2006-1649: BREAKING THE BOX: A NECESSITY FOR INTERACTIVE ON-LINE COLLABORATIVE TEACHING

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Introduction

When undertaking a project in which there is no precedent, it may be necessary to go outside the normal boundaries of conventional thinking and functioning, that is “breaking the box”. This was the case for the interdisciplinary online course concerning the interactions of the professional fields involved in the building enterprise. The course was named “Issues of the Built Environment”, an umbrella title created for the disciplines of Architecture, Construction, Interior and Industrial Design, Landscape and Urban Planning.

Importance of collaborations - The principal motivation for organizing a collaborative online course was to teach the importance of cooperative and respectful relations among all professionals in completing a successful work of construction. High quality building projects require the concerted effort of all professional disciplines. The interdependence of disciplines from the professions of the built environment is not readily found in the academy. Exposing students to the ideas from the various professions and requiring them to work together with students from other disciplines was a first step in trying to mediate that disparity.

Selecting the faculty to teach the course was of the highest importance. Faculty were expected to have a respectful attitude towards the other disciplines to participate in the collaborative teaching course. If faculty were consistent with the course intentions their actions would model the behavior we sought in students. The multiple disciplines from the built environment are found at many university campuses, however interdisciplinary team-teaching was not the common place experience of the faculty participating in this course. None had participated or witnessed more than three disciplines teaching simultaneously. When interdisciplinary teaching occurs, one discipline usually serves in the primary role and others in secondary or consultant roles. Interdisciplinary teaching is typically instigated and supported by individual efforts rather than institutional. This course was an explicit attempt to confront stereotypes of value that develop from the hierarchical attitudes found in isolated academic environments. Teaching in a team collaborative format allowed faculty to demonstrate the importance of parity among the disciplines from the built environment. The team collaborative teaching format was accomplished with an online faculty. The internet technology removed the physical boundaries of distance and brought together individuals who were philosophically aligned in their attitudes about the professions from the built environment.

Why (did we break the box?)

Proximity to practice - Every building endeavor requires the interaction of many disciplines. The architect, engineer, construction manager, city officials, investors all
play a key role in completing a building project. A successful project is not possible without numerous and repeated interactions with individuals for all disciplines. A professional interdependence exists among disciplines of the built environment. All construction is a dynamic collaboration of professional and trades personnel. A professional attitude necessitates the ability to work respectfully with others. Negotiation, compromise, leadership, apprenticeship are social contexts in which all individuals will ultimately participate. Creating an environment that provides opportunities for students to experience the varied perspectives of the professions improves learning. According to scholars in the field of professional education, any learning context that brings the theory closer to practice creates a more meaningful and relevant education (Boyer, Mitgang, 1996). A collaborative approach that draws upon faculty from many disciplines of the built environment is one way to attain that relevance.

Teaching in a professional school also requires that one’s knowledge of processes is current. Access to current information gives one a competitive edge, whether in business or in education, particularly in a professional education. Schools located in non-urban settings are disadvantaged because of their proximity to the professions of the built environment and the corresponding activities. The use of on-line interactive technology bridges the educational disparity that exists between rural and urban located professional schools. The collaboration of diverse faculty can diminish the stereotypes held among the respective disciplines.

Education quality - Active learning is facilitated when students are engaged with the context of their education. An engaging education process requires that learning is relevant, current and interactive. Learning is improved when students play a larger role and invest themselves in the education process. If the collaborative approach is more effective than the unilateral approach to teaching then participants must share authority with the team for the benefit of learning. Students engaged in the learning process improve the quality of their education (Burke, 2005). The active learning environment is not only the responsibility of the student but also that of the instructor, particularly with an interactive online teaching situation. Instructors teaching online must adopt methods that go beyond the conventional teaching. There is a need for flexibility, adaptability and preparation for unexpected situations not common in the traditional classroom space. Online instruction has to connect with the student even though the student and faculty are not physically present in the same place. Faculty must be prepared to change their approach if the connections are not made or broken, as in the case of technology failure or passive student behavior. Faculty should have a contingency plan with ready made alternative methods of communication and instruction in the event of failure. This approach requires additional time and should be factored when planning to teach an online course (Young, 2003). Cell phones, chat rooms, emailed PowerPoint presentations, voice over IP telephone communications, virtual classrooms, and desktop audio communications were all implemented as back-up approaches when unexpected communication problems occurred. A collaborative interactive on-line class changes the entire context in which teaching takes place. One has to deviate from the standard or routine approach to teaching and learning, and be prepared to ‘break the box’ when necessary.
New Medium of Learning - Active learning is even more critical when the vehicle for the education delivery is an online course. It is easy for a student to become passive and or reserved in an online class particularly if a student is isolated from other students and faculty. It is compounded when the teaching method is not adjusted for the new medium. It is not only incumbent upon students to adjust to this new medium of learning but faculty must also adapt to a collaborative interactive on-line course. When participating in an on-line course the relationship of student to instructor is changed from the traditional position of authority to facilitator, thereby creating an environment that is more conducive to active learning (Blocher, et al, 2005). Control of the content of learning is relinquished not only because of physical proximity of the participants but also due to the equity of power relations in a team. Cooperation is necessary at every level of the production of the on-line collaborative and interactive course, from technical support to administration without which failure is inevitable and success is impossible.

