledge that something new and different is happening for them. I will return to this theme later.

In this paper I build theoretically off this conception of the virtual, through a series of steps. First, I explore four processes of engagement through which immersion happens (interest, involvement, imagination, and interaction); these will prove especially important for understanding the educational potential of virtuality. Second, I apply this conception of the virtual to a discussion of virtual space and time, suggesting that as virtual spaces become familiar and significant, they become virtual *places.* Two ways in which this transformation can take

place are *architecture* and *mapping*, and I suggest that in educational contexts these processes broadly relate to the perspectives of teacher and learner, respectively. Architecture and mapping represent the structures or design elements in which the four aspects of immersion are guided toward learning goals; when these structures are successful, the process of immersion involves students strongly in the activities of learning. In this sense, then, it is not an exaggeration to suggest that all successful learning environments are, to some extent, ìvirtual.î One way to think of this project is as an attempt to rethink virtuality outside of an exclusively technological domain, and to see it as a central *educational* concept.

Four Aspects of Immersion

It needs to be explained *how* the virtual sustains the sense of ìas iffî ó what some call telepresence, and what I am calling here immersion.[17] I gave several examples previously of experiences that can sustain a sense of immersion ó and which are to this extent *virtual experiences*: watching a film, reading a book, listening to music, or being caught up in a reverie or a conversation. What gives such virtual experiences this quality of immersion? I define four interrelated factors at work here: interest, involvement, imagination, and interaction.[18]

An experience is *interesting* to us when it is complex enough to allow us to pick out new elements, even with repeated encounters. We can shift focus and notice things we had not noticed before. An interesting experience presents a kind of puzzle that is challenging enough to engage us in actively trying to work out what is going on. Even rereading a book or hearing a piece of music that is very familiar can have the capacity to interest us anew if there is enough to it that we can pick out something that we hadnít noticed before, allowing us to appreciate it or understand it in a new way. Interest is one of the qualities that can sustain the sort of engrossment that makes us immersed in a virtual experience. But, of course, interest is not an intrinsic quality of experiences; what is interesting to me may not be interesting to you. Something that lacks interest cannot sustain a truly immersive experience.

An experience is *involving* when we have a reason to care about what we are experiencing: we pay attention to it because it concerns us in some way. Perhaps there is a narrative structure involved, or a goal or aim that *matters to us*, even if the goal or aim is not intrinsically valuable (games can be like this, for example, as we lose ourselves in the playing of them). In some cases there may be an aesthetic component to involvement, because we enjoy the experience and this is what makes us care ó at other times the experience may not be particularly enjoyable, but it involves us because it is important for other reasons (hearing a sad story recounted by a friend, for example).

An experience engages our *imagination* when we can interpolate or extrapolate new details and add to the experience through our own contributions. We may be interpreting what is going on, making guesses about things that are not immediately present to us (visualizing the face of a character in a novel, wondering what her inner thoughts might be; conjuring a mental image to go along with a piece of music we are hearing; thinking about what the unseen interior of a house we see in a painting might look like); or we may be anticipating what will happen next in some sequence or development. Actively going beyond the given is part of what engages us deeply in it.

An experience is *interactive* when it provides us with opportunities to participate in it, not only perceptually or intellectually but also

through embodied action and responses. Many theorists put interactivity at the forefront of what makes ìvirtual realityî so vivid and plausible, because we are able to act upon an environment, see the effects of our actions, and react to them. This deeper engagement of our bodyís movement, activity, and sensations triggers unconscious responses that make us *feel* ìthis is really happening,î below the level of conscious analysis (for example, how the perceptual field of a technological ìVRî environment moves as you move your head wearing goggles or a helmet). But, again, it is a mistake to think of this as a factor only in such technological ìVRî environments. When watching a film or hearing a story, our posture, body tension, and startle responses ó or, to take another example, our relaxation, rhythmic movement, and kinesthetic sensations listening to music ó are a key dimension of the quality of immersion that makes the virtual seem or feel ìrealî to us at the moment it is happening.

These four qualities, as described here, are not meant to be exhaustive of all the factors that constitute the virtual; and they are not entirely discrete from each other ó one could consider imagination in the sense defined here as a kind of interactivity; interest and involvement clearly can have a lot to do with one another. But I think they are helpful in clarifying the processes through which immersion happens; and they help us understand why immersion can be such a powerful mode of response. They push our understanding of the virtual beyond simply thinking of it in terms of vividness or verisimilitude (ìit seems so real!î); and they decouple what makes the virtual, virtual, from the issue of technology and the specific media through which engagement happens. All of these qualities (interest, involvement, imagination, and interactivity) could be true, for example, of an intense conversation with a friend recounting a traumatic event, say, an accident or an assault: for long stretches the conversation could sustain an immersive, virtual experience, in which we are not only listening, but actively engaged with what they are telling us; all four of the factors described here could be involved as we identify with the event and even, in some sense, virtually re-experience it with them ó we may even *feel* as if it were happening to us (we may feel a sympathetic ache, for example). These four factors are outgrowths of the *relation* between observer and observed: qualities of response to an experience (in this they might be characterized in John Deweyís terms as *transactional* elements).[19] While grounded in characteristics and qualities of the virtual environment, this analysis makes clear that immersion is a consequence of our active response and engagement with them ó†it is not something that happens ìtoî us.

