Sustaining Studio Culture: How Well do Internet Tools Meet the Needs of Virtual Design Studios?

Brian R. Johnson

Keywords

Abstract

The Internet beckons seductively to students. The prospect of nearly instantaneous communication with acquaintances spread across the face of the earth is alluring. The ease with which rich graphical content can be made available to the world is stunning. The possibility of a design being seen by friends, family, and famous architects is tantalizing. Faculty are drawn by the potent synergy and learning that can be found in the opposition and cooperation of different cultural roots. It is probable that entire design studio sequences will be offered through distance-learning programs in the near future. Is that a good idea?

Much has been written [1,2,3] about "virtual design studios" in architecture schools and "virtual offices" in practice. Most offices have largely or totally abandoned drafting boards in favor of digital tools of production. Yet, regarding design, Ken Sanders, author of *The Digital Architect*, and Manager of Information Services at Zimmer Gunsul Frasca Partnership (ZGF), of Portland, Oregon, has written "we still make an effort to locate project teams together *and always will*" [4].

Production CAD work requires different kinds of interaction than design and design instruction. The experiments have been invaluable in developing strategies for use of the Internet as a component of a design studio series, but rarely depend entirely on use of the Internet for all course communications. In fact, most describe fairly isolated efforts to augment some aspect of traditional design environments using Internet tools (ftp, email, web). A few have implemented new pedagogic or collaboration paradigms (e.g., ETH's phase(x) [5]).

This paper considers the traditional design studio in terms of formal and informal activities, characterizes the major Internet technologies with regard to the resulting interaction issues. In particular, it describes an area of informal work group communications that appears to be ill-supported with existing tools. The paper goes on to describe a web-based collaboration tool which was developed to address the need for less formal communication. The context for this development is the concept of a fully distributed collaboration environment with particular attention to questions of informal communication.

Finally, it describes how the tool was deployed

in an experimental "web studio" setting and student responses to use of the tool.

Studio Education: Overview

Architectural design education occurs in a particular physical and psychic setting, the design studio. Much is made of the "culture" of a design studio. One effort to describe this phenomenon can be found in the writings of Donald Schön in which he characterizes design as "reflection in action" [6]. Unfortunately, Schön does not address the issues of on-line design education: How might we form a design community on-line? How can we best foster the same deep cultural roots and close psychic ties amongst participants who are physically quite distant?

The pedagogic construction known as a "studio" is used to teach the subtle, imprecise, culturally rooted but individually artistic process of design. It describes a mixture combining **place**, a group of **people**, and a fairly standardized **process**, all overseen by the faculty **mentor** in charge.

The central idea behind studio education, as described by Schön and others, is learning by doing. The student works at a design problem with the assistance and guidance of the studio critic or master. The mentoring process provides the conduit by which good design, while outwardly difficult to describe, is demonstrated, practiced, and adopted by the student—to become what Schön calls "knowing in action".

Architectural practices frequently utilize the studio model as well, co-locating team members in order to maximize communications efficiency and enhance team cohesion. At the same time, architects are anxious to take advantage of the opportunity the Internet provides to develop "virtual offices" —temporary alliances of specialist team members assembled to work on a particular project. Maintaining good communications becomes very important under these circumstances.

Place to Work
Most tangibly, a studio is a shared workspace. Different schools of architecture approach the definition of this space differently. Often it is determined by the walls of the room assigned to a particular design critic, though sometimes it is defined by the admission cohort, or through some other scheme. In any case, some or all of the students in the studio will be working on the same project at roughly the same time, but not all in the same way, nor at the same pace.

Faculty Mentor
The studio critic, often an experienced practitioner, sets the design exercise, often assembles and makes available selected reference material and/or imagery, arranges field trips, conducts the desk crits, and usually orchestrates the formal review(s).

Process: The Formal Activities
Individual Design Work
The student learns to design by designing. Much of the time students spend "in studio" is spent working on their own response to the exercise set by the faculty mentor. Activities may include research into similar types of buildings, making drawings or models to record ideas. Often students modify their workspace to include a visual display where they pin up and organize personal or precedent drawings as a visual reference.

