Developing a Collaborative Multidisciplinary Online Design Course

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Abstract

Technology is transforming the practice of architecture and design from the conceptual stages right down to the actual construction. One would assume technology is being readily integrated into current design education. Unfortunately, this is not the case. The purpose of this study is to explore the integration of online education into the curriculum of architecture and design. The three primary obstacles to integrating technology with education in these disciplines are identified as: 1) the limited evidence of online education in the fields of architecture and design (Sagun, Demirkan, & Goktepe, 2001); 2) the reluctance of design educators to teach in an online environment (Bender & Good, 2003); and 3) the lack of multidisciplinary coursework currently available between architecture, design, and other related fields (IIDA Report, 1998). This paper will discuss online education in the context of traditional architecture and design studio instruction. A case study of the development of a collaborative, multidisciplinary online course offered between five major universities will be presented as a catalyst for change. The paper concludes with reflections on the pedagogical advantages and disadvantages of this new educational model and its implications for instructors involved in online education.

Introduction

Instructional boundaries are blurring as schools share library resources, research facilities, and even educators through online education. The synthesis of computers and telecommunications, advances in fiber optic cabling, and the growing affordability of sophisticated technology tools increase the power to deliver superior course content. With this in mind, online courses are emerging in many fields of study. Yet art and design often lag behind the schools of business, engineering, and science in curricular integration of technology (NEA, 2000), even though technology has impacted the way art is taught, studied, and practiced (Lawn, 1998). Technology impacts every stage of the architectural design process, from ideation to construction. In turn, technology impacts traditional design education and the newest form, online education.

The Design Educator in an Online Environment

Traditionally, educators in art, architecture, and design teach using the "studio method". This studio method is based on the traditional principles and instructional methods of the Ecole des Beaux-Arts, a French school of design established in the 18th century. At this school, students were grouped in studios where design and artistic demonstrations took place. They were under the guidance of a "patron architect" who would guide them through the design process. Other components of the Beaux-Arts approach include a small student-to-faculty ratio and a high level of interaction in intimate group settings.

Studio instruction continues to be the focus of architecture and design curricula. Educators in these areas consistently teach in this manner, though the methodology is being questioned (Rapaport, 1984). As offerings of online courses continue to increase, the most commonly stated barrier for faculty to integrate technology into their curriculum is a lack of time ((NCES, 2003; O'Quinn & Corry, 2002). For design educators in particular, "preparing for a virtual studio experience requires more preparation on the part of participating faculty" (Blossom, Matthews, & Gibson, 2002, p. 29). Acknowledged as more labor intensive than traditional face-to-face courses (Bender, Wood, & Vredevoogd, 2004; Visser, 2000), studio course preparation is more than an "add-on" to our all ready busy schedules. Other barriers include a dislike of computers, a lack of available technology resources, and the insensitivity of administration to instructional needs. In addition, online education is not yet seen as advantageous to design educators.

Significant findings show if design educators believe online education is compatible with their teaching style and they have an opportunity to experiment with it, they will be more likely to adopt it (Bender & Good, 2003).

On a positive note, the use of new technologies can be motivating. Fifty-one percent of educators in the 2000 National Education Association survey who had never taught a Web-based course were favorable toward distance education and 72% of those who had taught a Web-based course were also favorable. The enthusiasm to offer this educational opportunity to students outweighs other concerns. Parker (2003) analyzed over 100 articles and concluded faculty become involved in distance teaching for the same reasons and rewards that they teach traditional courses. Some of these rewards are extrinsic (such as compensation and recognized leadership) while some are intrinsic (such as gained knowledge and accommodating a diverse group of students).

There are a number of factors contributing to the need for this study.

1. Very few educators have developed online courses in architecture and design (Matthews & Weigand, 2001; Blossom, Matthews, & Gibson, 2002). This is an area underrepresented in online education.
2. Educators in the area of design are cautious of online education and view it as inappropriate to serve their instructional needs (Bender & Good, 2003). Reasons typically cited for this lack of participation include the lack of skills, lack of time, and lack of incentives (Gustafson & Kors, 2004).
3. The practicing professionals of architecture and design function in a collaborative environment. Yet few curriculum programs reflect this energetic collaborative environment (IIDA Report, 1998).

These three factors represent the underlying impetus for the creation of a new online course in architecture and design.

Methodology

To benefit from the advantages of online education as applied to design education, a new course was developed between multiple universities. This is considered a natural experiment, which is not a designed empirical experiment, but one that occurs due to the nature of circumstances (Kerlinger, 1986). Details of the course development are described below.

Many Universities and Multiple Disciplines

A multidisciplinary collaborative course entitled "Issues of the Built Environment" was recently offered to a multiple university audience. This was a new course developed by five educators at five major universities from five different design disciplines. Using the latest technologies, students in various majors were taught by faculty from Arizona State University, East Carolina University, Oklahoma State University, Texas Tech University, and the University of Minnesota. Each faculty member represented a different discipline such as Architecture, Construction Management, Interior Design, Landscape Architecture, and Urban Planning.