This analysis also makes it possible to see some of the ways in which virtuality can be abused: as a method of deception or manipulation, for instance. I have already described people who state that they *prefer* their virtual experiences and identities, consider them ìmore real,î as far as they are concerned. For some of these people it may truly be a concern that they become addicted to virtual experiences, or can no longer differentiate the virtual from other modes of experience. Countless science fiction stories and films (most recently, and perhaps most famously, *The Matrix)* have been premised on the idea that a person may permanently inhabit the virtual and lose awareness of the context that gives the virtual experience its boundaries. Here the illusion/reality dichotomy seems to re-emerge, but in my view it is more accurate to say that these are different kinds of realities, made worlds, some of which are more susceptible to questioning about how and why they are made the way that they are (a vivid

memory which may or may not recall an event which really happened; an historical text versus a ìtruthfulî fiction; and so on). It is the lack of an ability to ask such questions, to regard the context of any experience as potentially problematic, that is a potential issue. The whole point of ìimmersionî is that for periods of time we forget that we are watching a film, wearing goggles, sitting in a symphony hall, etc. But if we *perpetually* forget this, abuses and dangers can arise.

On the other hand, turning this question around, I would argue that this analysis of immersion, and how it happens, has strong positive implications for the design of educational environments and experiences. Interest, involvement, imagination, and interactivity, as I have defined them here, are essential educational resources if we mean to engage and motivate active student learning: in this sense, any truly educational experience is immersive, or in other words, *virtual*. A virtual learning environment is not necessarily a technologically based one, I have stressed, and other modes of teaching can promote the quality of immersion. But I do mean to upset the assumption that face-to-face classroom interactions are necessarily more authentic, more meaningful, or more educationally productive than technologically mediated ones. For a digital generation, the qualities of interest, involvement, imagination, and interactivity are to some extent shaped by their engagements with technology and the media (computer games, videos, cell phones and handheld PDAís, etc.) and educators seeking to attract and retain student attention will have to learn from what makes those environments so immersive for youth. Yet neither am I arguing the superiority of the technological over the face-to-face. Each domain has its own unique qualities and advantages; for this reason the question, to me, is not a matter of ìWhich is better?î or which should substitute for the other, but, ìWhat is the distinct capability of each to support immersive learning experiences?î (For example, in my experience, based on several online courses, there often is more, and more varied, student interaction and participation in online discussions than in many regular classroom seminars ó and for particular students a great deal more.) The virtual, as I am describing it here, is not a new fad or a gimmick, but a very concrete way of rethinking the nature of learning spaces ó spaces where creativity, problem-solving, communication, collaboration, experimentation, and inquiry can happen.

Virtual Space and Time[20]

People tend to think about the online environment as a *medium*; a path of point-to-point communication. People use the network like a telephone or mail system to exchange messages, or to retrieve and download documents, web pages, and other resources. To the extent that it is a medium or pathway, however, it is not *neutral* — it affects the form of information and the communication that occur within it. As many have noted, online text-based communication has features of both writing and speech; it is written, of course, but it is often spontaneous and unedited, like speech. Online communication is affected by whether it is synchronous or asynchronous, and is shaped also by the degree of anonymity provided by not being in immediate, face-to-face contact with one another. It can make people more frank and honest, perhaps, but also less sensitive to the effects of what they say upon others. This degree of impersonality can also make participants oblivious to irony, sarcasm, or intended humor. In all of these ways the online medium is not a neutral medium.

But it is also useful, and more directly relevant to my purposes here, to think of the online environment as a *space*, a place where people spend time, interact, and *do* things ó for example, collaborating with others on a shared project. The fact that they inhabit a shared space is essential for this collaboration to work. I do not mean the medium/space distinction as a sharp or overly broad dichotomy; different technologies are designed with one or the other sort of purpose predominantly in mind. But to the extent that this is a useful distinction, it helps us see that the online, networked environment supports community-building, communication, and the sharing of resources in ways that are impossible to explain simply as a series of point-to-point exchanges. When this online environment is seen as a space people occupy, and through which they *move*, new ways of thinking about it come to the fore.

First, start with the idea of mobility itself: movement defines, and is defined by, both space and time, transiting distance *d* in length of time *t*. Online mobility has a different character, since what ìmovesî are electrons through cables, chips, wires, and screens ó but what they carry (voices, images, information, etc.) has the quality of *virtual movement* that defines, and is defined by, *virtual space and time*. This is why ìdistance education,î for example, is becoming an anachronism: distance is not a primary factor in how such teaching and learning are accessed and experienced. The symbol ì@î ó normally transliterated as ìatî ó is colloquially used as both a spatial (ìmeet Bob @ cafÈî) and temporal (ìmeet Bob @ 2:00î) shorthand. But in the online environment, such as an email address, ì@î does not necessarily mean ìatî: my email address may appear to be ìat University of Illinoisî; but someone else is not in the same sense ìat yahoo.comî (*where is* ìyahoo.comî?)[21]

The nature of our experience in networked environments is frequently of a *kind* of movement: the most obvious example is exploring the World Wide Web.[22] In following hyperlinks we do have a sense of moving across different semantic spaces: we can trace a kind of trail or pattern to our path; sometimes, we may feel lost. We might wonder, How did I get here? It is interesting, and significant in my view, that these links and pathways have both semantic as well as navigational characteristics.[23] Here I want to foreground the question of mobility: we interact with these networked environments with the language, the subjective sensibility, and sometimes even the embodied feeling of movement.

