VIRTUAL LEARNING ENVIRONMENTS

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SUMMARY: Cyberspace, an information space created through ubiquitously networked computers, has been transformed from fiction to fact in the past decade thanks to the advent of the World Wide Web. Although it can only be experienced through the mediation of computers, it is quickly becoming an alternative stage for everyday economic, cultural, and other human activities. As such, there is a potential and a need to design it according to architectural principles, rather than the prevailing document (page) metaphor. This need is most evident in learning environments, which rely on social and contextual attributes as much as they rely on content. This paper describes the underlying theory and our efforts to develop such virtual learning environments, and the software that allows users to access and inhabit them.

KEYWORDS: cyberspace, virtual places, learning, virtual presence, remote learning, architectural design.

1. INTRODUCTION

Architecture was among the first disciplines to adopt the use of computers in its professional practice, a development made possible by SKETCHPAD—Ivan Sutherland's seminal PhD dissertation at MIT in 1963. It made Computer-Aided Design (CAD) a reality that changed the process of architectural design like no other invention has since the introduction of scale drawings and perspective renderings in the 15th century.

Yet, an even more profound consequence of the digital revolution has begun to manifest itself within the last decade: the Internet and the World Wide Web have effectively created an alternative 'space'—cyberspace (Gibson 1984), which serves as an extension and a substitute for physical settings. Although it can only be accessed through the mediation of computers, this 'space' supports many activities that heretofore were conducted exclusively in physical environments, such as shopping, learning, working, and entertaining.

The environments in which we live, learn, work, and play, however, are neither neutral nor separable from the activities we perform in them. Rather, as observed by Heidegger (1958), they constitute 'places'—settings that afford a wide range of human activities, while affecting—and being affected by—social and cultural behavior. A 'place,' according to Chastain & Elliott (1998), is a territory defined by a sense of being 'somewhere,' as opposed to just anywhere, and thus provides a socio-culturally rich *context* which informs the activities that 'take place' in it. Moore (2001) defined this 'sense of place' as the "intersubjective construction of conditions experienced [through] realities that give a place its 'character' or 'quality of life.'"

Operationally, therefore, 'place' is the setting that transforms mere spaces and activities into unique socio-cultural *events*: the coming together of people to the same location, at the same time, for the purpose of participating in a common, authentic, one-of-a-kind, memorable activity. The relationship between people, their activities, and the context in which it takes place is reciprocal: people create an activity within a specific context. In turn, the activity affects the people and the context (Champion & Dave 2002). Consider, for example, the difference between shopping for a book on-line vs. shopping in a physical bookstore, where the author talks about her book: the activity is the same (buying a book, learning about its content), but the 'event' is totally different.

It is surprising, therefore, that the metaphor that has been guiding developers of cyberspace is the document metaphor—the same one that dominated user interface design when computers were used primarily to access information, rather than to inhabit the information space itself. The document metaphor sees information as separate from the people who use it and from the environment in which it is used: a commodity that can be encapsulated and distributed by mechanical or electronic means, and used by anyone, anywhere, without affecting the quality of the activity. While this approach has been successful in making informational contents

accessible, it fails to account for the confluence of the information and the place-specific process of accessing and using it: a process replete with socially- and culturally-rich experiences derived from contextualization.

Nowhere is the poverty of this metaphor more evident than in the realm of learning: a highly social, contextualized activity. Yet, paradoxically, *remote learning*—one of most the rapidly growing uses of cyberspace—is little more than an organized way of distributing learning materials in an efficient, electronic way. All the participants in 'remote learning' (the teachers and the students), miss out on the rich cultural and social phenomenon of the learning experience itself. While the method is efficient, it is hardly the type of experience most learners will remember fondly many years later, like remembering their place-specific high school or college years.

We propose that the socio-cultural advantages of place-based learning can be combined with the efficiency of remote learning if we use architecture as the metaphor guiding the creation of virtual learning environments, rather than the prevailing document metaphor. Architecture, as the art of making places, considers them a combination of *context*, *activities*, and *actors*, interwoven in functionally and conceptually appropriate ways (Canter 1977). Accordingly, *place-making*, rather than *page-making*, is a more appropriate metaphor for designing cyberspace: in addition to communication and information management, this metaphor affords a contextualized locus for situating the activities themselves, much like physical places do. Thus, virtual places will include socio-cultural and perceptual qualities, enriching them to the point where they may approach— perhaps even surpass—comparable physical settings.

Again the activity of learning provides an excellent case in point: virtual places afford group learning, of the kind enjoyed by students gathered in a (physical) classroom, lab, or library, where they 'know' they are in a communal space, are aware of the social process of learning, and affected by the presence and behavior of their fellow students. Such virtual places for learning can be designed to look like three-dimensional physical places, using common web technology like VRML and Java 3D. In addition to supporting the dynamic exploration of 3D environments, this technology also supports avatars, which can be used for marking by proxy one's presence in the virtual learning environment. Since such avatars, and their actions, are controlled by 'real' people in real time, they contribute a human dimension to the creation of a 'sense of place': their actions are serendipitous, unpredictable, and known to reflect the action of their human controllers, rather than some canned software program. Equipping the virtual place with learning tools, such as a whiteboard for group discussion, and objects that carry shared meaning such as projectors, further enhances their ability to convey a sense of place. To support different kinds of learning they can be designed to afford different levels of interaction (with different levels of privacy). They can be connected to other places, as well as to additional resources (the library, the Internet, e-mail, course web-sites, etc.). Most importantly, they are amenable to appropriation by the community that uses them. For example, they allow for 'spreading out' learning materials and for leaving them behind for others to see. They encourage pinning-up projects (by the students as well as the instructor), and leaving them there with the confidence that they will not be torn down by the custodial staff (though they might be annotated by fellow students…).