This course provided new paradigms for collaboration across design-related disciplines. In this course, collaboration occurred through both online asynchronous and on-site synchronous discussions. Discussions focused on the philosophy, parameters, and practice of each discipline, plus legislation and ethical issues for both timeliness and controversy. By purposely including controversial topics, multiple perspectives were shared and students became more actively engaged in debate. The collaborative process via the Internet has been the focus of educational experiments in other design programs at Cornell University, George Washington University, Ohio University, and Miami University. In these online studio experiences, Blossom, Matthews, and Gibson (2002) found collaboration was the key to success. In our course, students exchanged information and opinions on various subjects and interacted with one another to complete a multidisciplinary group project at the end of the 13-week course. Each team consisted of three to four students and typically had members representing at least three of the five universities. We, the faculty, also had to work collaboratively to design, implement, and teach as a cohesive group.

Building upon past collaborative successes, this project was unique in its multidisciplinary approach. Multiple disciplines are very common in "real life" architectural projects. Whenever a building is constructed, representatives from various disciplines come to the table to design and develop the site, the building's structure, and the building's interior and exterior components. These disciplines often include architecture, urban planning, building construction, interior design, and landscape architecture – the same disciplines represented in this course. The growing complexity of the construction industry has increased the need for graduating students to have a "clearer understanding of the collaborative environment in which they will work" (IIDA Report, 1998, p. 54). By placing students in a multidisciplinary environment now, they are more prepared to collaborate outside of their field when they graduate and join the workforce. Students from each discipline gained an appreciation of the other disciplines and the diversity provided by students at other universities. They also learned how to work in a virtual environment using the latest collaborative tools, such as videoconferencing, email, instant messaging, and online discussion boards.

Given the advantages of multidisciplinary collaboration, few curriculum programs currently emphasize interaction between these disciplines. Educators may cite logistical and coordination barriers, while students may cite negative perceptions about the other students' capabilities (IIDA Report, 1998). By introducing the students in this course to the values and scope of work within each discipline, misconceptions could be challenged before the students adopted stereotypical behaviors (Blossom, Matthews, & Gibson, 2002). In this course, educators with complementary skills provided more learning opportunities to students from different parts of the country (Matthews & Weigand, 2001). Ultimately, we could provide a richer learning experience than teaching the class independently or at our own individual universities.

Collaboration via Videoconferencing

The primary method of collaboration we used was on-site videoconferencing, using *Internet2* technology. *Internet2* provides a transmission medium 100 times faster than the current Internet, and made multi-point communication virtually seamless. Each site had a controllable camera and a live audio link. With the transmission able to go back and forth between multiple sites, we

experienced an interchange of ideas with professional-quality imagery. This was pedagogically as close to face-to-face instruction as possible.

Videoconferencing as a communication tool is providing educational avenues that were unavailable a decade ago. Real time interaction allowed an authentic exchange of viewpoints to be expressed extemporaneously. This could not be achieved through email or asynchronous website communications with the same level of energy and passion. Other advantages included reducing our travel time and expenses, utilizing multiple media, and accessing faculty expertise from geographically dispersed locations (Motamedi, 2001). In addition, we were able to have a guest speaker from the Netherlands join us in one class session, and a visiting group of landscape architecture students from Peru participate in another class session. The interactive ability of videoconferencing allowed us to take advantage of these opportunities and to have students collaborate with peers at other universities - experiences they would lack if not for this technology.

Many educators are attracted to distance teaching because it centers on the flexibility of scheduling and teaching at any time and from any place (Landstrom, 1995). We found this to be true. Occasionally, one of us did not attend class due to time conflicts or prior obligations. The other instructors taught the students and the class continued in our absence. We easily participated remotely as well. Did the students know we answered email or checked the discussion board from other cities ourselves? The answer is most likely, no.

Technical assistance is an important component in persuading faculty to pursue distance teaching (NEA, 2000). Most campuses have information technology development programs and campus support centers where technical personnel are available. Support personnel were involved at all five universities to make the class sessions run smoothly. There was some initial apprehension to teaching in this new format, as none of us had prior experience teaching via multi-point videoconferencing. But with some training and a little bit of practice, the videoconferencing and website technologies were quickly mastered. This led to an added benefit of teaching this course: learning new technology plus new ways of teaching. Now we are able to return to our traditional classes with new knowledge, which in turn makes us better educators.

Overcoming Challenges

We overcame a number of challenges. As research has confirmed, a higher level of planning was required for this course because it involved Internet videoconferencing between multiple sites (Matthews & Weigand, 2001). Additional coordination for this course was required to address three time zones and diverse teaching schedules. Our class met once a week for two hours from 6:00-8:00pm EST. This worked smoothly until Daylight Savings Time began and Arizona State University was on a two-hour delay instead of the previous three-hour delay. In addition, unanticipated circumstances sometimes occur in a course like this, such as a freak snowstorm that shut down Oklahoma State University (OSU) during the second week of class. But for the wonders of technology, the other four universities met virtually and the class discussion was archived for the students and faculty of OSU to review later. Unforeseeable situations such as these caused a few headaches along the way but did not dampen the enthusiasm of participants.

