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Content Seeking Students

Site-and-Sound Bites as Participants in Ubiquitous Social Computing

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Abstract

Discussion of digital, collaborative environments for architectural work often focuses on the *structure* of discourse, rather than upon its *substance*. An implied assumption is that the various means of electronic-based communication are suitable for any kind of subject matter, whether visual, sound-based, or text. Our project team has chosen to challenge this assumption by example: We have created new media artifacts for collaborative architectural education.

Our project is an attempt to leverage on-going research concerning the efficacy of “ubiquitous social computing” (USC) for design-studio teaching. With a pilot project already put in place by one of our team’s leaders, we have supplemented graphic and verbal communication among participants with purpose-crafted video for their use and exchange. Smart-screens, placed strategically within students’ “social enclaves,” provide access to curated content.

Our approach challenges traditional educational emphasis upon explicit types of architectural knowledge. The construction of *tacit* knowledge, usually derived from first-hand architectural experiences, is here effected by mediated, digital-based experiences. Nevertheless, the *social* dimension of the USC framework may be significant in negotiating the interface between immediate and mediated experiences.

01 Getting “In” On Architectural Knowledge

Many teachers of architecture are struck by how much their students *don’t* know. Especially among students for whom preparatory programs and quality facilities have traditionally been lacking^{01.01}, one finds little firsthand experience of “intentional” architecture, i.e. buildings and spaces which embody thoughtful design and which reward critical study^{01.02}. Naturally, architectural education is explicitly charged with providing all students such experience; but the logistics of doing so have remained challenging, especially for students in programs far from urban centers or for students everywhere who work while enrolled.

These students, too, have had scarcely more secondhand exposure to information about architecture, whether through traditional media (photographs, drawings, and text) or through representation of architecture among moving images, such as television or cinema. One significant consequence is that many students enter the educational framework lacking conceptual tools (e.g., the ability to use formal abstraction for the derivation of general principals) to aid their own learning. That these tools must be taught determines, naturally, the content and timing of many schools’ architectural curricula.

Although architectural schools do present the explicit knowledge which students are expected to acquire, what is at issue might better be characterized as “tacit knowledge,” a phrase more often used by writers without direct involvement in architectural design^{01.03}. Tacit knowledge has been described as “a certain kind of causal-explanatory structure which underlies ... knowledge that the speaker has concerning complete [concepts]”^{01.04} and, in the context of architectural research, has been described as a “process of discovery through observation and description... knowledge learned by *doing* rather than from rules”^{01.05}. That the development of significant tacit knowledge is embodied by the emphasis upon design – learning by doing – seems clear for most contemporary, studio-centered curricula. But the tacit knowledge ostensibly gained by observation and description remains less a formal part of educational curricula than an aspect of enrichment, to be provided as time and resources allow.

For some time now, new digital technologies have promised to remedy these and other deficits in architectural education as well as, naturally, professional practice and research. With regard to the construction of tacit knowledge, the question of those new technologies’ immediacy quickly arises: *How can a digital representation, or in fact any kind of mediated architectural experience, affect the scope of sense-data and observation which underlie architectural knowledge?*

Our project seeks to answer this question by creating digital video artifacts to promote the acquisition of *tacit knowledge* among students. What we call “Site-and-Sound Bites” differ from traditional representations of architecture in two ways. Rather than using “real-world”-derived means of dissemination, typically constructed for an audience’s passive viewing, these videos are from their inception to be exchanged within a “**ubiquitous social computing**” environment [01.06]. Fluid, interactive, yet simple user-tagging mechanisms embellish the hearing, viewing, and sharing of these digital compositions to afford additional content and to become an additional “sense dimension” for students’ experience.

“Site-and-Sound Bites” differ, too, in their formal and substantive characteristics. Short, with emphasis on acoustic and visual rhythm, these video artifacts do not depend upon narrative to hold students’ attention. On the contrary, an impressionistic and subjective approach to composition allows greater emphasis on immediate experience – of the video itself, of the social framework in which the video is itself embedded, and of each viewer’s imaginative association.