How (did we break the box?)

Material – Faculty developed a common syllabus that highlighted the issues of contemporary practice from the built environment. Students were recruited based on their interest to learn about the disciplines from the built environment and the opportunity to participate in a team project with online students. Students learned about the course from informational sessions with faculty at the respective universities and a poster was created and posted throughout the schools. Course goals, the method of the instruction, the requirements for participation and the opportunities that an on-line collaborative course were described on the poster. (see Figure 1).

![Figure 1. Course information poster](image-url)

Each faculty member taught the issues related to their discipline. The specific topics covered in the course were; Values of designers and design process, Issues facing Landscape Architecture, Problems from an Interior Design perspective, Tools utilized for Communications in the Built Environment, Ethics, Professionalism, Values and
Legal obligations, Professional Interrelationships, and Technology’s impact on the future of Design Professionals. Presentations were rotated in sequenced to have each discipline present once, then after all disciplines presented, a roundtable discussion meeting was held to review and discuss the materials. The students created PowerPoint presentations of their term projects and showed them at the end of the semester.

Manpower – Nine instructors ultimately participated in the course. The instructors were selected based on their willingness to work as team members of an online interactive course. Six of the instructors were from universities and three from industry. The instructors represented the following universities; Arizona State University, East Carolina University, Iowa State University, Oklahoma State University, Technical University of Eindhoven - the Netherlands, Texas Tech University and the University of Minnesota. The instructors consisted of three full-time, two part-time, three one-time and one full-time reflective moderator. Thirty-one students initially enrolled in the class from four different universities, however only twenty-two completed the course. The students groups were as large as twelve at one university and as small as two at another. Information technology personnel at each participant faculty members’ university and a host of technical assistants were needed to manage the complexities of networking distance communication systems for the online course. Administrators with vision and trust approved the course.

Machinery – Four of the instructors taught from interactive video conferencing classrooms with technical support studios and were connected over the Internet with H.323 level technology. A host institution was selected to bridge all data over the internet each week. Two instructors used Polycom ViaVideoII cameras to interact from their location to the bridge. Two instructors used PC desktop cams supported by NetMeeting software. One session required a network of “duct-taped” systems to bring the international instructor into the on-line course. Duct-taping a system is the colloquial term used for early adaptor attitude where the participants do not accept failure as an option and patch together any means necessary to produce a successful collaboration. In that instance members collectively solved the problem of live teaching with a web of technological alternatives that included Blackboard chat, Instant Messenger voice and a preset PowerPoint presentation manipulated by one of the distant sites. Alternative or adaptive video conferencing technologies, such as MSN Messenger, NetMeeting, desktop web cams and Polycom ViaVideoII, cell phones, and IP telephony, chat rooms, and email were at times combined as needed.

What (did we do to break the box?)

A semester of pre-course meetings and discussions took place among the faculty in advance of the course. Two tests of audio-video systems were conducted among the participating schools to work out the compatibility issues and general preparation for the online teaching medium. The pre-test permitted faculty to meet and IT personnel test the interoperability of systems and accustom the all users to the nature of the project.
The course was scheduled for twelve collaborative meetings. Each synchronous meeting took place once a week and lasted two hours. The online class meetings were conducted in synchronous time, with no less than four simultaneous locations. The faculty and students spanned four time zones, five if you include the session from the Netherlands. Off-line meetings times and dates varied for the different universities as their schedules required. There were three interim roundtable meetings in which all sites interacted to discuss backgrounds, choose teams and present their team projects. All students and faculty shared the online teaching tool of Blackboard. All twelve presentations were archived on the Blackboard site for subsequent review if needed. Lecture notes, reference materials, suggested readings and assignments were place on Blackboard. Discussion topics were created and required responses among students were archived on the site.