This is dramatically true of certain technological VR systems: a room-sized VR space at my university called ìthe Caveî features a virtual roller coaster ride. I have seen people almost fall over while ìridingî it, even though they are standing upright in an empty, unmoving room, two feet firmly planted on the floor. (I have not personally seen instances of how this simulation earned its colloquial name, ìVomit Mountain.î) I will return later to the nature of embodiment in such contexts, but I want to reiterate that this embodied sense of movement is not unique to VR settings; we might experience something similar, and just as powerful, listening to music, watching a film, or surfing a series of web sites. Are we ìreally movingî? The question of virtuality wants us to see that question in a new light: *we are really moving through virtual space and time*. You ride the roller coaster and sway, stumble, and feel dizzy and nauseous. Is that ìrealî enough for you? The experience of movement is one on the primary dimensions underlying the sense of immersion which, I have suggested, defines the ìvirtual.î

But this roller coaster example puts a rather negative spin on the virtual (though people do seem to like riding roller coasters, even when it terrifies them or makes them feel dizzy and nauseous). In many networked settings this experience of movement is part of the pleasure of discovery. (Why else do we label web browsers with intrepid names like ìExplorer,î ìNavigator,î and ìSafariî?) It isnít just that one can be a virtual tourist and go visit web sites featuring the sights and sounds of sub-Saharan Africa; it is that even in looking for good barbecue recipes or checking sport scores or sending birthday greetings to a cousin or reading an e-book there is a fluidity and flexibility and ìtimelessnessî to the way one can browse sites, or meander through texts, that feels liberating (note: I am not saying here that space, time, or embodiment ó of the ìrealî varieties ó disappear or become irrelevant when we are in virtual environments; but they do not constitute fundamental constraints on how we inhabit and explore such environments).

Second, online mobility is related to certain things that we can *do* in virtual space (and time): we can communicate, interact, observe, and even act upon objects ìfrom a distance.î The virtual, Paul Virilio writes, has the quality of simultaneity.[24] This idea of the extension of our senses and physical capabilities suggests, to some, the emergence of a ìcyborgî self, a ìhuman+technologyî entity that is both more and less than the fully enclosed and self-sufficient human self. This is not my main concern here, though I would point out that prostheses, pace-makers ó or for that matter eyeglasses and telescopes ó carried us over this bridge a long time ago. I am concerned with the experience of this extension as a transformation of space and time. These transformations are not only matters of distance; in the Cave at the University of Illinois you can observe the development of a fertilized chick embryo in an egg, *from the inside*. When we look at a web-cam, watching our child at play in preschool or checking the current weather in Lillehammer, Norway; when we turn off our coffee maker with a coded beep from our cell phone while we are driving toward work two miles away; when we have a synchronous (ìreal time,î we like to say) conversation with a colleague from halfway around the world, discussing and simultaneously revising a draft book chapter we have posted in a shared writing space, we are, as I said earlier, doing more than just sending and receiving a series of electronic messages back and forth. We are inhabiting and doing things as actors in a virtual space (and time), and our *expectations*, our *habits*, our *relationships*, and our *values* are reshaped by the fact that we are actors in virtual space and time. ìRealî space and time do not disappear or become irrelevant; for one thing, they provide the experiences and the vocabulary that we carry over to the virtual domain as a way of making sense of it; furthermore, they provide a context that gives the sense of movement within virtual space and time part of its force (the fact that we *know* the colleague is halfway around the world; that the websites we move between have been developed by people who never will meet each other; that we can ìfast forwardî the stages of development of the chick embryo, etc.). But it is also true that for many people, their activities in virtual space and time provide a set of experiences and vocabulary for how they make sense of ìrealî space and time too.

Third, our engagement with virtual space and time is linked to the fact of our embodiment.[25] We may have virtual identities and experiences, but these are not set against our ìrealî embodied identities and experiences; on the contrary, by basing the concept of the virtual on *immersion*, and showing how our embodied selves, in

interaction with a situation or set of experiences, are *part of* what creates this sense of immersion, what makes it seem or feel ìrealî to us (for example, *that* the field of view shifts as we turn our heads), the two domains cannot be understood apart from each other, or even less in opposition to each other.

Another way in which our bodies do not disappear or become irrelevant is that while their internal ìclocks,î their needs for rest and for food, may move into the background of our awareness when we are in an immersive experience, these needs have a way of intruding themselves upon us whether we like it or not ó and, of course, without attention to such ìrealî needs none of the rest would matter anyway.

One might even say that our bodied selves are the sites on which the real and the virtual play off each other (for instance, it is the disjunct between what our eyes seem to be telling us and the feedback from our own inner ears that makes the roller coaster ride in the Cave so disorienting). We feel an interaction with a virtual world because we *feel* it; immersion is, revealingly, itself a bodily metaphor.

This intimate connection is even more apparent with the growing interest in *haptics*: the use of touch and feel as the basis for a human/machine interface. Control gloves were one of the first areas explored in this domain: one can, wearing a glove containing sensors, move, pick up, and manipulate objects in a virtual world (remember the scene in the movie *Disclosure* where the character is rifling though folders in a digital file drawer); or to control robotic machines that translate oneís movements into a distant location. One dimension of haptics is to strengthen the sense of ìaction at a distanceî: imagine being able to pick up a rock on the lunar surface, heft its weight, feel its texture, and so on.[26] Another dimension of haptics is to exploit the particular sensitivity of our sense of touch as the locus of experiencing a virtual domain, providing feedback not just through visual and audial cues but through a tap on the shoulder, a vibration or change in temperature, or, for example, through a seat that allows us to ìmoveî through a virtual domain through movements of our body or shifts of our weight, while communicating back to us a subtle sense of movement or location that provides us with a way of orienting ourselves within a complex domain. Here again our embodied selves do not become irrelevant; quite the contrary.