Not surprisingly, this interface between digital and physical architectural experience touches upon, in turn, a fundamental theoretical notion: Presence. For many years, presence has been primarily the focus for immersion-based Virtual Reality research^{01.07}; but, in more recent discussions, the concept of presence has also been found to underlie the efficacy of social-action-oriented environments, both mediated and immediate^{01.08}. In fact, the contributing factors to the sense of presence may underlie the construction of tacit architectural knowledge itself.



Figure 1

(Stills from Ando's Modern: http://www.jkargon-architect.com/71_Ando-Modern.html)

02 Media, Immediacy, and Hypermediacy: Presence and its Social/Cognitive Dimension

Although the experience of presence might be simply described as the feeling of “being there,” “(t)here is consensus that the experience of presence is a complex, multidimensional perception, formed through an interplay of raw (multi-)sensory data and various cognitive processes – an experience in which attentional factors play a crucial role as well”^{02.01}. IJsselsteijn and Riva describe two broad categories – media characteristics and “user” characteristics – and other writers propose finer distinctions. Lombard and Ditton, for instance, identify the following six interrelated concepts which researchers have correlated with the feeling of being present in a physical or mediated environment: social richness, realism, transportation, immersion, social-actor-within medium, and medium-as-social-actor^{02.02}.

That their initial concept emphasizes the role of social connectedness is especially significant, if anti-intuitive, in the architectural context. Although traditional representational media such as drawing and still photography have tended to idealize architectural experiences, even to the extent of removing all reference to other inhabitants^{02.03}, our firsthand experiences of architecture are typically shared experiences, with a specific social and programmatic context. Our impressions of formal characteristics may be significantly influenced by these factors. As Lombard and Ditton write, “Presence as social richness is related to two important concepts originally applied to nonmediated interpersonal communication: intimacy and immediacy... [I]nteractants vary physical proximity, eye-contact, intimacy of conversation topic, amount of smiling, and other behaviors to establish an ... overall level of intimacy.”^{02.04} That intimacy and immediacy are also phrases used in formal descriptions of architectural spaces should not be disregarded; in fact, these formal characterizations are essentially impressionistic descriptions of those social ones.

Realism, in the literature concerning presence, typically alludes to the clarity of one’s immediate experience and, in addition, to the fidelity of mediated representation towards that original experience. In this concept, too, are embodied two parallel ideas that contrast the perceptual with the cognitive. An experience may be said to reflect “social” realism, despite poor visual or acoustic quality, if its message is perceived as true or relevant. On the other hand, even fantastic

narratives can easily appear “realistic” given attention to visual detail. Typically, we demand certain qualities in our firsthand experience of architecture – good lighting, personal comfort, and elemental shelter – which we expect, too, from representations of architecture.

The concept of *transportation* relates to the most fundamental question to which presence contributes: Where Am I? ^{02.05} Mediated experiences sometimes transpose the feeling of place from one’s immediate location to that which is represented; alternatively, some works attempt to effect those foreign impressions in the perceived-as-local environment. Architectural critics often write of a “sense of place,” which implies not “transported” but *collective* presence – a feeling of sharing one’s experience with others. Here, too, the social dimension extends one’s individual, perceptual world.

The *immersive* aspect of presence is perhaps the most misleading. Many studies of perception, especially since the development of cinema, have suggested that the exclusivity of one’s attention is key to the transformative potential of mediated experience. More recent studies, however, have cast doubt on immersion’s central importance (and, therefore, of its *necessity*) for the feeling of being present ^{02.06}. Senses, such as hearing and touch, can provide the impressions of spatial or physical context even while other senses, such as vision, are directed elsewhere. In these circumstances, the concept of “hypermediacy,” which draws attention to the means of representation and to the substantive concepts embodied in its technique ^{02.07} may afford a kind of cognitive immersion distinct from its purely sense-based analogue.

Lombard and Ditton’s remaining categories, *social-actor-within medium* and *medium-as-social-actor*, reflect the surprising willingness of people to suspend their awareness of obviously-mediated interactions, especially when they are subject to visual and verbal clues which mimic social conventions. “Looking past the frame of the looking-glass” characterizes these circumstances, in which individuals’ acquired social behavior apparently supercedes distractions which would otherwise lessen these persons’ involvement in a particular environment.