Cyberspace, however, occupies a different medium than physical space. Hence, time and space themselves are malleable constructs. It is possible, for example, to locate the virtual learning environment in a time period other than the present—a historically significant period as called for by a course in archeology, or one which has not yet been constructed for a course in architecture. It is possible to locate it in a context more appropriate to the course's subject matter than the ubiquitous (and bland) classroom (e.g., a museum of modern art which has a Picasso collection like no physical museum can afford …), or a completely abstract setting that reflects some qualities associated with the learned content. In other words, the virtual learning environment can be used as a *constructive* element of the learning process itself, both through the social actions it affords and the cultural setting its provides.

Access to such virtual learning environments requires mediation of hardware and software. Specifically, it requires means that enable the participant to sense the presence of others, and make his/her presence apparent to them. Only through such overt presence—which can be explicit or symbolic, as in chat rooms—can the social and cultural conventions manifest themselves (Riva et al 2003). Furthermore, because the medium of cyberspace is different from physical space, controls that allow its manipulation and appropriation through the interface are needed. These controls include protocols for the users' social interaction: who may initiate a conversation, join an existing conversation, mark-up someone else's work, etc.

We have begun to develop such virtual places for learning, along with the technology that affords their virtual inhabitation. Three types of environments are currently under development:

- A large-group virtual environment, which is similar to a precept room used in lecture courses. It is intended to support large enrollment courses in statistics and chemistry.
- The small-group virtual learning environment, which resembles technologically-enhanced seminar rooms where students can interact with each other and with various learning aids.
- A rich-context virtual learning environment, intended to support courses in Anthropology. It is based on a reconstruction of the Neolithic site of *Çatalhöyük* (Turkey), and provides contextualized, kinetic, first-person viewing experiences, where students can 'step into' and move through the historical environment as it was nine thousand years ago.

The technology, which we call *VIP* (for Virtual Inhabitation and Presence), uses Java3D and VRML for environmental modeling; *Babylon* for communication; and *H-Anim* avatars for virtual presence. Communication is triggered by explicit actions of the users, or by proximity, much like in physical space. Objects can be inspected dynamically in a separate window. And, of course, they can be linked to other sources of information, like web pages, PowerPoint presentations, and whiteboards. The following sections discuss the underlying theory, the virtual learning environments, and the inhabitation technology that we have developed thus far.

2. THEORY

Architecture, above all its other virtues and accomplishments, is the art of *making places*. Places differ from mere 'spaces' in that they embody social and cultural values, in addition to spatial configurations. It is the concept of place, not space, that makes an environment responsive to given needs. Although objects and spaces are necessary building blocks of places, they are not sufficient components. To qualify as a *place*, spaces must be defined and ordered in meaningful ways (Ching 1979). Such meaning is not part of the objects and the space themselves: rather, it is an added quality, acquired through the adaptation and appropriation of the space by its is users, through their actions and conceptions.

People, consequently, inhabit *places*, not spaces: it is a *sense of place*, not space, which provides a sense of belonging, directs behavior, and stirs emotions that affect activities. It is the sense of place that makes it appropriate to be naked in the bedroom, but not in the classroom; and to sit at our windows, peering out, but not at other people's windows, peering in (Harrison & Dourish 1996). Places frame our actions by providing cues that organize appropriate social behavior in the world: we rarely sing or dance when presenting conference papers, although conference halls and theatres share many similar spatial features (lighting, orientation, etc.). Conversely, the same *space*—without any changes to its spatial organization—may function as a different *place* at different times.

Place is thus as much a cognitive phenomenon as it is a physical one. It is rooted in human social action and cultural conceptions: "a *place* is a *space* activated by social interactions, and invested with culturally-based understandings of behavioral appropriateness" (Harrison & Dourish 1996). Or, as Bertrand Russell proclaimed (1914): "Indeed the whole notion that one is always in some definite 'place' is due to the fortunate immobility of most of the large objects on the earth's surface. The idea of 'place' is only a rough practical approximation: there is nothing [physical] logically necessary about it, and it cannot be made precise."

If *placeness* is a consequent of the activities and conceptions of the inhabitants of a space, then 'space,' or the physical attributes that frame those activities, provide the *socially shareable setting* for the activity, in the form of cues that organize and direct appropriate social behavior in that particular place. It is this shared experience that makes the *sense of place* a reality: 'place' is neither imaginary, nor is it a matter of personal interpretation. It is the ability of a place to affect social behavior through spatial organization and shared cultural conception that causes it to be the same for *all* the actors in a particular spatio-temporal space. The *shared* sense of place allows people to orient themselves with respect to the space they occupy and with respect to each other, and thereby establish social references that direct their behavior in a way that gives meaning to their activities.

Place, of course, has many more qualities than merely affording a shared social setting and directing behavior. Place is *unique*: there are no two places that are alike, no matter how similar they may look. Their uniqueness comes from internal characteristics (location), and from external characteristics (situation)—their relatedness to other socio-spatial determinants (economic, geographical, etc.). Although unique, places are not detached: they are *connected* physically and conceptually to other places. It is this connectedness that allows us to 'know' how

to behave, for example, in a fast food restaurant in Des Moines, Iowa, even if we have never visited that particular establishment before. Places have *history*: past, present, and future. They grow, flourish, and decline, along with the site and the culture in which they are embedded. Most of all, places have *meaning*, which is based on the beliefs people associate with them. It is this meaning that determines the *expectations* of human behavior in a place (which, when violated, is considered to be 'out of place'—but not 'out of space'). These meanings arise over time as practices emerge and are transformed within the cultures that use them. Different cultures may have different understandings of similar places and similar concepts, which contributes to feeling of estrangement when visiting foreign countries, where the same cues have acquired different meanings than back home.