Finally, there are questions of embodiment and identity, which I introduced earlier in discussing Turkleís *Life on the Screen*. For Turkle, the Internet is a zone of enormous creativity and experimentation in forming virtual identities. Decoupled from the apparent one-to-one association of body and identity, participants online are exploring identities, perspectives, and modes of interaction that are not constrained by their ìrealî selves: pretending to be a character of the opposite gender in a chat room, putting out provocative opinions that are not necessarily oneís own, just to see where the discussion will take them, and so on. For many people these can be tremendously liberating experiments. These arenít necessarily *false* identities; they may in fact involve exploring aspects or extrapolations of oneís actual identity that cannot be enacted without disapproval, harm, or other consequences in oneís ordinary life. So, again, ìrealî versus ìfalseî identities is too neat a dichotomy, which does not capture the ways in which these can be different *versions* of oneís identity. People sometimes say that these virtual identities are in fact more truly who they feel themselves to be. These identities often become the basis on which *interaction* and *involvement* take place in virtual contexts; and they support a sense of significance related to how *interest* and

imagination get triggered. Hence they can be fundamental to the process of how immersion takes place.

To be sure, these experiments in identity can be subject to abuses ó where playing with an alternative identity can become impersonation or deception (the legendary ìAlexî affair, in which a male psychiatrist posed in a women-only chat room as a character named Joan),[27] or where playful online interactions can have dire real-world consequences (a rape in cyberspace),[28] or where participants cannot integrate their various selves into a coherent identity (that is, a form of schizophrenia), or where they can no longer differentiate between the real and the virtual.[29]

An MCI commercial once said, when youíre online, there is no race, no gender, no disability. This is not really true: all of these factors clearly impinge on who is participating online, who is not (the digital divide), and on how those who are online interact with each other ó many claim they can identify gender just by othersí speech patterns, for example. People donít *lose* their embodied identities when they act anonymously or pretend to be other than they are. But the relative anonymity of online interaction can suppress the effects of prejudice or discrimination. Others are forced to deal more with the content of what one says or does, not necessarily with what one looks like. It is important to remember that the embodied experience for many people is seriously limited: by disability, infirmity, illness, chronic pain, isolation, or a physical appearance that leads others to prejudge, ignore, or despise them. For many of these people, their virtual identities expand their opportunities and sense of efficacy. Here as elsewhere in these sorts of arguments, claims about which mode of interaction is ìbetterî must always be tempered by asking, ìbetter for whom?î[30]

In the end, it is not the existence of new technologies that has raised questions about the necessity of our bodies for our sense of identity; it is a much larger cultural shift that foregrounds the ìperformativeî rather than ìessentialî character of our embodied selves. Every day people play at other roles in relation to gender, race, sexuality, etc., regardless of their ìbodilyî facts. For others, I have tried to make clear, the embodied self is seen as an artificial constraint, falsely prioritizing *one* dimension of identity (which is itself a changeable social construction) over others. For the different, the hybrid, the disabled, and others, it is experienced as tremendously liberating *not* to allow an embodied physical ìfactî to be so determining; and the virtual is proving a fascinating zone of experimentation in how people can move beyond these embodied physical facts, not necessarily for the sake of ìescapingî them or denying them, but for *changing what they mean to themselves and to others*.

In this section I have been asking, If immersion is the basis of virtual experience, what are we immersed ìinî? The dynamics of interaction, imagination, interest, and involvement which create the sense of immersion in virtual space and time, I have argued, are closely tied to experiences of mobility, inhabitance, action at a distance, haptic sensitivity, and performative identities that each, in various ways, engage our embodied selves. In this context, it is important to see, *virtual* movement, *virtual* identities, *virtual* action at a distance, and so on, are not simulated or illusory experiences: they are real in the context of virtual space and time ó as real as can be. And their sense of veracity, their ìas ifî quality, is intimately tied to the fact that these experiences are implicated in our actual embodied selves, and vice versa; they should not be seen as separate from or in opposition to them.

But there is another stage of transformation. Eventually, the sense of inhabitance, familiarity, and comfort people feel in virtual space and time ó especially when these are experienced in conjunction with the similar engagements of other people ó achieve a further qualitative shift: from virtual *spaces* to virtual *places*.

Virtual Places

Calling the online environment a space captures the idea of movement and activity within it, the possibility of discovering meaningful connections between elements found there; but it does not capture the distinctive ways in which people can make a space familiar, make it *their* space ó † make it a *place*. This shift from thinking in terms of spaces to places reflects an important theoretical and practical difference. A place is a socially or subjectively meaningful space. It has an objective, locational dimension: people can look for a place, find it, move within it. But it also *means* something important to a person or a group of people, and this latter, more subjective, dimension may or may not be communicable to others. When people are in a *place*, they know where they are, and what it means to be there. Place also has an important temporal dimension, because places emerge, change, and develop diachronically: a space may be a place at one point in time, but not earlier or later; or it may become a different kind of place.[31]