What begins to emerge is that all these different concepts, each of them fundamentally phenomenological, underlie personal experience in a way which allows us to build a cognitive map of our surroundings – or of those environments with which we *intend* to surround ourselves. If we hope to encourage the development of tacit architectural knowledge among our students, we need to provide them not only with experiences of architectural forms – whether perceived immediately or by mediated means – but with experiences conceived as a social, potentially interactive, activity.

03 Collaborative Actions and Questions of Content

Nevertheless, discussion of collaborative environments for architectural education often focuses upon the *structure* of discourse, rather than its *substance*. Researchers in related fields place emphasis upon modes of interaction ^{03.01}; upon channels of communication ^{03.02}, or upon the definitions of roles which characterize the participants in architectural design (or learning) ^{03.03}. Even when researchers attempt to address the conceptual elements of architectural knowledge, their attention is mostly given to schema which, presumably, might be populated by others. ^{03.04}

Significant examples of alternative approaches do exist, especially at the interface between “analogue” and digital design. As we shall see later, one such precedent – Le Corbusier’s early fusion of moving image and electronic-based music for the Phillips Pavillion – still poses this stimulating challenge: Can context be conceived *together* with content?

How a medium’s technical constraints determine formal characteristics has been repeatedly discussed by artists and architects throughout recent times. At the very least, the intimacy between hand and gesture, between pencil and mark, or between materials and architectural form is an inevitable point of departure for discussion about creative work. Discussion about digital media has been no exception, whether addressing either work created as art^{03.05} or as products for use without analogue reference [03.06].

Interestingly, the introduction of content-oriented research has already begun to effect some substantive changes upon architectural curricula. One example, among others, is SUNY Buffalo’s dual M.Arch./MFA program, an offering of that faculty’s Center for Virtual Architectur^{03.07}. The decision to approach the synthesis between architecture and digital-based technology from the perspective of fine-art studies appears to be valuable for two reasons: First, for the application of interdisciplinary theoretical methods (typically found in the teaching of fine arts) upon otherwise technological problems; and, second, to leverage the creation of art-like content to help define the scope of those technological problems.

Such changes to educational methodology emerge not from the use of innovative tools per se, but from the way in which these tools are dispersed and used. These changes conform to the rubric “Ubiquitous Social Computing,” or its more recent cognate, “Situated Technology” [03.8]. The emphasis on spatial ubiquity (in the digital or analogue realms) is naturally significant, as is the acknowledgment of the social factor in the acquisition and creation of architectural knowledge.

04 Ubiquitous Social Computing: Today’s “Facts on the Ground”

So what are these changes? How is Ubiquitous Social Computing defined in the context of architectural practice, education, and research?

Social computing has been defined as “any type of computing application in which software serves as an intermediary or a focus for social relations.”^{04.01} These social relations are effected by different forms of communication between or among people (and, potentially, agents other than people). Social relations imply reciprocity, so that each member of a social group has both passive and active roles to play.

The proposition that opportunities for social computing is now “ubiquitous” is significant less for the removal of geographic constraints upon these activities than for the qualitative changes among the activities themselves^{04.02}. Those changes might be characterized as follows:

Real-time interactions are no longer always preferred to asynchronous interactions;
Casual interactions assume an immediacy similar to those based on older relationships;
Multiple interactions, performed in parallel, may be preferred to tasks which demand more significant attention.

Many of these changes parallel prescriptive theories about effective knowledge acquisition among architects. J. Woo and his collaborators, at Texas A & M, have investigated ways by which electronic means can encourage fruitful interactions between students and mentors^{04.03}. With explicit reference to the need to develop Tacit Knowledge among students, Woo et al follow Sternberg's proposal that interaction with experts is the most direct way to imbue students with hard-to-articulate, "useful" knowledge^{04.04}. Simple tools such as remote "chat," e-mail, and real-time collaborative software allowed students to interact with multiple advisors, dispersed over a wide area. Many similar projects have taken place over the last five years, and most of them seem to provide, at best, a promise of better, more fluid interactions than these pilot projects actual provide.