Places are the product of human intervention: they have to be *created*, through practice and appropriation, and made to fit into the culture of society. Place-making is the conscious process of arranging or appropriating objects and spaces to create an environment that supports desired activities, while conveying the social and cultural conceptions of the actors and their wider communities—their so-called *hermeneutics* (Champion & Dave 2002). This is what architects, landscape architects, town planners, and other environmental design professionals have been practicing in physical space for centuries.

3. ENVIRONMENTS

With the advent of VRML (Virtual Reality Markup Language), web-enabled spatial models are becoming increasingly more popular in the design of all sorts of virtual environments. These designs are based on the assumption that, since many aspects of our behavior seem to be organized around spatial elements of the physical 3D world, we can carry over these patterns of behavior to virtual environments by designing them to have the same affordances for action and interaction that the physical world exhibits.

Yet very few, if any, existing cyber-spaces exhibit a sense of place in terms of environmental quality or socio-cultural experience. Among these few are video games, which attempt to provide a rich environmental context to the activity they support. Ever-advancing technologies have fostered the production and marketing of games with progressively more sophisticated graphics, which combine activities, contexts, and the expectations of the players into well matched wholes. Still, their pre-defined plot (called 'game play'), which requires the player to assume a given role or solve a given mystery, contributes to a predictability that contradicts of the sense-of-place. The spontaneity and serendipity which occurs in physical places does not happen in games. Multi-user domains (MUDs), like *Alphaworlds,*[©] *There,*[©] and *Second Life,*[©] where the action is determined by 'live' players, have the potential for serendipity and unpredictability, but lack purpose (other than meeting other people—an activity whose novelty is rather short-lived, hence the attempts by these MUD designers to introduce business or contest-like entertainment activities).

Most non-game virtual environments, such as virtual shops, museums, and remote learning, do not exhibit much environmental richness at all (witness sites like Amazon.com). They emphasize utility, by mimicking certain aspect of the activity they were designed to support, but lack the environmental stimuli that enrich and contextualize that activity. On the other hand, those virtual environments that emphasize environmental realism afford only limited action (e.g., the Virtual Museum of Modern Art—MOVA, in Uruguay, depicted in figure 1a). Both types of environments often lack support for socio-cultural behavior and group engagement, depriving their visitors of the ability to meet each other and share their experience, such as standing in front of a painting and discuss its virtues with fellow visitors (figure 1b).
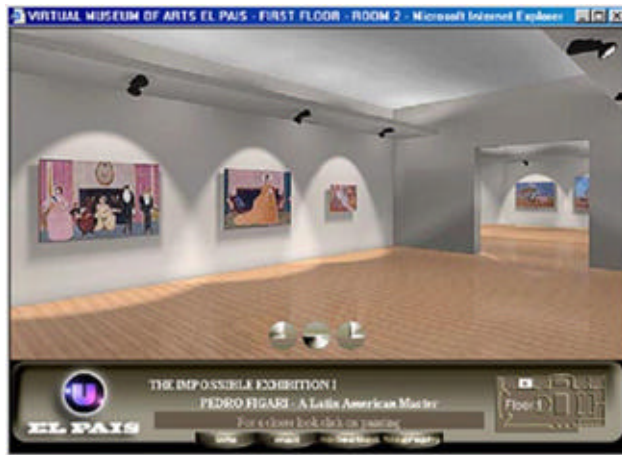
FIG. 1: (a) Virtual Museum of Arts Al Pais is a virtual environment devoid of people (Uruguay, 2002); hence deprive visitors of the shared experience they enjoy in a physical gallery such as (b) (Tel Aviv, Israel, 2002).

Educational web sites, of the remote learning type, have by and large emphasized informational richness at the expense of environmental richness. Yet, the cues derived from environmental awareness have a profound impact on the students' learning experience. Learning, as an activity, takes on a very different meaning in the absence of complementary environmental cues: it operates more on the level of *communication* than on the level of *inhabitation* and *presence*.

Communication is a process that looks at information from the *outside*: even though the observer can interact with the information, s/he is not *part* of it. The computer screen, much like the printed page of a book, stands for a *separation* from the information, rather than a *connection* with it. This state of mind was first observed by Marshal McLuhan (1964), with regard to the difference between television and movies: the relatively small frame of the TV screen, McLuhan argued, sends a message of separation from the action seen on the screen, whereas the wide screen of a movie theater draws the observer into the action, often causing an emotional involvement that is not easily engendered by television (e.g., crying, being scared, etc.). That is why he considered television a 'cold' medium, whereas movies a 'warm' medium, even though both use essentially the same visual display technology (two-dimensional moving images). More recently, the same sense of engagement and participation has been promoted by designers of video games like *Mist*® and *EverQuest*®, where the player becomes part of the action, as opposed to games like *The Sims*® where the player is an outside observer of the unfolding events.

Accordingly, we have begun to develop virtual places for learning that contextualize the activities they afford, and convey a sense of place. Of the three types of environments mentioned earlier, two are currently under development:

- A virtual environment that supports courses in Anthropology.
- A virtual environment that supports courses in Statistics.