Desk Crits
A key component of studio instruction is the individual desk crit. During these exchanges the studio critic joins with the student in engaging the design problems on which the student has been working, helping the student work through difficult issues, demonstrating appropriate design think-

ing, and often making normative remarks about design objectives, strategies, and techniques.

During desk crits the critic is engaged in helping the student "think like an Architect" [Schön], sometimes through verbal discussion, but most often through displays of needed problem-solving behavior. Desk crits also provide an opportunity for the studio critic to observe both how the student works and the resulting design work at close quarters and "in process". More importantly, they provide the critic with a chance to provide personal guidance to the student, helping them formulate their design strategy and goals as well as refine their design values.

In addition to providing a chance to help the student with questions about the particular design, the desk crit also provides an opportunity to discuss the general design process, or the process of design education, what Schön calls "meta-reflection".

Formal Reviews

Formal reviews are usually quite different. They present a chance for students to practice both their verbal and graphic presentation skills. Student are expected to explain their design response, through words and drawings, to an audience which does not share the history of the studio, and which may be skeptical or hostile to their approach. Most students see these as the more important form of critique, as the procedures are more rigorous and they are most often scheduled at the end of the design project.

Informal Activities

In the course of working on their own design, the student incidentally displays their project by taping it to their drafting board or pinning drawings to their personal work area. Of course, while moving around the studio they will also observe and interact with their peers: for instance, they may see (and later mimic) a successful process or pro-

duction strategy; they overhear conversations and desk crits [7]; and they may participate in informal debate or discussion regarding the design problem which has been set before them. Finally, they will usually share a design review, in which outside critics offer comments and suggestions.

Summary

In the vocabulary used to describe the digital realm, these studios are co-located, synchronous experiences, monitored and mentored by a co-located critic. The traditional studio process creates an opportunity for each student to passively observe work and see techniques which are closely related to their own, but not identical. They receive personalized but only semi-private desk crits and reviews. The students spend far more time in studio than the hours the mentor is present. During those long hours they study other topics, and they engage in casual socialization, flirtation, occasional debate, and general discussion. Through this intense interaction the student lives the design experiences of their peers as well as their own, and as a consequence, develops a richer vocabulary of design response.

Discussion of Major Internet Tools

The previous section considered the studio in terms of its communications activities. This section looks at the major Internet technologies and how they map onto the communication activities of the studio. There are many specialized Internet applications available. In the interest of generality, this analysis considers only those tools which might be found on, or available to, a student's personal desktop computer.

One important characteristic of these technologies (or their use) has to do with time—some tools work better in "real time" (as the clock ticks), while others work better in "slow time" (interaction se-

quences where the probability of two events over-lapping is fairly small). Tools which work well in real time may work poorly in slow time, and vice versa.

World Wide Web Publishing

Static web pages (including those with one-way multimedia content) are quite comparable to print or reprographic publication and presentation. They all share a level of formality and permanence. Within the restrictions of copyright law, any refer-ence and resource material that might traditionally have been made available to a class can be readily mounted on a web server. This extends to faculty problem statements, background presentations and student design presentations, though the overhead of producing such content might be a limiting fac-tor. Most notably, web publishing does NOT sup-port informal socialization, desk crits, or feedback on presentations.

World Wide Web Interaction

Of course, the web need not be a static place. Web bulletin boards may be used to collect and distrib-ute collective knowledge. They may be used for certain kinds of formal and semi-formal discussion. Database interaction media of almost any configu-ration can be assembled. However, based on per-sonal experience with on-line critiques, and as we saw in the ACADIA competition judging [8] when the time-base for the discussion is too short evalu-ators do not interact in a coherent way. One pos-sible explanation involves the uncertainty surround-ing the synchronous presence of the "other" (con-sider how much more engaging even email is when the individual with whom you are interacting is actually on-line at the same time). In any event, these tools lend themselves more to formalized statements or comments than to informal utter-ance.