Researchers at NJIT have, on the other hand, tried to establish a framework for students' architectural education which reconfigures both spatial boundaries and boundaries between disciplines at their institution^{04.05}. Collaboration among studio participants involves students of architecture, computer science, information science, and management. By placing dispersed, easily-accessible collaborative workstations in locations more typically associated with relaxation and recreation, Wassim Jabi and his collaborators have afforded students with "situated" opportunities for design work, media research, and unrelated social interaction. The intended effect of this geographic dispersal is to "deinstitutionalize" workplace context; students' interaction is encouraged to become more fluidly casual, to promote exchange not only of technical knowledge but of the procedural, tacit kind.

The following observations about contemporary USC behavior may be useful in considering potential applications within an educational framework:

Increased access and interaction does not represent a flattening of hierarchies among participants; significant differences remain between roles traditionally defined as "teacher" and "student."
04.06

Annotation is fundamental to asynchronous educational interaction, whether or not within an educational, institutional context.^{04.07}

Agency among data-side artifacts may be necessary as intellectual geography (i.e., learning) occurs with both iteration and real time's passing.

05 Formal Qualities of USC-purposed Content: *Precedents and Propositions*

So what might be character of content intended for dissemination in a USC context? The informal nature of USC interaction suggests that content be short -- too short, in fact, for a traditional narrative to emerge. In the context of architecture, the emphasis of such content seems to be better directed towards physical forms of themselves, not (necessarily) upon its history, its construction, or its creators; such themes tend to impose more familiar, narrative structure. Technically, USC-appropriate content can be produced using any sound-and-vision technology^{05.01}, but it is video's contemporary, digital manifestation that allows its products' application here.

The "Site-and-Sound Bite" titled *Patterson Park Pagoda* illustrates our straightforward approach. Although an "experiential narrative" (i.e., approaching and climbing to the top of the pagoda)



Figure 2

Stills from Patterson Park Pagoda:

http://www.jkargon-architect.com/71_Patterson-Park-Pagoda.html

does allow viewers to orient themselves among the images and sounds, the clip *evokes* more than it *represents*. The cacophonous, relentless percussion of the music mimics the repetitive visual effects, including short cuts of aggressively-cropped views of the structure. The curve of the stairs seems to push against the rectilinear frame of the camera's view, with effort analogous to one's effort climbing flight after flight. When, at the top of the pagoda, visitors to the pagoda are given a panoramic view of Baltimore's skyline; likewise, at the end of the clip, raucous music is replaced with the more quiet "background sounds" of the city. The clip's coda, which gives a glimpse of the source of the music itself, ties viewers back not only to the real cultural sources of the pagoda's origin, but also to that culture's continuing presence in the city itself, quite close to the pagoda's actual location.

If one looks for precedents for this sort of video, which explicitly represents a work of architecture, one finds that such films are at once everywhere and surprisingly rare. Naturally, almost all film scenes depict a visually-defined space; often, these environments are architectural. Whether or not these environments have an independent existence exterior to the film, and whether or not these spaces reflect design intentions beyond those of the filmmaker, almost all film and video depend upon these images for thematic support^{05.021} Historically, the creation of architecture-like backgrounds used in cinematic settings extends back in time through the genre of film to stage, opera, and religious ritual.

On the other hand, films about "architecture" are typically narrative documentaries. Although individual sequences may attempt to give a sense of a design, most of these films are conceived as descriptions of persons or processes that produce buildings. Especially among films conforming to the expected length of a cinematic "feature," emphasis upon the *experience* of architecture is rare. Hiroshi Teshigehara's film, *Antonio Gaudi*^{05.03}, might be considered a singular exception: The director attempts to draw a personal portrait of the architect almost solely by cinematic representation of Gaudi's buildings. Filmed with great attention to the feeling of both spatial character and material detail, Teshigehara's movie is mostly without spoken word. Instead, an evocative soundtrack, which often replaces on-site sound with music, affords viewers with clues about the acoustic character of Gaudi's work.