The transactional elements of interest, involvement, interaction, and imagination, as I have defined them here, are not just qualities of response to an experience: they actively shape and change the experience. We might not just visit a space; after a while we move in, start to rearrange the furniture, so to speak, and make it comfy. Spaces are transformed by such activities. And, as I have mentioned, this is not necessarily an individual endeavor, but can be a collective one ó indeed, it is often the quality of a space as a *shared space* that plays a crucial role in its development into a *place*. Things happen there, memorable things (whether pleasant or unpleasant, but *important*), which mark the space as a place (ìthis is where it happenedî). Places become familiar, acclimated to us as we are to them. They become marked by various social conventions (rules, norms, customs, vocabularies). They become, in many cases, a locus of community. In all of these respects a relatively objective space and time, a pre-transformative given, becomes something marked, signified, *important*: and in this both the space and those inhabiting it are changed in relation to each other. A place is a special, important kind of space; but those occupying it also stand in a different relation to the space, and to each other, because they are there. In this description I have purposely not emphasized whether these must be *virtual* spaces becoming *virtual* places; this dynamic is true of spaces and places generally (a crossroads, a battlefield, a classroom, a lovers lane). Or perhaps it is more accurate to say that insofar as spaces become places there is *always* an element of the virtual to them (in other words, there is a quality of immersion, supported by the elements of interest, involvement, interaction, and imagination).

It is possible to theorize more broadly what is going on here. There are two distinctive ways in which we turn spaces into places.[32] One is by *mapping*: by developing schemata that represent the space, identify important points within it, and facilitate movement within it. A map is never an exact replica (as the story goes, the only map that would be identical would be an exact copy of the original, which would be useless as a map) ó † a map always simplifies, selects, and schematizes the original, and it is the particular way in which this simplification, selection,

and schematization occur that makes this version of the space a place. These are pragmatic activities; we make certain, and not other, choices because they allow us to do things in the space that are meaningful and important to us. There can be multiple maps, and in this sense they constitute different *places*, even when they refer to the same space.

There are also maps that represent patterns of use. Trails that are worn by many feet tramping through forests, or across campus greens, are maps of a sort. Again, they simplify, select, and schematize a space: they identify what is important to people, they mark out key places, they facilitate movement. They also indicate another important characteristic of maps: how their use can also shape and transform the space they represent. This can be seen at work in the World Wide Web, for example, through frequency indicators: page counters, for example, as well as ratings of ìmost frequently visitedî sites. Such representations tend to influence patterns of future use, because they influence how search engines pick out and identify sites, which sites get selected for indexes, and so on. Viewed pragmatically, the representation is not discrete from the thing represented; it acts upon and is acted upon by it.

Yet another kind of map is one showing relations of relative centrality and relative periphery, from some point or points of reference. The repetitiveness of ìrelativeî here is not accidental: there can be no absolute center of a space that is any more necessary than any other ó in fact, it is as true to say that a center is *defined by* the map, as to say that the map begins from a center. And a more rhizomic map may have no single center at all. But a map of relative centrality and periphery can still provide a way of simplifying, selecting, and schematizing the pragmatic relation of what is more or less useful or relevant to a given purpose, or set of purposes. This sort of endeavor can be highly useful even though there is nothing necessary about this particular mapping, even if others would map it differently ó indeed, we should expect this to be true in order for such maps of relative centrality and periphery to be useful to different people (because their purposes and criteria will differ).

In sum, a map does two things as once: it marks significant places; and it makes places significant by marking them. To return again to the four elements of immersion: mapping is a process that makes manifest our *involvement* with a space, the places we care about; it is an expression of *interest*, as mapping is a kind of problem-solving (how do we find our way about); it entails an act of *imagination*, because mapping is a process of selecting what is judged to be significant enough to include, and of adding a structure of association and organization for what is selected (in other words, it is both less and more than the original); and finally mapping is a process of *interaction*, changing what is mapped, from space to place, in the process of trying to describe it.

The second distinctive way in which spaces become places is through *architecture*. A space becomes a place when we build into it enduring structures. Often we live in these structures, work in them, observe or admire them. We are changed by these things we create as we change them ó the relation runs both ways. Architecture here is not only the initial design or building, but the transformation of it over time; in this sense, we always help build the structures we occupy, and the structures are not fully finished until they have been used for a while (in one sense, then, they are never ìfinishedî). Here I do not mean architecture only in the literal sense of buildings and bridges; there are architectures also of language, of customs,

of complex practices and activities (games, for example); all of these can play a role in transforming a space into a place.

Architectures transform not only a space but the patterns of activity for those who occupy them. I think that these patterns can be viewed along five polarities:

(1) movement/stasis

(2) interaction/isolation

(3) publicity/privacy

(4) visibility/hiddenness

(5) enclosure/exclusion

These interrelated dynamics shape the ways in which participants operate within a space, and the particular constellation of them gives a space its distinctive character as a certain kind of place: for example, structures along the polarity of isolation, hiddenness, and privacy, versus those emphasizing visibility, interaction, and publicity.

(1) Structures facilitate, direct, or inhibit movement. They anticipate the way in which people are likely to navigate a space, but by making this assumption they also tend to direct it. In an art museum, for example, this is reflected in choices such as what exhibits to put near each other, and where to put doorways. Where will people want to pause, and which paintings will they want to linger over? Yet there are substantive assumptions at work here as well: let say one wants to learn about historical periods in art, but finds that the rooms have been organized by subject matter or styles of painting; all the information is there the visitor might want, but not in a pattern that supports the inferences he or she is trying to make. Which room to start with? Where to go next? The visitorís confusion and uncertainty may also be a kind of paralysis, even though the design of the museum is, on its own terms, quite clear and easily navigated.