Chat

Java chat applets are common on the web. They create a shared type-in space, where individuals type up to one-line of input per utterance. In most cases the conversations are not logged, so only those participants who are on-line at the same time may use it. The real-time, temporary, and limited-utterance characteristics all make this a more per-sonal, casual form of communication. It is certainly suitable to informal interaction, and usable for desk crits.

Email

Person-to-person email is more like a private con-versation. It is intentionally private in form (though one party might violate that privacy by repeating/forwarding the conversation to another). This com-munication can be expanded to include any number of people, though there is a loss of intimacy as the circle of correspondents expands. Email tolerates a wide variation in utterance length, from one-line messages to multi-page paper drafts, and it can be archived, permitting review of a "conversational thread".

Email may be extended significantly through the use of "listserv" software, through which a mes-sage sent to one "collective" email address is broad-cast to every group member. When used in a rela-tively small group, this can be an effective means of unreal-time discussion. However, as anyone can attest who participates on a "busy" list, this me-dium becomes chaotic when too many people try to "speak" at once.

Video Conference

As ephemeral as a telephone call, and with the rich potential of facial expression and voice, this real-time interaction mechanism is difficult to use other-than point-to-point (thus doesn't support distrib-uted groups well) and often overstresses machines

and network bandwidth. Projects such as VDS'97 [9] and VDS'98 [10] involving institutions with high-speed Internet access, attempted to use VC technology in a (globe spanning) four-way network with very limited success.

Whiteboard

As with chat systems (and often including chat systems) web white-boards [11] and redliner systems enable participants to contribute to an ongoing graphical interaction. Some permit loading of a background image, enabling them to be used for

graphical feedback purposes. These modified images (or their stroke sequences, which might be more valuable) can then be saved and retrieved later.

Compadres

In a distributed studio, students might access faculty web pages at any time, viewing or reviewing relatively static faculty presentations of relevance. Students can participate in on-line bulletin board
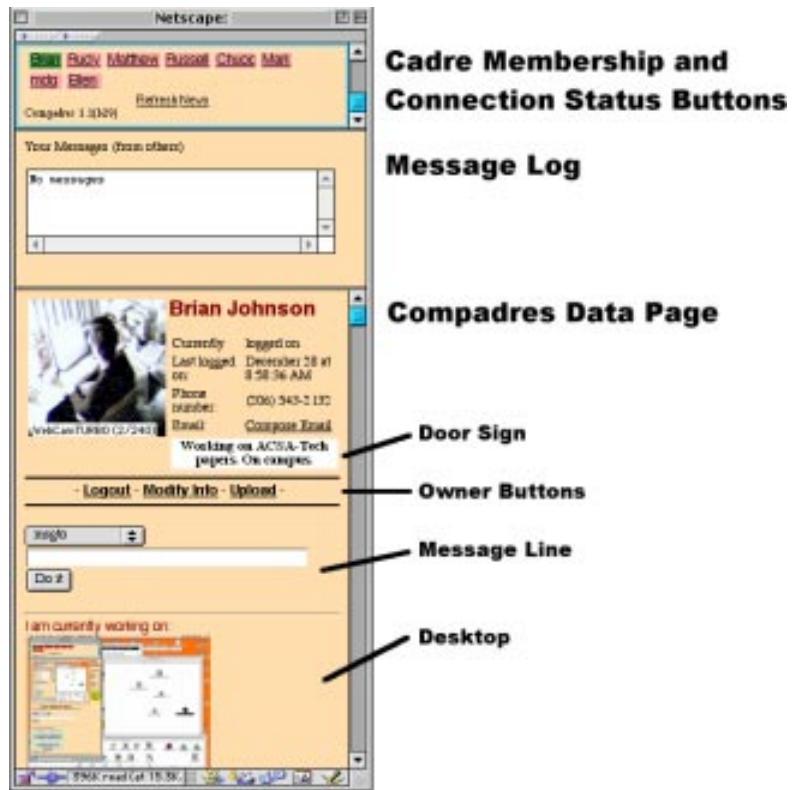

Figure 1:
The Compadres Display, showing major divisions of the display and parts of an individual data page.

or listserv discussions. They can store their projects on a common ftp or http server, present them with web pages, and receive email or bulletin-board verbal feedback and synchronous or asynchronous whiteboard feedback.