Two other precedents are unusual both for their content and for the context from which they emerged. The first, Le Corbusier's video-and-sound collage *Poeme Electronique*, was created to be shown within his atelier's own design for the Phillips Pavilion, at the 1958 World's Fair in Brussels^{05.04}. This film, the audio track for which was composed by Edgard Varese, is well documented in the historical literature but, until recently, rarely seen. Although a thorough description of this piece is beyond the scope of this essay, several characteristics of *Poeme Electronique* are worth mentioning:

Sound and music unified the multimedia experience, described by its creators as "simultaneous perception".

No "chronological" narrative organized the visual images.

Images were framed within the rectangle of the projected film cell.

The electronically-produced compositions by Varese and Xenakis (who was also Le Corbusier's architectural collaborator) were arranged in temporal *and* spatial sequence. Stereophony, reverberation, and ambient sound were used to create novel sensations; but, no conscious attempt was made to synchronize the acoustic with the visual effects. Consequently, the asynchronous character of the sound and image composition can be understood only in the context of its creators' efforts to establish a socially-experienced *gestalt*.

A second precedent is the work by filmmaker Peter Rose, who addresses explicitly phenomenological themes relating to space, time, and human artifact, including architecture. Based in Philadelphia, Rose emerged as an artist from the genre of performance art, in which themes of language and meaning predominated. His transition to work in video allowed Rose to explore what he describes as "simultaneity,"^{05.05} a state appearing to allow complex, even paradoxical, impressions to coexist. Throughout his work, he has continued to prefer immediate to mediated experiences. He has written:

[T]he triumph of digital simulation technology has rendered equally suspect the notion of experience itself... I've been committed to the proposition that witnessing place, time, and event has some superogatory value. How can this still be? How can it matter that one was there, that an image was made by virtue of one's physical presence in a context, rather than by the simulation of such?^{05.06}

Several works created over the last decade effectively phrase Rose's questions. *Rotary Almanac*^{05.07} imposes multiple, differently-shaped view-ports upon scenes of nature, as that environment changes over both seasons and shorter time spans. *Pneumemon*^{05.08} exchanges the context-less view-port with the frame of a video monitor, itself ambiguously placed within (and containing) images of projected shadows, billowing upon a windblown tarpaulin. Both of these works discard story-telling in favor of certain kinds of experiences; furthermore, while watching these videos, one is led toward intended themes by the disorienting coincidence of multiple time-streams and

points of view. Intriguingly, and in common with *Poeme Electronique*, what allows viewers to orient themselves is the acoustic environment that accompanies the visual experience.

A third, more recent video, *Odysseus in Ithaca*, recalls its title's theme only in the most abstract (and, perhaps, ironic) way: "Odysseus moors his boat in an alien architectural machine, a labyrinth with echoes of De Chirico and Escher – a place of mystery and power where the rules of visual perspective are transformed and another space erupts."^{05.09} The video itself is split into three changing views, each of which depicts a moving perspective from within a parking structure, displaced slightly in time, and placed side-by-side. No visible characters inhabit this space, and although the video begins by depicting (apparently) an entrance into a parking structure, no narrative emerges from the subsequent scenes. Instead, the viewer is confronted with repeated and varied views of moving through and around the parking structure.

The audio track is at once disconcerting and evocative, since its acoustic effects superimpose seemingly white noise, echoes of mechanical operations, and music by Giacinto Scelsi and Carles Santos, the latter of which evokes romantic associations to which the video's title implicitly alludes. This collage of sound definitely places viewers in a specific, although entirely fictional, acoustic space, itself convincingly appropriate to the architectural triptych comprised by the visuals.

As a precedent for USC-purposed content, Rose's video work appears willing to conflate both immediacy with *hypermediacy*. Although viewers' perceptions of natural scenes and realistic images are heightened by the abstract, non-narrative content of these films, their disconcerting temporal and spatial effects encourage viewers to reconsider both *what* they are viewing and *how* they are viewing it.