(2) The design of spaces also communicates assumptions and expectations about social interaction. Architectures, by directing movement, create avenues to bring people together or barriers to keep them apart. Where will crowds tend to congregate, for example? Architectures also make assumptions about the kinds of things people will be doing in a space, and whether they want to be doing it with others or alone. Again, these assumptions also shape behaviors: if a telephone booth is only big enough for one person, three girl friends canít all talk to their friend at the same time; they have to decide who gets to talk first, which may start an argument.

(3) Publicity and privacy constitute a slightly different issue, which is the extent to which an architecture allows or inhibits the disclosure of the participantsí selves, their activities, and not only their words and ideas, to others (and vice-versa). Are walls transparent; or are there walls at all? Can you be seen, or do you always know you might be seen, and how does this tend to encourage or discourage certain things you might do? Can you *choose* when you can be seen, and when you do not want to be?

(4) Visibility and hiddenness, here, refer to the transparency of architectures, to what they disclose or conceal within, and to what they disclose or conceal about themselves. This is not quite the same as publicity and privacy, because here what is exposed or hidden are characteristics of the architecture itself. Does a wall close off a room that only some people know how to get to? Where does this doorway lead, and who is allowed through it?

(5) Architectures also operate through enclosure and exclusion; what (or who) is counted in and what is counted out. Some structures are intended to define a community made special in its own eyes by its privileged access and made to feel safe so that others viewed as less worthy will not interfere. The very attractions of such a partitioned space give rise to its limitations: the risk of complacency and numbing homogeneity. If we assume that certain kinds of change and development can only come from encounters with new and challenging ideas, this architecture of enclosure and exclusion may seem less like a protective shell, and more like a self-built prison.

There is much more to be said about architecture and the dynamics of shaping spaces into places; but here again I want to return to the dynamics of virtuality. I have tried to indicate how specific design features express assumptions about social dynamics, about values, about knowledge and substantive subject matter; in this, I have tried to enlarge the concept of ìarchitectureî to mean much more than just the design of rooms and buildings. Architectures reveal and conceal; they facilitate and discourage; they welcome and exclude; they direct and redirect and inhibit certain choices. In all this, architectures assume particular modes of interest, involvement, interaction, and imagination ó and in these assumptions tend to bring them about (or to suppress other modes).

In summary, I have explained two different ways in which spaces become places. The first is mapping, which is in some ways a more reactive process; a process of representing a space in order to be able to move and work within it. A mapped space takes on the character of a place for those who understand and can use the map. The second way in which spaces become places is through architectures; enduring structures that reconfigure spaces. This is in some ways a more active process, in which the space is not only represented (mapped) but transformed. There are at least five ways, I have suggested, in which this transformation affects not only the configuration of space but also the activities and the persons who operate within it. These dimensions determine the kind of place it is. I do not mean to argue that the activities of mapping and architecture are utterly unrelated or dichotomous: sometimes a map is prefatory to designing a structure (a blueprint is a kind of map, in fact); sometimes a large, complex architectural layout includes maps or directional markers within it as a way of helping people get around; trails, as I describe them here, have features of both. But the ways in which mapping and architecture influence navigation and meaning-making are different; and they suggest something important, I think, about virtual learning environments.

Virtual Learning Environments

Earlier, I described virtual learning environments as spaces where creativity, problem-solving communication, collaboration, experimentation, and inquiry can happen.[33] But now we can give greater specificity to how they happen. Let me suggest that mapping indicates, on the whole, the perspective of the learner, while architecture indicates more the perspective of the teacher (though again, I am not trying to separate these entirely). A learner is asking, How do I find my way about? A teacher is asking, How do I design this learning space in such a way that my students will explore and use it in the way I intend for them to? Mapping and architecture are both ways of turning spaces into places, generally; but in the context of this paper I am interested in how they turn virtual spaces into virtual places ó† and more specifically, virtu-

al *learning* spaces into meaningful, hospitable virtual learning places. They do this by guiding the dynamics of interest, involvement, imagination, and interaction in ways that are judged to be productive (in this case, educationally productive); when they are successful, the learning space becomes immersive ó the learner is engaged, actively relating to the subject matter, seeing (and I will add here *feeling*) its importance. As I mentioned before, a place (as opposed to a space) always entails to some extent the quality of the virtual; and so in this sense it is no exaggeration to say that a successful learning space, as it becomes a learning place, is in a wider sense *by definition* virtual.

Now I think you can see the larger purpose of my discussion here: to remove the virtual from a fundamentally technological domain and situate it at the core of educational theory and practice. How do we make learning *immersive*? What role does interest, involvement, imagination, and interaction play as dimensions of active engagement between a learner and a learning environment? In what ways are these activities linked with *mapping*? How can we theorize teaching as the design of *architectures* of learning spaces ó architectures that allow learners to inhabit and experience them as places of interest and familiarity? How do these structures of the virtual express (and thereby reinforce) deeper assumptions about social community, value, equity, and the nature of knowledge? Do they assume standardized models of engagement, or tolerate, even encourage, the expression and exploration of alternative identities? These important questions each need to be elaborated in further studies.