The Anthropology learning environment is modeled after an actual site—the Neolithic village of *Çatalhöyük*, in Turkey, as it is assumed by archeologists to have looked some 9,000 years ago. The site consists of densely packed houses, with few spaces in between (figure 2a). The buildings were made of sun-dried mud bricks and a lime or clay mortar. The roofs, supported by internal timber posts, were made of thickly layered clay (figure 2b). Theories suggest that some of the day-to-day activities, such as cooking and food preparation, took place on top of the roofs as well as inside. The absence of windows (due to the dense packing of the houses) suggests that entry into the houses occurred through an opening in the roof, via a ladder. This opening also vented the smoke from fires used for cooking indoors, and provided some light. The interior walls of the buildings were covered with plaster, which was often painted red and black, ranging from simple red washes that covered whole walls to elaborate geometric designs and scenes with people and animals. The interior was further divided by means of screens and changes in the level of the floor.
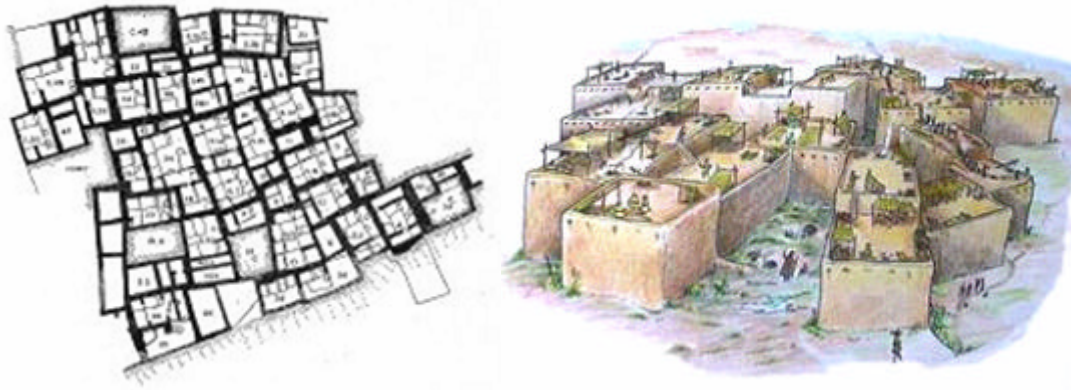
FIG. 2: The village layout and a house in Çatalhöyük (source: http://catal.arch.cam.ac.uk/catal/catal.html)

The virtual learning environment of *Çatalhöyük* consists of a VRML model of the ancient village (modeled in 3DStudioMax), and the modern building used by the archeologists to house their collection and perform their work. Visitors first gather in the modern building (the so-called 'compound'), where they are briefed and introduced to the site. They are represented in the form of avatars, resembling human beings. These avatars, which are controlled by the visitors, can 'walk' and face each other, as well as perform a range of other human-like activities, much like characters in video games can. On the top of the mound, a tent covers the excavation site itself. Visitors may walk from the compound to the tent, review the excavations and speculate on what they mean. Upon entering a special portal located within the tent, nicknamed 'StarGate' after the TV series by the same name, they are transported to the past: the village appears as it was 9,000 years ago. The visitors, through their avatars, can walk around the village, enter buildings (by climbing ladders up to the roofs and into the buildings), and otherwise roam the site. They can return to the 'present' by entering another StarGate, located just outside the village.

The Statistics learning environment, unlike the anthropology one, mimics no physical reality. Rather, it is designed to reflect abstract concepts in mathematics, taking advantage of the opportunities offered by cyberspace that do not exist in physical space. Accordingly, its design is inspired by bar graphs and by mathematical surfaces (figure 4). For example, each bar in the graph is the locus of a work group of 10-12 students. Its height represents the relative achievements of the group, compared to those of other groups, in solving certain assignments. Inside, group members, represented in symbolic form as spheres, communicate among themselves using chat, whiteboards, and other communication devices. The instructor can see the activity of all groups, or choose to view a certain group's activity more closely. At certain times, the 'walls' enclosing the groups become transparent, so they can see each other and attend a lecture. At other times, the walls become opaque, so each group focuses inward.