In different manner, a very similar hypermediacy for our "Site-and-Sound Bites" is effected by the technical USC framework itself. Explicitly rather than implicitly, our work confronts students with the *what*, *how*, and *why* of their viewing. Simplistic text, added to display title, author, keywords, and rating, is intentionally intrusive; students are expected to interact informally with the rating or exchange functions while maintaining limited attention to the video images. Audio tracks, which provide acoustic clues evoking site-specific characteristics, may also act as sound hooks to capture attention when most critical. Just as casual computing is thought to be an agglomeration of small cognitive tasks, which accumulate with repetition or variation, "Site-and-Sound Bites" are composed to encourage repeated, "casual" viewing.

The video entitled "Through Light and Shadow" illustrates possible advantages of this approach. Contrast between audio samples of a well-known jazz composition by John Coltrane and evocative, nighttime clips of Steven Holl's recent addition to the Nelson-Atkins Museum in Kansas City, can be quickly assimilated due to repetition and clarity. With limited visual means, much of the building's exterior design and site-planning is described.



Figure 3
 (Stills from Through Light and Shadow
http://www.jkargon-architect.com/71_Through-Light-and-Shadow.html)



Figure 4
 (Stills from Lights @ Night
http://www.jkargon-architect.com/71_Lights-at-Night.html)

Repeated viewings might afford some additional detail, but more significant will be the implicit sense of the rhythm of the building's skin, illuminated from within.

The video "Lights @ Night" evokes the movement through Tokyo of a *flâneur*, whose ambient perceptions would have been detailed by the written word for others to share. In this case, the *flâneur's* digital counterpart records random impressions consistent with most first-time visitors' impressions of the Japanese city.

"Site-and-Sound Bites" have, so far, tended to fall into two subject categories: Buildings and Streetscapes. The former videos tend towards visual and acoustic coherence; and, in lieu of a traditional temporal narrative, they often substitute a *spatial* narrative: The spatial sequence or hierarchy of the subject building itself. "Site-and-Sound Bites" which depict exterior, city views are more open-ended, without a single, particular focus. Instead, the rhythmic pace of imagery and sound allow viewers to make connections that would otherwise be lost.

06 "Site and Sound Bites" in a USC framework: *Interaction Towards Propagation*

Three key considerations determine how these videos might be inscribed within a USC framework: Means of Entry, Robustness of Tagging/Annotation, and Potential Agency.

“Means of Entry” describes the circumstances by which students are challenged to participate, and through which they might begin their interaction with the content. The “Means of Entry” reflects a pedagogical choice about how to implement the USC environment.

We have, initially, implemented two means of entry, each of which provides students with alternative opportunities for discovery and/or inquiry. The first, web-browser-based, is a table-like array of many video windows, each of which begin to play when the web-page is first called up. Students may make their own assessment of which content appears particularly interesting, for their subsequent selection. Verbal subject/content tags, available to participants with a simple “mouseover” gesture above each video window, provide additional information concerning the subject of the video. Clicking on any single video window brings up an additional browser window for full screen view and annotation, using the *YouTube* platform. The popular and diverse feature set of the *YouTube* environment allows capability for documenting the interaction among select participants.

A second means of attracting student participants might be described as “random entry,” in which the array is replaced by a sequential display of different videos in an innovative USC context. We have made use of NJIT’s experimental interactive poster network, part of NJIT’s collaborative project studying inter-disciplinary studio work. Jabi et al have written: “The salient features of these kiosks are:

- Freedom of expression: authors should have the greatest possible latitude in presenting their ideas, without being constrained to predefined formats or templates;
- Interaction: viewers should be able to communicate feedback to the authors, either graffiti-style or as typewritten annotations;
- Automation: the kiosks should invite interaction without demanding it.”^{06.01}

The advantage of this method may be its very serendipity, by which unexpected connections among content options provide both richness and breadth.

“Robustness of Tagging/Annotation” anticipates the range of possible exchanges among those participants. The interactive poster kiosks provide pen-based annotation, the subject of which may be either written word (“commentary”) or graphic sketch. For the PC-embedded means-of-entry, there are a stream of innovations released for use by the general public. Flash-based “graffiti” tools by *Vidavee* and in-stream, video annotation by *Viddler.com* are examples which may afford students even richer tagging capability.