The student learning objectives for the course were (1) to understand the interdependent roles of the various disciplines of the Built Environment, (2) to learn and understand the implications of the differing values systems of each discipline, (3) to work in partnership with the other disciplines and thereby foster a respect for and appreciation of the role that each discipline has in the built environment.

Students learning objectives were assessed through multiple measures. Each student took an InQ assessment of thinking style to determine parameters for discussing differing values of the respective professionals in the Built Environment (Harrison, 2002). Each student was asked to prepare a personal introductory presentation to the online class members sharing their interests in the course and the values learned from the InQ assessment tool. Understanding the values imbedded within a thinking style permitted students to understand that multiple approaches to problem solving are available and desirable when examining problems from the built environment.

Students were asked to create a personal webpage on the Blackboard to learn about each other and then form teams of three to four students from different disciplines and work on a semester long project. The teams would identify and resolve a problem from the built environment. Seven teams were formed and most achieved the objective of an interdisciplinary team. Students communicated online and through the chat page and email while working on the semester projects. At the end of the semester each team submitted a written report and made a 30-minute presentation to the entire online participants.

Faculty looked for complexity and thoroughness of the student team presentations as an indicator of successful collaboration across disciplines. Faculty observed the level of cooperation and preparedness of the interdisciplinary team presentations to verify the hypothesis that a collaborative effort would yield an improved product. All teams did not meet the goal of forming interdisciplinary groups. It was evident that some students deferred to the on-campus instructor over the online instructors to form teams. The authority of the on-campus instructor had greater influence than the on-line instructors, even though the stated intention was for equitable team teaching. The projects without
mixed students were noticeably less sophisticated in their level of inquiry and analysis of the problems presented.

At the conclusion of the course a survey was sent to each student’s email (see Appendix). The survey was structured in two parts, the first part had seven questions on the Likert scale and the second part included five opened ended questions. The Likert questions were created to determine how effective the course was in meeting the course objectives and to determine if the shared learning environment of Blackboard was a useful way to organize, share and archive materials for the course. The open-ended questions sought confirmation of the Likert questions and allowed students to elaborate on the subject of course quality and objectives.

59% of the students responded to the online survey. As few as half of the students responded to the survey from one site and as much as two-thirds from another with the remaining two others sites falling in between. The sampling size was not statistically large enough to generalize conclusions, however we did learn some useful information concerning the course content, course participation, and course planning that would be useful for future planning.

Only one student rated the course low (1) in terms of learning about the different disciplines of the built environment, the remainder were evenly divided between average (3) and very much (4). Overall rating of how this course compared to others was average. Upon reviewing the open ended responses there was a correlation between satisfaction with on-campus instructor and the rating given to the course. Those with an instructor they were not satisfied with rated the on-line course low, and those who were satisfied rated it high. Positive responses for the course were most often noted as the ability to learn from students and faculty perspectives on issues related to the built environment that were different from their discipline or location. The next most positive response was related to the technology use in the course. Students mentioned that having the experience of using technology to learn, and having the ability to retrieve information and reviewing it at a later time was a useful aspect of the course. Students disliked the inequity of course requirements among the different discipline groups. Students felt that many did not have to perform an equal amount of work. Having different degrees of commitment on the part of their student partners was disappointing to many. Decisions were negotiated among the different distant students and there was no lead authority with four different instructors in different locations. This was an unexpected problem since faculty agreed to work on the common shared syllabus and respectful collaborations were the primary premise of the course. The majority of the faculty thought that two major factors may have contributed to the high level of attrition in the course. The lack of consistent intention on the part of faculty, and some students likely misjudged an online course in terms of work load and level of preparation necessary for learning. Three students dropped the course initially because of over committed schedules and one student dropped because of health related issues.
Conclusion

Teaching on line required not only equilateral treatment of positions of the respective disciplines but also a proactive collaboration. Proactive collaboration occurs when faculty are engaged in the presentations of the other instructor and prepared to interact. Proactive collaboration promotes relevant and active discussions at the end of presentations. The time commitment on the part of students and faculty are often mistakenly underestimated (Tomei 2004). During the semester students had the first instance of an immediate exchange of knowledge with practicing professionals in the field, gained knowledge of cross-regional concerns from multiple discipline’s perspectives, had presentations from southwestern America to the Netherlands, they created and presented a multi-discipline team project, were exposed to the value differences among the different academic disciplines of the built environment and had personal experience with a technology that opened possibilities future educational opportunities that were heretofore unimagined. Did this meet our goals of understanding and developing respect for the disciplines other than their own? Yes.