These environments are only the first forays into this new realm of virtual places. They were chosen to demonstrate the range of capabilities afforded by cyber place-making, from a realistic-looking model where the actors are represented in human form, to an abstract one, where both the environment and the actors are represented in symbolic form. The opportunity lies in designing virtual environments of many different kinds, which cannot be constructed in physical space due to natural, economic, or other constraints.
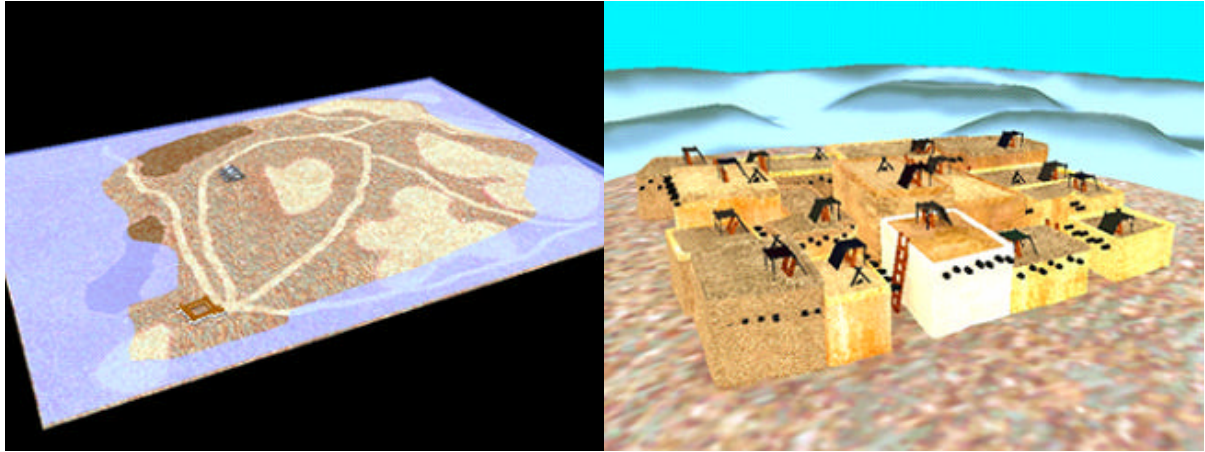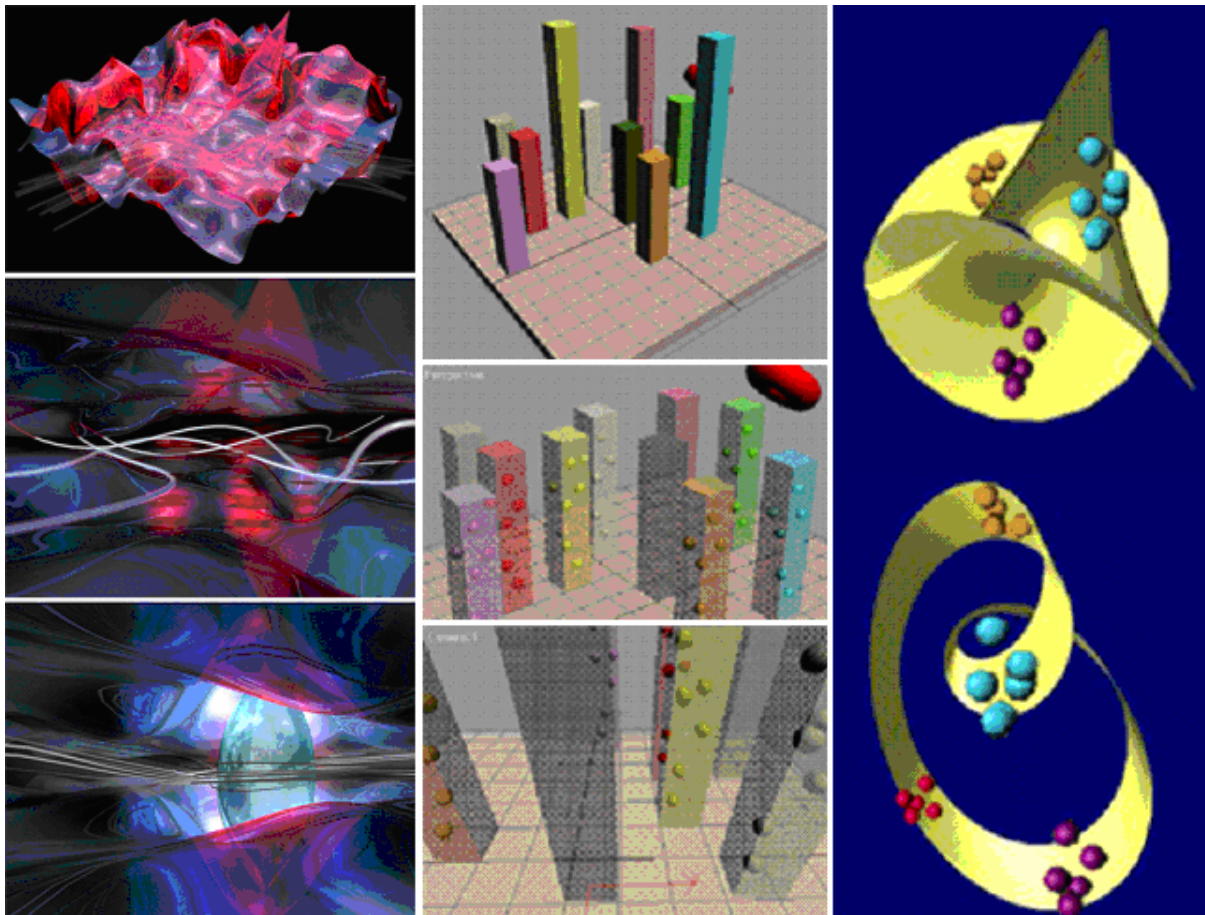
FIG. 3: The virtual model of current site and ancient Çatalhöyük (modeled by Daniel Osazee Ebuehi, UC Berkeley, 2003).

(a) mathematical surfaces

(b) a bar-graphed 'cathedral' of learning

(c) Enneper and other mathematical surfaces

FIG. 4: Some preliminary sketches of possible Statistics virtual learning environments: (a) mathematical surfaces (Nicholas Hamilton); (b) a bar-graphed 'cathedral' of learning; and (c) Enneper and other mathematical surfaces.

4. TECHNOLOGY

Virtual environments, in and of themselves, engender no sense of place unless they can be 'inhabited' by their users. Inhabitation is different from mere visual, auditory, or tactile experiences: it involves some kind of social and cognitive *engagement* with objects and/or people who populate the environment. Thus, they require *presence*. Presence—a notion that sits at the intersection of philosophy and the study of consciousness—has intrigued philosophers and psychologists including Nietzsche, Heidegger, Russell & Whitehead, Popper, Derrida, and others. In the physical world, presence typically involves corporeality and physicality. When combined with virtuality, as it is in film, video games, even novels, it becomes an even more challenging term to define and resolve (Holderness 1998).

Researchers agree, however, that presence is a *participatory* notion: it exposes the actor to social customs, cultural norms, and above all, to the scrutiny of others. Hence, presence is a social construct.