This rethinking of the virtual as an educational concept[34] poses a sharp contrast to much current practice: in highlighting the centrality of choice, decision, and exploration as important dimensions of learning; in thinking in terms of learning spaces (learning places), rather than ìdelivery systemsî; in seeing these learning places as potential sites of collaboration and communities of learners, and not just individual achievement; and in recognizing that the face-to-face classroom, as it is currently constituted, is by no means necessarily more humane or authentic than alternative learning spaces. One can see these issues arising in how new information and communication technologies are being thought about and used in schools ó† but as should be apparent they raise much larger questions about the ways that we think about teaching and learning in general.

I hope to have laid the groundwork for a reconception of the virtual, and to have engaged in an exercise in virtuality here: beginning the design of a theoretical architecture that invites engagement and exploration. If I have been successful in some measure, you have moved into this space yourself and begun to make it a place of your own. It may not be the same as mine. But an academic article can also be a virtual environment ó one that you complement through your own interest, involvement, imagination, and interaction.

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Footnotes

[1] http://www.fourthwavegroup.com/fwg/lexicon/1725w1.htm [Last accessed March 14, 2004]. However, Michael Heim argues that ìthe father of virtual realityî was Myron Kreuger, writing in the 1960ís: Michael Heim, *The Metaphysics of Virtual Reality* (New York: Oxford, 1993), pp. 115-116.

[2] http://ism.ferris.edu/students/m/maqboolt/Paper10.htm [Last accessed May 26, 2001]

[3]http://www.euro.net/mark-space.glosVirtualReality.html [Last accessed May 26, 2001]

[4] http://www.openchannelsoftware.org/discipline/Visualization_and_Virtual_Reality [Last accessed March 14, 2004]

[5] http://w1.2691.telia.com/~u269100246/vr/vrhiof98/whatisvr/What1.html [Last accessed May 26, 2001]

[6]http://www.euro.net/mark-space.glosVirtualReality.html [Last accessed May 26, 2001]

[7] On this sense of immersion, I have been influenced by the ideas of Alan B. Craig and William R. Sherman, National Center for Supercomputing Applications, University of Illinois. See, for example, William R. Sherman and Alan B. Craig, ìLiteracy in Virtual Reality: A New Medium,îComputer Graphics, Vol. 29 No. 4 (1995).

[8] James Kneale, ìThe Virtual Realities of Technology and Fiction,î and Jennifer S. Light, ìFrom City Space to Cyberspace,î both published in Mike Crang, Phil Crang, and Jon May, eds., Virtual Geographies: Bodies, Spaces, and Relations (New York, Routledge, 1999), pp. 205-221 and 109-130, respectively.

[9] See, for example, Howard Rheingold, Virtual Reality (London: Mandarin, 1991): ìartificial experience,î p. 46. For contrasting views that do not dichotomize the virtual and the real, see: Pierre Levy, Becoming Virtual: Reality in the Digital Age, trans. Robert Bononno (New York: Plenum, 1998): ìthe virtual is by no means the opposite of the real,î p. 16; Myron Krueger in the preface to Michael Heim, The Metaphysics of Virtual Reality: ìvirtual reality constitutes a new form of human experience,î p. vii; Manuel Castells (quoted in Crang, Crang, and May, eds., Virtual Geographies: ìthe virtual not as copy or representation but as alternative,î p. 7; and Otto Imken, ìThe Convergence of the Virtual and the Actual in the Global Matrix,î in Crang, Crang, and May, eds., Virtual Geographies, pp. 92-106, who calls this exaggerated dichotomy ìcyperbole.î

[10] ìThe Question Concerning Technology,î in Martin Heidegger, Basic Writings, D. Krell (ed.) (New York: Harper and Row, 1977), pp. 283-317.

[11] For an excellent critical discussion of Heideggerís legacy in this context, see Andrew Feenberg, Questioning Technology (New York: Routledge, 1999).

[12] For one version of this account, see Nelson Goodmanís highly influential Ways of Worldmaking (Indianapolis: Hackett Publishing, 1978).

[13] Lee Herman and Alan Mandell, ìThe Given and the Made: Authenticity and Nature in Virtual Education,îFirst Monday 5/10 (2000) http://www.firstmonday.dk/issues/issue5_10/herman/index.html [Last accessed January 9, 2002]

[14] A good overview of this work, focusing especially on the ideas of Baudrillard and Derrida, can be found in Mark Poster, ìTheorizing the Virtual,î in Whatís the Matter with the Internet? (Minneapolis, University of Minnesota Press, 2001. See Jean Baudrillard, ìThe Virtual Illusion,î Theory Culture and Society, Vol. 12 (1995) pp. 97-107, and The Perfect Crime (London: Verso, 1996). The ìperfect crimeî refers to a deception so perfect it is never seen as such: ìThe virtual illusion is contrary to that of appearances. Nothing hides itself there, no secret, no absence. Its aim is the cloning of reality, the cloning of the real by the hyper-real, and the extermination of the real by its double.î Jean Baudrillard, ìThe Perfect Crimeî (1993) from the website of the European Graduate School of Media and Communications: http://www.egs.edu/faculty/baudrillard/baudrillard-the-perfect-crime.html [Last accessed March 11, 2004.]. For more on Baudrillard, see Marcus Doel and David B. Clarke, ìVirtual Worlds,î in Crang, Crang, and May, eds., Virtual Geographies, especially pp. 277-280.

[15] Sherry Turkle, Life on the Screen: Identity in the Age of the Internet (New York: Simon and Schuster, 1995).