For any educator who creates a brand new course, the amount of time and effort that goes into thinking of the appropriate pedagogy to engage students and assess their learning can be staggering. Now add four more opinions and you can imagine the complexity of decision-making in a multidisciplinary course such as this. To begin, we communicated via email one year in advance to discuss course topics, potential assignments, a lecture schedule, and other course logistics. After much discussion and debate, we decided on a course structure and appropriate guidelines for student group projects. We then created one course syllabus and tried to select one required textbook. Since we could not find a book which addressed all of our diverse disciplines, we decided to select, scan, and post individual required readings in PDF format to address topics relevant to our discipline. We each had an opportunity to lecture and lead discussions on these topics during subsequent course sessions.

Besides email dialogue to establish the course structure and to handle management tasks, we met for three videoconferencing sessions prior to the start of the semester. These sessions helped to establish a sense of community among the five faculty and to allow experimentation with the technology without students present. A study by Ali (2003) found faculty were concerned about

using technology and having the students actually be more knowledgeable than them. By experimenting without the students present, we were more at ease when the class commenced.

To offer an effective course, we had to be interactive and proactive. We quickly realized that working in this medium was a paradigmatic shift and required a different way of thinking. We adopted an "expect it to fail" attitude. If things didn't work as anticipated, such as occasionally getting disconnected from the videoconference call, we were not discouraged. We simply fixed the problem as soon as possible. We also anticipated students' reluctance to participate by assigning a faculty moderator for each class session. This moderator could lead the discussion, call on individual students, and oversee the flow of conversation. By trying to anticipate problems and also realizing that some things are simply out of our control, we were able to better enjoy our own participation in this course.

Conclusions

With over three million students enrolled in distance education courses during the 2001-2002 academic year, there is clearly a demand for online learning today (NCES, 2003).

As technology becomes more transparent in the learning process and offerings of online courses continue to rise, knowing how technology impacts teaching and learning is imperative for all educators. The benefits of instructional technology may not relate to educational quality, increased academic productivity, or better student learning, but instead, offer educators and their students opportunities which would not exist without technology (Rickard, 1999). The participating faculty believed this course provided this opportunity, as well as others (see Table 1).

Table 1: Pedagogical Advantages and Disadvantages of this New Educational Model	
Advantages	**Disadvantages**
Increased access to expertise in geographically dispersed locations	Time to develop course was higher than a traditional course; or one taught at one location
Multidisciplinary approach broadened educational perspective of students and faculty	Proactive approach to instruction required (i.e. what to do when the technology fails?)
Prospect of working with renowned faculty from other universities	Cooperation with peers at other universities may be taxing
Opportunity for students to meet and collaborate with peers at other universities	Student and faculty class scheduling between five universities was difficult
Students and faculty learned the latest electronic communication tools	Learning new technology required extra time and effort
Flexibility of scheduling and teaching at any time and from any place	Videoconferencing technology tends to be expensive

This unique course addressed the challenges identified earlier in this article. It is believed the instruction of this course and subsequent dissemination of information regarding its development will demonstrate to other faculty who primarily teach with studios that online education is a realistic possibility. Because online learning environments are relatively new to architecture and design programs, it offers new challenges as well as opportunities. Academic goals must be matched with available technology without limiting the creativeness of the faculty. Because we are products of the face-to-face classroom, we may not know how to develop an online course. We may need the opportunity to explore new technologies, investigate alternative teaching modes, and participate in a sample online course. Faculty development programs such as the one followed by the University of Houston System can assist educators to step into this new arena (Kidney, 2004). Once the technology tools are mastered, it's not much different than creating and teaching a traditional course.

Multidisciplinary coursework is currently limited in architecture, design, and other related fields. By collaborating in the development and instruction of this course, we were able to make educational leaps beyond what we could do separately. This collaborative effort impacted our course content and class discussions. For example, our final class session was devoted to an interactive discussion on how online courses can impact the way future architects and designers are educated. How could subsequent multidisciplinary courses enhance our students' educational experience? Will a course such as this help foster better communication and understanding between the various design disciplines? Will more educators see the added benefits of teaching to a multi-disciplinary, multi-university audience? These are questions that need to be answered as more educators come to embrace online education. Some universities have experimented with online cross-collaborative efforts but more research is necessary to determine if this form of instruction is as good as, if not better than, traditional forms of collaborative education.

The description of this project is not intended to promote online education as the medicine to cure terrestrial educational ills. The traditional methods of face-to-face education should not necessarily be discarded, particularly the tried-and-true studio method embraced so strongly by educators in art, architecture, and design. Higher education must retain the best of these classroom experiences while integrating the exciting opportunities that technology presents. However, those "who do not take advantage of [Internet-based collaborative tools] are in danger of being left behind in the education revolution of the 21st century" (McLester, 2001, p. 20).

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