They also agree that presence is *exclusionary*: one cannot be fully 'present' in two places at once. Hence, presence engenders the sense of relative location: it lets actors know where they are, where they came from, and where they might be going in the future—spatially, temporally, and socially. The location creates a context for the activity, a sense of 'outside' relative to some 'inside,' both geographically and socio-culturally.

Presence and location, in turn, promote a sense of *authenticity*: they allow actors to know they participate in a 'real' event, rather than viewing a previously recorded one. It is the sense one gets by actually *being* at a ball game or a concert, rather than viewing them on TV. The tell-tale signs of an authentic place are change and serendipity: the traces of other people's presence, and the chance of seeing something no one else has seen before.

Presence and location allow for *adaptability*, so that the place can be appropriated for the specific needs of the actor: this fosters an ability to make a place personal. Well-designed places foster a sense of ownership and a sense of control, and at the same time a shared responsibility. It is such adaptability by others, who leave their mark on a place, that makes a place authentic. Adaptability could be achieved through the placement of objects, or symbols, both personal and communal, by re-arranging objects, or by adding/subtracting them.

Digital places, unlike their physical counterparts, can also afford a *variety of experiences*: they can provide multiple different points of view, different scales, different levels of abstraction, even different temporal perspectives. These experiences can be simultaneous or they can evolve autonomously or interactively.

To endow the environments we have been designing with the qualities of presence, we have developed *VIP* (Virtual Inhabitation and Presence)—software that allows users to 'enter' and 'inhabit' the environments, and to interact with each other. *VIP* is a multi-user domain, comprising a number of inter-connected communication modules and the means to manage them. At its core is a 3D VRML viewer, where actors can see the environment they inhabit as well as each other, in the form of avatars (figure 5). Each actor can manipulate his/her own avatar, and certain objects in the environment. These actions, which include walking, sitting, pointing-at, picking-up and moving objects, are communicated in real-time by *VIP* to all the other actors who are present in the same environment at the same time. Hence, each actor can see the location and actions of all other actors, and the results of their actions.

To increase the sense of awareness of actors to the presence of others beyond the limitations afforded by a small screen size and a relatively narrow angle of view, *VIP* uses a 'map' of the environment, in addition to the first-person VRML view. On this map one can see the location and orientation of all other actors, in symbolic form. *VIP* uses this map also to control the location and actions of the avatars, in addition to allowing them to move and rotate their avatar in the VRML view. In the map view, one can, in addition, 'jump' from location to location, ascend or descend stairs in one move, and otherwise be freed from the pseudo-physical limitations most games and 3D worlds impose on their actors (why 'walk' a path or 'ride' an elevator in cyberspace, if one can reach his/her destination by direct manipulation and control?). The map is, in fact, a 3D model, which can be rotated, zoomed, and panned at will, to achieve a third person view that is best suited for a given task.

The map is combined with a communication management module, which provides the means to identify individual actors and to control social settings. For example, an actor can address another specific actor, or a group of actors, or everyone who is logged in to the same environment. These last two social settings facilitate group work and lecture modes, respectively. The communication module, which is implemented in the form of

hierarchical lists (trees), also controls the abilities of actors to use communication tools like a whiteboard and a dedicated web browser (e.g., for PowerPoint presentations).
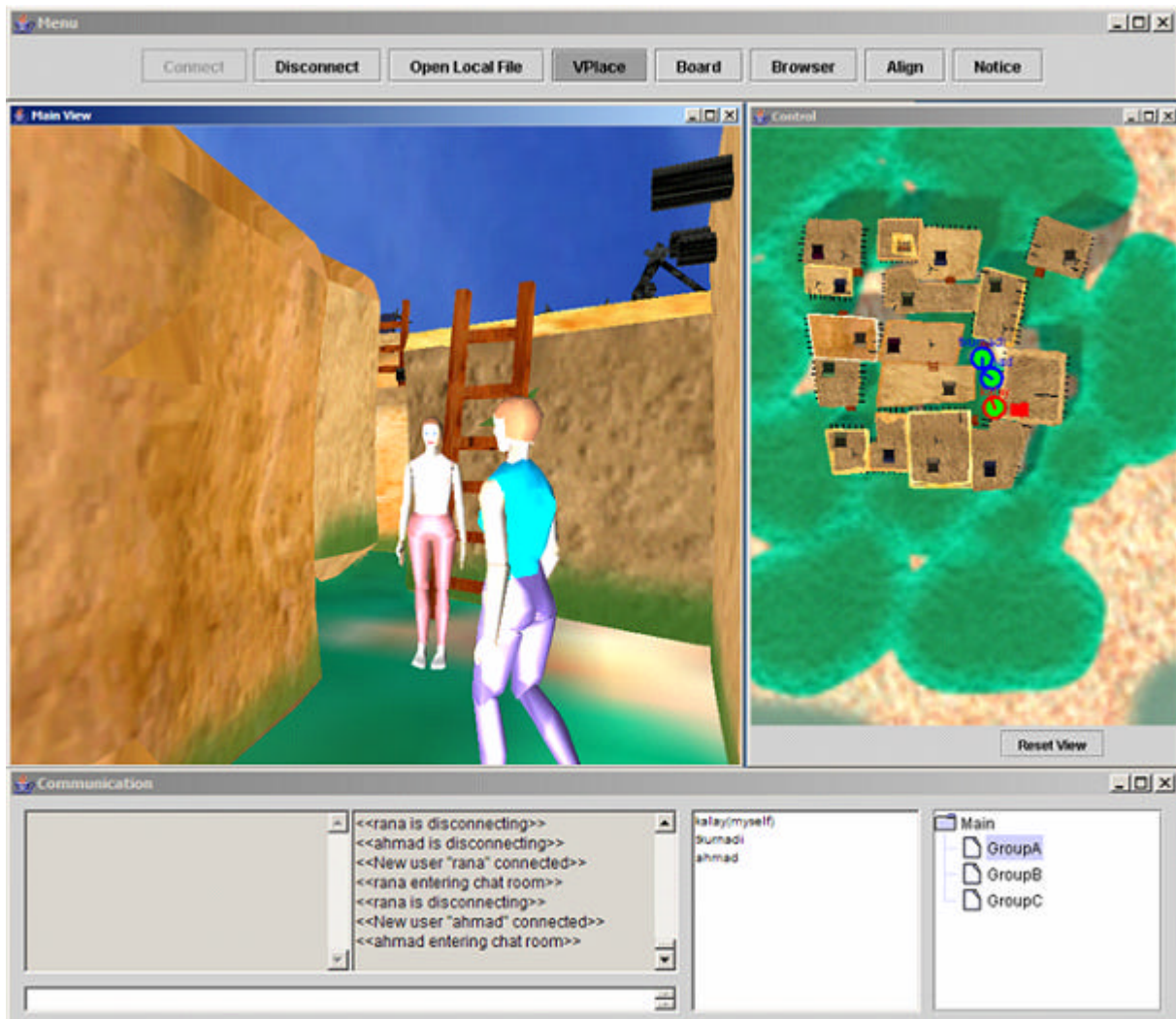