The third consideration, “Potential Agency,” reflects the most profound promise of any USC based system: The active participation by electronic-based agents in the “social” life of the system. Projects along similar lines have already been implemented in commercial contexts, such as real-world tourism^{06.02}. Initial capability for agency is provided by our use of the com-

mercial on-line platforms' mechanisms for delivering "More From" and "Related To" content. Considering the efficacy of these tools, initial observations suggest that their rudimentary "agent-like" service may be sufficient, pending further assessment of initial trials.

Nevertheless, one is confronted by an obvious question: What aspects of tacit knowledge about architecture and its related disciplines do "Site-and-Sound Bites" actually embody? The following list proposes relevant concepts:

Awareness of geometric and spatial similarities among functionally different spaces, to encourage understanding of formal ordering systems;

Awareness of the role of rhythm in organizing processional experiences within architectural spaces;

Familiarity with the diversity of architectural forms and the potential for diverse architectural solutions to similar programmatic and structural challenges;

Awareness of the relative proportions of various spaces, as embodied in acoustic sensations as well as visual cues;

Appreciation for cultural diversity, as a consequence of the explicit learning about different cultural manifestations.

This list is hardly exhaustive. But our own emphasis upon the sort of tacit knowledge ascertained by experience and description (distinct from that which is learned by doing or through mentorship) naturally determines the concepts we hope to engender. A more fundamental question concerns, perhaps, our own work's assessment. Is it possible to track the acquisition of tacit knowledge in any meaningful way?

Previous studies have proposed measuring tacit knowledge by creating "inventories" of knowledge by experts in the relevant field of endeavor. These inventories, described by Sternberg et al^{06.03}, may be used to establish baselines for "real-world competencies" by typical methods of assessment, including simulations and situational-judgement tests. But Sternberg's repeated emphasis on *expert* knowledge seems inappropriate for anticipating divergent, personal sensibilities in the context of thinking about architecture. We suggest, therefore, that the interactive nature of the USC framework provides a surrogate for expert-based evaluation, so that "emergent communities"^{06.04} of participants – instead of designated "experts" – might more organically provide categories for evaluation of individuals' acquisition of tacit architectural knowledge^{06.05}.

In the context of USC environments, we suggest that the appropriate place for "expertise" lies in the creation and curation of content -- in the definition of institutional, intellectual boundaries. As architectural *educators*, we must leverage our original skills as architectural *creators*. In addition, metrics of assessment may need to pay additional attention to those social factors that

afford the group interactions, which so fundamentally underlie our social awareness of experiential thinking. Intriguingly, the digital framework itself affords new opportunities for inventing and implementing these metrics:

Quantitative measures of student discourse, whether student-student, student-teacher, or between student and other participants.

Quantitative measures of “depth of interaction,” including analysis of number of links both across topical categories and within them.

Naturally, some qualitative assessments should be possible in the context of continuing studio work. But since indicators for improved design skill, sophistication, and quality often emerge only over significant periods of time, quantitative metrics may prove to be more useful in guiding short-term pedagogical decisions for many students.

Preliminary findings from NJIT’s experience confirm that learning depends strongly upon students’ individual values concerning methodology and creativity. In the context of architectural education, where correct questions are often more valued than correct answers, the USC framework may require revision of the ethical component within architectural curricula. Ethical concepts may extend from our expectations for professional behavior to, more generically, expectations for communication and social behavior. What changes to our means and manners must we assume in a nascent, digital environment?

We suggested earlier that “the contributing factors to the sense of presence may underlie the construction of tacit architectural knowledge itself.” The true test of this statement leads outside of the discipline of architecture. Our own urban and natural environments remain the true loci for our feelings of “Being There.” This challenge, therefore, remains: To build, among both architects and among those for whom they design, a more sensitive understanding of our world.

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02 Media and Immediacy and Hypermediacy: Presence and its Social/Cognitive Dimension

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