[16] See my contribution to an exchange with Hubert Dreyfus on Turkleís ideas: Nicholas C. Burbules, ìLike a Version: Playing with Online Identities,îEducational Philosophy and Theory, Vol. 34 No. 4 (2002): 387-393.

[17] On telepresence, see for example Jonathan Steuer, ìDefining Virtual Reality: Dimensions Determining Telepresence,î http://www.cyborganic.com/People/jonathan/Academia/Papers/Web/defining-vr1.html and Ödefining-vr2.html [Last accessed May 26, 2001]

[18] There are some similarities between my account here and that provided by Michael Heim in The Metaphysics of Virtual Reality, previously cited, and especially his more recent book Virtual Realism (New York: Oxford University Press, 1998). In the latter book he even proposes his own ì3 iísî (immersion, interaction, and information intensity): pp. 6-7. He also stresses in both books the quality of ìas ifî; but my account is quite different from his, and in any event I encountered these books after developing the ideas here.

[19] John Dewey, Experience and Education (New York: Macmillan, 1938).

[20] This argument is developed and expanded from a keynote address given at Lillehammer University, in Norway, and published as ìDialogue in Virtual Spaces,î in Dialog og Naerhet: Ikt og Undervisning, Yvonne Fritze, Geir Haugsbakk, and Yngve Nordkvelle, eds. (Kristiansand, Norway: Norweigian Academic Press, 2003), 19-28.

[21] This issue is explored very perceptively in Samira Kawash, ì@, or Being on Line,îTheory and Event 1 no. 2 (1997), also online http://muse.jhu.edu/journals/theory_&_event/v001/1.2kawash.html. I write more about this in the last chapter of Nicholas C. Burbules and Thomas A. Callister, Jr., Watch IT: The Promises and Risks of Information Technologies for Education (Boulder, Colorado: Westview Press, 2000).

[22] Nicholas C. Burbules, ìAporias, Webs, and Passages: Doubt as an Opportunity to Learn,îCurriculum Inquiry, Vol. 30 No. 2 (2000): 171-187.

[23] Nicholas C. Burbules, ìThe Web as a Rhetorical Place,î in Silicon Literacies, Ilana Snyder, ed. (London: Routledge, 2002), 75-84; and Nicholas C. Burbules, ìRhetorics of the Web: Hyperreading and Critical Literacy,îin Page to Screen: Taking Literacy Into the Electronic Era, Ilana Snyder, ed. (New South Wales: Allen and Unwin, 1997), 102-122.

[24] Paul Virilio, Open Sky (London: Verso, 1997).

[25] See also Megan Boler, ìThe New Digital Cartesianism: Bodies and Spaces in Online Education, in review, New Media and Society.

[26] This description may trouble some readers: ìYou arenít picking it up, but directing a robotic arm to do so in another location.î Apparently so. But imagine lots of cases that blur this distinction: what if I am using my prosthetic arm; what if I am using a clamp in my hand to pick something up that is hot ó†in such cases do we not say ìI picked it up?î

[27] Turkle, Life on the Screen, pp. 228-230.

[28] Turkle, Life on the Screen, pp. 250-254.

[29] Turkle, Life on the Screen, pp. 258-262.

[30] For an insightful analysis of this same MCI commercial, see Megan Boler, ìBodies and Space in Cyberculture,î presented at the Philosophy of Education Society annual meeting, March 2001.

[31] On ìplaceî as an educational concept see for example David Gruenewald, ìFoundations of Place: A Multidisciplinary Framework for Place-Conscious Education,îAmerican Educational Research Journal, Vol. 40 No. 3 (2003), pp. 619-654, which includes an excellent bibliography; Jane McKie, ìConjuring Notions of Place,îJournal of Philosophy of Education, Vol. 34 No. 1 (2000), pp. 111-120; and David Kolb, ìLearning Places: Building Dwelling Thinking Online,îJournal of Philosophy of Education, Vol. 34 No. 1 (2000), pp. 121-133.

[32] Some of these ideas were first explored in the last chapter of Nicholas C. Burbules and Thomas A. Callister, Jr., Watch IT: The Promises and Risks of Information Technologies for Education (Boulder, Colorado: Westview Press, 2000). See also Martin Dodge and Rob Kitchin, Mapping Cyberspace (New York: Routledge, 2001).

[33] Some more concrete educational implications of this analysis can be found in Nicholas C. Burbules, ìNavigating the Advantages and Disadvantages of Online Pedagogy,î in Learning, Culture, and Community: Multiple Perspectives and Practices in Online Education, Caroline Haythornthwaite and Michelle M. Kazmer, eds. (Peter Lang: forthcoming).

[34] For some contrasting views, see ìVirtual Reality and Education,î Sarah Inkpen, http://www.oise.utoronto.ca/~sinkpen/VRED.html.gz [Last accessed March 14, 2004]; Kimberley Osberg, ìVirtual Reality and Education: A Look at Both Sides of the Sword,î http://www.hitl.washington.edu/publications/r-93-7/ [Last accessed March 14, 2004]; Glenn Russell, ìComputer-Mediated School Education and the Web,î http://firstmonday.org/issues/issue6_11/russell/index.html http://firstmonday.org/issues/issue6_11/russell/index.html; K. Schwienhorst, ìThe ëThird Placeí ó Virtual Reality Applications for Second Language Learning,îReCALL Vol. 10 No. 1 (1998), pp. 118-126; and Herman and Mandell, ìthe Given and the Made,î previously cited.

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