Was it possible in to have the same educational experience in a traditional instructional setting? We think not. Practically speaking, all could not afford a guest speaker from the Netherlands. The speaker did not have the time to present at all four sites. Students would not have the ability to interact with the professional architectural visualization firm in Oklahoma City. No school had all disciplines that were willing to work together and some lacked the particular disciplines that participated in the course. Students and faculty were able to observe, interact, and change the perceptions of persons outside their normal sphere of existence all the while remaining in their own domain. The class broke the box of the conventional boundaries of an on-campus course.

What did we learn from each other? It is difficult to manage a course with four different student groups and their respective instructors. Holding discussions among the group was not equal, some participated more than others, some not at all. Some of the stereotypes that the course had intended to overcome were imbedded in the attitudes of some comments made during discussions. Too many sites in a collaborative teaching effort may actually work against participation for reasons beyond content or interest, but simply overwhelming the communication possibilities. We learned that you must be prepared beyond the conventional preparations for a class, since keeping students engaged is critical to the course if interactivity is an objective. We learned paradoxically that a course of this nature needs to have considerable structure so that communications will have the effect of being natural. We learned that students who take an online course behave much like those on-campus only the effects of this behavior are more noticeable since engaging them is more challenging from a distance. It is not for everyone but it has considerable value for the interested student.

Does the result justify the effort? Did the effort achieve the end? We succeeded in getting the course approved at four different universities, four faculty were granted permission to teach it, with nine different instructors, presenting their ideas to all students simultaneously at their respective home university location with audio and video
interactive ability. Creating an interactive online collaborative course among multiple disciplines from the built environment was a major undertaking. It required extra efforts in terms of pre-planning, course content management, student interactions, technical facilitation and interoperability, scheduling, teaching strategies, tools, and a high reliance on others to accomplish what one has historically done alone.

Figure 2. Wireless Model for Learning

Fifteen years ago the technology was only capable of supporting live chat sessions over the Internet. Ten years ago we were capable the most limited interactive teaching over the Internet. As a result of this trend and what we have learned from this experience we expect that in the next two to three years technology will develop in the mobile and wireless areas of online teaching and learning. In that future moment students and instructors will participate and have the capability to interact regardless of location (Alles, 2004). Models of this type of interactive learning environment are currently being explored and the box will be broken once again (Figure 2).
Bibliography


Appendix

STUDENT SURVEY OF COURSE

Please mark Questions 1 - 7 with an "X to the question. Questions 8 -12 write in your own words the reply.

Scoring for the questions below.
1 = very little or none, 2 = slightly, 3 = somewhat, 4 = very much, 5 = tremendously

1. How much did this course help you to understand the different disciplines of the built environment?
   1( ),  2( ),  3( ),  4( ),  5( )

2. How much time did you have to spend learning to work within the Blackboard?
   1( ),  2( ),  3( ),  4( ),  5( )

3. How would you rate the usefulness of this course in contrast to other traditional courses you have taken in the present or past?
   1( ),  2( ),  3( ),  4( ),  5( )

4. How helpful was the "Blackboard" and its various applications in terms of working on assignments, receiving and sending communications, collecting notes and other distance related aspects of this Internet course?
   1( ),  2( ),  3( ),  4( ),  5( )

5. How much did you use Blackboard during this course?
   1( ),  2( ),  3( ),  4( ),  5( )

6. How helpful was your particular instructor over the duration of the course?
   1( ),  2( ),  3( ),  4( ),  5( )

7. How helpful were the other internet instructors over the duration of the course?
   1( ),  2( ),  3( ),  4( ),  5( )

8. What was the most effective aspect of the course?

9. What was the least effective aspect of this course?

10. What suggestions would you make to improve the students learning experience of this course if it were offered again in the future?

11. Is there anything that you learned from this course that you could not have from a traditional course at your university?

12. Are there any other comments you would like to make concerning this course?