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From atelier to e-telier: virtual design studios

by Jerry Laiserin, FAIA

The design studio, as physical place and pedagogical method, is the core of architectural education. Ateliers clustered around rue Napoleon in Paris defined the École des Beaux Arts. The Carnegie Endowment report on architectural education, published in 1996, identified a comparably central role for studios in schools today. From programs, schemes, and parti to desk crits, pin-ups, and charrettes—language and behavior learned in the studio establish the profession's cultural framework.

Advances in CAD and visualization, combined with technologies to communicate images, data, and "live" action, now enable virtual dimensions of studio experience. Students no longer need gather at the same time and place to tackle the same design problem. Critics can comment over the network or by e-mail, and distinguished jurors can make virtual visits without being in the same room as the pin-up—if there is a pin-up (or a room).

Virtual design studios (VDS) have the potential to favor collaboration over competition, diversify student experiences, and redistribute the intellectual resources of architectural education across geographic and socioeconomic divisions. The catch is predicting whether VDS will isolate students from a sense of place and materiality, or if it will provide future architects the tools to reconcile communication environments and physical space.

With a little help from my friends

While shuttling between Harvard and MIT on Boston's MTA Red Line subway during the 1980s, William J. Mitchell, FRAIA, now dean of architecture and urban planning at MIT, mused that the network linking the two schools' computer systems served as an "electronic Red Line." By the early 1990s, former students, collaborators, and admirers of Mitchell began establishing trans-continental and transoceanic "Red Lines," inventing the ground rules for electronically mediated studios as they went along. From 1995 to 1997, a watershed in VDS evolution occurred in the academy, with publication of experiences in overlapping studios among the universities of Sydney, Tasmania, and Queensland in Australia; University of British Columbia (UBC); Hong Kong (UHK), Kumamoto, and Kyoto universities in Japan; MIT; the National University of Singapore; Washington University in St. Louis; and the Technical University (ETH) of Zurich, among others.

In 1997, Mary Lou Maher, Simeon Simoff, and Anna Cicognani wrote a landmark paper and subsequent monograph, Understanding Virtual Design Studios (Springer-Verlag, 1999), on VDS experiences at the Key Centre for Design Computing, Faculty of Architecture, University of Sydney. According to Dr. Simoff, who's now at the University of Technology Sydney, VDS makes "the location of designers irrelevant … because the workspace of the studio is distributed across the net. Designers are able to enter the studio for interactive and noninteractive sessions connecting to the World Wide Web, multimedia mailers, and/or connecting to a video conferencing session."

Photography courtesy Dr. Jerzy Wojtowiczp

Architecture student Tom Carajevski at the University of British Columbia presents his design proposal to a critic at Kumamoto University in Japan.

The design collaboration may be single-task, in which each participant "has his own view over the whole design problem, and the shared conception is developed by the 'superposition' of the views of all participants," or multiple-task, in which "the design problem is divided among the participants in a way that each person is responsible for a particular portion of the design."

Similarly, communication may be synchronous, implying "the simultaneous presence and participation of all designers involved in the collaboration," or asynchronous, in which "designers may work at different times, often on different parts of the design, and do not require the simultaneous presence of all team members." Asynchronous communication has modest technical needs—typically e-mail and file transfer protocol (FTP)—while synchronous communication imposes high bandwidth and technology requirements for video conferencing, shared electronic whiteboards, and specialized groupware.

Simoff observes that an ideal shared design representation for VDS "would incorporate the designers' goals, descriptions, reasoning paths in their design steps, partial solutions to the design task, design communications, and information exchange." But he notes that no CAD system or interoperability scheme among CAD systems currently supports all these data. Therefore, the typical VDS employs an informal hypermedia approach, presenting information as text, tables, images, 3D models, animated images, and Web links to other information.