The challenge for the students and faculty in such a studio lies in developing and maintaining group identity, coming to know each other, getting a sense of unique personality, verbal presence, and so on. These, in turn, support the more subtle communications related to values, strategy nuances, etc. Face to face bonding and review protocols might be the best strategy, but if this is not possible, or inadequate to sustain the sense of group through a term, some sense of personal presence would help.

Compadres is a relatively low-tech web-based system for supporting work group communications. It does this by supporting each users' sense of the group. Two components provide the primary functions [see Figure 1]. One, the **Cadre membership list**, simply reveals, through a color-coded list of names, when someone is logged on to the system (thus, supporting lab use). The second component is a sort of web 'Rolodex' file, listing each member of the cadre—each **Compadres**. When an individual's name is clicked, their personal data page is displayed, with photo, phone number, information on their last log-on, a link for email, and a "desktop" link where they can display an image from whatever they are 'currently working on....'. Also present is an interaction tool called the Message Line through which short utterances can be directed to the individual. These messages are delivered immediately if the target is logged on, or stored if they are not. Finally, a "door sign" option permits the data page owner to leave a note on their page for all to see.

The owner of each data page, as shown in Figure 1, sees a set of Owner Buttons, through which they may upload files to a personal file space, modify the data displayed in the data page, and Log out of the system.

This display is intentionally small so that it can be kept open on the desktop at all times. In the case of a completely dis-located studio, it might even be reasonable to presume the existence of a "work monitor" and a "communications monitor", Other enhancements we have tried include replacing the still-photo URL of the personal data-page with a URL reference to a streaming web-cam such as WebCamTurbo [12]. Similarly the "I'm working on" (desktop) link might literally point to a streaming desktop graphic, such as that provided by WebCamToo[13].

Student Response
Compadres has been tested as a tool for keeping in touch in two seminar courses. The students enjoy personalizing their pages, like being able to view the personal pages of their classmates, and enjoy using the system to exchange quick messages. However, the program does not supplant face-to-face interaction.

Summary
The **Compadres** system provides a place, or *locus,* for a small- to medium-sized groups of people, using standard web browsers, to carry out group activity on-line. Future enhancements will include more messaging options, better support for shared file spaces and better message management. Finally, further testing will be conducted using a fully distributed group.

Acknowledgments

Notes

1 Chen, N. *et al.*, **Place, Time and the Virtual Design Studio**, in proceedings of ACADIA '95, pp 115-132.
2 Bradford, J.W., N. Cheng, and T. Kvan. **Virtual Design Studios**, in proceedings of the 12th eCAADe conference, pp 163-167.
3 Wojtowicz, Jerzy (ed.). *Virtual Design Studio*, Hong Kong University Press, 1994.
4 Sanders, Ken. The *Digital Architect*. John Wiley & Sons, p 406, 1996.
5 Wenz F. & U. Hirschberg. **Phase(x) Memetic Engineering for Architecture** in proceedings of the 15th eCAADe Conference.
6 Schön, Donald A. *The Reflective Practitioner*, Basic Books, 1983.
7 Indeed, in the first undergraduate studio at the University of Washington personal stereo systems are explicitly banned during studio hours, precisely to encourage this sort of learning.
8 Johnson, B. & B. Kolarevic. **EVAL: A Web-based System for Design** in proceedings of ACADIA'99, pp 30-39.
9 Kolarevic, B., *et al.* **An Experiment in Design Collaboration**, in proceedings of ACADIA'98, pp 90-99.
10 Donath, D., *et al.* **Virtual Design Studio 1998 A Place 2 Wait**. in proceedings of eCAADe '99, pp 453-458.
11 For example: **GroupBoard** <http://www.groupboard.com/>.
12 **WebCamToo** <http://webcam.paperjet.com/>.
13 **TurboCam** <http://webcam.paperjet.com/>.

Brian R. Johnson
Design Machine Group, Department of Architecture, Box 355720
University of Washington, Seattle, WA 98195-5720
brj@u.washington.edu