FIG 5: VIP provides both first-person and symbolic third-person views, as well as communication and control.

5. DISCUSSION

The core idea behind the work presented here is to harness the web as a platform for exporting the place-making notions of physical space to the newly created cyberspace, in terms of form, function, and socio-cultural behaviors. To properly evaluate the idea, two questions must be answered:

1.   How is a virtual place different from a common web page?
2.   And, since the context we chose is education, how is it different from common distant learning experiences?

The answer to the first question derives from our focus on *inhabiting* the information space, rather than merely interacting with the information. It is our contention that by using place-making principles, virtual learning environments can engender the feeling of being part-of, rather than a consumer of the information, and thereby convey the socially and culturally rich experience derived from contextualized, place-specific inhabitation and presence. Thus, although we use technologies that are similar to web pages (i.e., 2D screens rather immersive VR), the message conveyed by the context and content of the display should engender a sense of place. We use the word 'place' to describe the larger territory in which the user is located—spatially, culturally, and socially. The boundaries of this territory are defined by a sense of being *inside*—inside a room, a building, a university

campus, a geographic region. The boundary is identified not by a demarcation of its edge but by the feeling of coherence of the spaces, the activities, and the conceptions of other people who inhabit it, which give rise to a competence in the way a place is appropriated and inhabited: it engenders the feeling of being *somewhere* as opposed to just *anywhere*.

The second question can best be answered, perhaps, by comparing web-based environments to more common physical environments, and examining them from a human behavior point of view.

The field of Environmental Psychology has long demonstrated that people respond to perceived environmental factors cognitively, emotionally, and physiologically (Darley & Gilbert 1985, Holahan 1986, Russell & Ward 1982). Those responses influence individual behaviors as well as the social interactions among people. The relative importance of the environment depends on the nature of the activity it supports. Bitner (1992) offered a typology that categorizes [service] organizations according to the *participants*, and according to the *complexity* of that activity (figure 6).

Not surprisingly, she claims that *interpersonal* [service] environments, where the environment affects both the consumers and the providers of a service, deserves the highest level of environmental attention. In contrast, *self-service* environments typically promote only marketing objectives geared towards attracting customers, and *remote service* environments are designed to cater for the needs of the consumer while minimally burdening the service provider.

Types of service	Physical complexity of the environment	
	Elaborate	**Lean**
Self service	Golf Land	ATM
(consumers only)	Surf 'n Splash	Ticketron
		Post office kiosk
		Movie theater
		Express mail drop-off
Interpersonal services	Hotels	Dry cleaner
(both consumers and service providers)	Restaurants	Hot dog stand
	Health clinics	Hair salon
	Hospitals	
	Banks	
	Airlines	
	Schools	
Remote service	Telephone company	Telephone mail order desk
(service providers only)	Insurance company	Automated voice-messaging-based services
	Utility	
	Many professional services	

FIG. 6: Typology of service environments (M.J. Bitner, Journal of Marketing, Vol. 56, pp. 57-71, April 1992).

Traditional 'brick & mortar' universities fall into Bitner's *interpersonal services* category. They are heavily invested in physical environments that were designed explicitly to be conducive of knowledge development and dissemination, and engender an image in the mind of faculty, students, and staff that is designed to promote excellence. It is this investment that makes the physical space, in and of itself, part and parcel of the image and perceived quality of the institution.

The advent of the Internet has opened up a new avenue for disseminating information, one that so far has been devoid of 'place'—physically or metaphorically. Campus-less universities, like the *University of Phoenix* or the *California Virtual University*, are leveraging the economy and broad reach of the Internet's one-to-many communication abilities, and are developing place-less, remote-learning teaching modalities. By focusing solely on the dissemination of instructional materials they dispense with all the place attributes of the university: students access courseware, ask questions and answer tests in the privacy of their own homes, without having to

'come to' the institution granting the degree programs, and without physically interacting with faculty, staff, and fellow students.