When implementing these principles, Nancy Yen-Wen Cheng, AIA, who taught at UHK during the mid-1990s when VDS took root there, favors structuring well-defined tasks and interactions "because of the difficulty of a true artistic collaboration between people who have never met." In local projects at the University of Oregon, where she now teaches, Cheng observes, "Where students can supplement mediated communication with face-to-face talk, they see their contributions become part of a useful repository." In remote projects, such as a recent collaboration with the University of Stuttgart, "students see that though their distant peers may have different values and approaches to design, many fundamental aspects of the design process are unchanged around the world. The enlarged pool of students involved [in a VDS] allows us to identify different models of excellence. While face-to-face interaction is more direct for conveying complex aspects of architecture and urban design, even through the haze of the mediated connection we get to glimpse a wider world."

At UBC, Dr. Jerzy Wojtowicz has been involved in VDS technology since its inception and finds it "no longer a big deal." In a recent collaboration between UBC and Kumamoto University, remote faculty critiqued student work synchronously—via Microsoft NetMeeting, Cornell University's CUseeMe, and Moro Lab's Group Work CAD (GW-CAD, developed by Professor Mitsuo Morozumi at Kumamoto)—and asynchronously with design software from Abvent (Art•lantis), Adobe (Photoshop, Flash), Alias|Wavefront (Maya), Autodesk (AutoCAD), auto•des•sys (form•Z), Graphisoft (ArchiCAD), and Nemetschek (VectorWorks).

Wish you were here

The Las Americas VDS spans Texas A&M and universities in Mexico, Argentina, and Chile, and combines lessons learned from other VDS with some new twists. Like Cheng, "Aggie" assistant professor Guillermo Vásquez de Velasco believes the cross-cultural nature of VDS promotes questioning "the hundreds of default design decisions that our students make during a semester. People with different backgrounds will do things differently, and it is from that diversity of experiences that the students can learn that every decision in the design process is an opportunity waiting to be used. The virtual design studio also is important as we train our students for a global marketplace." Like Wojtowicz's students at UBC, Texas A&M students can use VDS-specific tools, including "electronic pin-up" programs that allow the same Photoshop image files to be plotted out for real pin-ups and published simultaneously in HTML format for virtual pin-ups on the Web, without duplicate effort.

Image courtesy Texas A&M

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University School of Architecture

The infinity room involves building studios in different locations equipped with floor-to-ceiling rear-projection screens, computers and video equipment to create life-size images.

Dr. Vásquez de Velasco's innovation in VDS is the Infinity Room (see illustrations below), which creates the illusion that studios hundreds or thousands of miles apart are just opposite halves of the same room. This logical extension of VDS technology into the realm of simulation or telepresence increases psychological engagement in the same way as "dissolving the fourth wall" does in the theater.

Toward a virtual architecture

Media guru Marshall McLuhan once noted that new media take their initial content from the media they replace. The first motion pictures were filmed stage plays; the first television broadcasts were radio programs with pictures. But new media eventually develop their own forms, processes, and content—an evolutionary phase that VDS technology is just now entering.

Jim Davidson, AIA, taught at UBC during the school's mid-1990s VDS work, moved on to the epicenter of virtual reality research at the University of Washington's Human Interface Technology Lab, and then moved on to Microsoft and independent consultancy D'Art, Inc. In response to "the nonphysical, placeless, and nontemporal character of the medium of collaboration," Davidson believes VDS is essential to "helping students understand when our communications—verbal, written, or graphic—are media-dependent and when they are not."

Some of the most advanced exploration of media dependence in design communication and its implications for architectural form and program has been ongoing at ETH in Zurich, initially under the direction of Gerhard Schmitt and now under Maia Engeli. ETH defines its use of VDS technology as a platform for creating a new hybrid of virtual and physical architecture for 2010 and beyond—an architecture as much about chips, sensors, and adaptive building behavior as about commodity, firmness, and delight. The role of the studio thus will come full circle: As the hand-rendered communication media of the original ateliers shaped the architecture of the Beaux Arts age, the virtual media of the e-telier will shape a new architecture of the digital age.

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