On the face of it, remote learning simply transforms the institutional manifestation of higher education from a physical building into a web page. But if we apply Bitner's typology, campus-less universities do much more than that: they transform the *nature* of the service they provide, by moving it from the category of *interpersonal service* into the *self service* category on the student side, and into the *remote service* category on the faculty/staff side.

This approach has undeniable economic advantages to both the institution and the students (Hamel 2000), and can bring higher education to students who would otherwise be denied access to it. But it also radically changes the rich social and cultural attributes of higher education, which according to many experts play an important role in the learning process. In his book "On the Internet" (Routledge 2001) Hubert Dreyfus presents powerful arguments against remote learning of all kinds, and Internet-based ones in particular. Following Maurice Merleau-Ponty's phenomenological argument that the fundamental way we understand reality is by 'having a handle on it' (Merleau-Ponty 1979), Dreyfus argues that the internet takes away exactly that: our connection to reality. Disembodiment, he argues, hampers our ability to interpret the world around us, which depends on our location in a particular physical and social/cultural context where we have to 'cope' with things and people. These contexts expose us to disappointments and failure, as well as injury even death. Our vulnerability produces a kind of engagement and commitment that is absent when we enter cyberspace and leave behind our embodied selves. We lose our ability to make sense of things, such as the sense of relevance and irrelevance, the sense of reality, and the sense of involvement that are necessary for inferring meaning—hence for learning. He goes on to claim that without involvement and presence we may be able to acquire factual knowledge but not skill—a competence beyond the mere ability to recognize facts and apply rules. Skill is based on the ability to contextualize factual knowledge and discriminate between facts that are important and those that are not, between actions that make sense and those that do not. Such competence requires the presence of a teacher (or fellow learners) who can point out the relevant from the irrelevant, and an emotional involvement that helps the student transform a mere 'learning' situation into an 'education.' The presence of others means that students are vulnerable to mistakes and the enjoyment of success.

Dreyfus conjectures that telepresence can substitute for physical presence if it enables human beings to be present at a distance in a way that captures all that is essential about bodily presence. Such presence would have to be perceived by both the actor and those whose presence s/he informs as an involved, embodied being. This means the ability to sense and control events in the world, and get perceptual feedback concerning what has happened. Such feedback must be instantaneous, not delayed, otherwise the mediation of the equipment will render the experience false. Moreover, such telepresence should include serendipity and vulnerability: the feeling that unexpected events may occur, and that they may affect us in good or bad ways. Hence, such presence is more than a matter of mere perception: it is based on our innate bodily experience which strives to determinate otherwise indeterminate phenomena, so we can get an optimal grip on the world around us (aka *reality*). Thus, a sense of presence requires not only perception and action, but also contextualization: the ability of the environment to respond autonomously to events outside our control. Such autonomy cannot be encapsulated in automatic 'bots,' which are typical of video games: it requires intercorporeality: the presence of others, whose own contextualized experience cannot be predicted.

By context Dreyfus means the physicality of the experience, as well as the social and cultural 'mood.' For example, the 'mood' of a classroom determines what matters and what does not: what is experienced as exciting or boring, salient or marginal, relevant or irrelevant. Students sense the 'mood' of fellow learners' reaction to the teacher, and thus contribute to the creation of a feedback loop to the teacher's actions. The teacher, in turn, senses when an example does not work. Vulnerability is engendered by a student risk of being called upon to demonstrate his/her knowledge, and the teacher being asked a question s/he cannot answer. Distance learning technologies that separate the students and the teacher are bound to be less effective than those that create such a feedback loop of teacher/students action/reaction. As a result, Dreyfus surmises, on-line learning, compared to the traditional ways of learning, is limited and inadequate.

6. CONCLUSION

It is not the intent of this paper to debate the relative merits of place-based vs. place-less higher education. Rather, it proposes an alternative option—one that combines the advantages of remote learning with the

traditional place-based experience of higher education institutions. Specifically, it suggests that *virtual learning environments* can be developed that will have many of the attributes of physical learning environments, and more. As such, they will preserve the remote learning experience within Bitner's *interpersonal services* category, while enjoying many of the benefits of contextualized learning Dreyfus argues for. They will enjoy the economic and other benefits of remote learning, without sacrificing the social, cultural, and environmental aspects necessary to engender a meaningful learning experience.

Developing a virtual learning environment that can support place-like activities as a substitute or an alternative to physical learning environments will provide an unparalleled opportunity to understand how the virtual experience differs from a physical place experience, and how it shapes perceptions and expectations of the physical place (and vice versa). It will help us understand the new possibilities offered by virtual place-making based on age-old architectural principles, and how cyberspace can support and complement the university's missions of education, socialization, and acculturation. More broadly, they will help us explore the effects of Information Technology on the relationships between people, their activities, and the environments they inhabit, within the context of higher education.

From the limited experimentation we have done to date, it is clear that a sense of presence and a sense of context can be conveyed through this new medium: participants like to 'see' each other, and when the line of sight is obscured by some object—a column or a bush—they maneuver their avatar so they get a direct line of sight to the avatar of the person to whom they are talking. When someone turns her avatar's 'back' on another person's avatar, the sense of rejection is quite visceral.

Still, much more work remains to be done before virtual environments become a viable alternative 'place' for learning, for they not only can afford new ways of interaction and collaboration, but also challenge and question our basic notions of space, time, culture, and behavior. It is not enough to merely mimic the functional characteristics of physical spaces: it is also necessary to embody the tasks we perform there, as well as infuse them with cultural and social meaning, and through them—behavioral conventions that engender a sense of commitment, vulnerability, and engagement.

7. ACKNOWLEDGEMENTS

8. REFERENCES

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