Lessons Learned from Web-Enhanced Teaching in Landscape Architecture Studios

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The purpose of this article was to summarize lessons learned from implementing web-enhanced teaching in landscape architecture studio courses. The lessons are documented as challenges and opportunities based on a two-year assessment study of web-enhanced landscape architecture construction studios. This article will help landscape architecture educators realize the opportunities and possible problems when web-enhanced or web-based learning is introduced to the studio, and provide suggestions for improving teaching efficiency and effectiveness.

The World Wide Web (Web) since its onset in the 1990s has spread widely and rapidly throughout the educational community. In recent years, there has been a dramatic increase in the use of the Web as a teaching vehicle in the United States higher education either at a distance or on campus (Lewis, Alexander, & Farris, 1997; Lewis, Snow, & Levin, 1999; Waits & Lewis, 2003). During the 2000-2001 academic year, more than 127,000 university-level courses were offered by the United States higher institutions on the Web (Waits & Lewis). Following the explosive growth of online courses, educators and researchers have begun to evaluate the use of the Web in higher education. For example, McKnight and Demers (2003) studied how students utilized web pages in a science and technology course. Pérez-Prado and Thirunarayanan (2002) explored the perceptions and experiences of English education students in an online section and a traditional section of the same course. Katz and Yablon (2002) compared the expectations of students in an online and a traditional statistics course. Martindale and Ahern (2001) investigated how an online computer literacy course affected student learning. These studies, despite their efforts and contribution to higher education, primarily focused on classroom pedagogy. Few studies of how the Web is influencing landscape architectural studio teaching and learning can be found.
Online teaching is predominantly used for business, liberal arts, science, and engineering majors. At present, only a few online courses are being integrated into the teaching and learning of landscape architecture in the United States, which can be categorized as two major types of web teaching: web-based or web-enhanced. A web-based course completely relies on the Web, a virtual classroom, to conduct teaching and learning activities while a web-enhanced course is defined as one that meets face-to-face in addition to being enhanced by course materials provided through a website (McKnight & Demers, 2003, p.13). At this stage of web-based or web-enhanced teaching in landscape architecture, the next few years will be the critical period for landscape architecture educators to develop knowledge and exchange teaching experiences.

This article describes a two-year assessment study of web-enhanced landscape architecture construction studios extended from a preliminary study reported by Li and Murphy (2004). It further summarizes lessons learned from web-enhanced studio teaching with course management software, WebCT, and WebCT Vista. The purpose of this study was to share the author’s experiences with those who are interested in implementing web-based or web-enhanced studio teaching.

**METHODOLOGY**

**Web-Enhanced Studio Teaching**

The use of WebCT and later WebCT Vista in two, one undergraduate and one graduate, core landscape construction studio courses at Texas A&M University have been experimented with since 2002. Students did not need any prerequisites to enroll, and the courses covered subjects of landform grading and drainage, and storm water management. The courses were co-taught by two instructors, and delivered in three environments: online, classroom, and studio that had different levels of student-to-teacher and student-to-student interactivities: low, medium, and strong, respectively. In online virtual classrooms, course materials including syllabus, prerecorded lectures, lecture notes, assignments, and exams were prepared and stored in university servers. With a secure logon system, students were permitted access to course materials with any Internet browser. Students may repeatedly watch and listen to prerecorded lectures online. The schedule of all course activities including assigned lectures, assignments and their due dates, exam dates, and field trips was posted on the calendar in WebCT. In classrooms, students met face-to-face with instructors two times per week for lectures. After lectures, students moved to studios where individual desk critiques, group reviews, and hands-on exercises were conducted.

The effectiveness of web-enhanced studio teaching in the courses was evaluated in two consecutive years. As mentioned, both undergraduates and graduates were involved. The difference between the undergraduate and graduate
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Courses was some extra projects that graduate students had to complete. The first-year assessment in the preliminary study reported by Li and Murphy (2004) focused on students’ perceived satisfaction on web-enhanced learning, and preference level on eight different learning vehicles in the courses. The course management software used in the first-year courses was WebCT. In the second-year courses, the software changed to WebCT Vista (a newer version of WebCT). The assessment continued surveying students’ preference on same eight learning vehicles, as well as examined the three learning environments: online, classroom, and studio on their effectiveness for different subject types learning.

Sample
The first year study consisted of 22 third-year undergraduates and 10 first-year graduates. The second year study consisted of 27 third-year undergraduates and 11 first-year graduates.

Instrument
In the first year, assessment data was collected by two methods. First, questionnaires were used to survey students’ satisfaction level and obtain students’ rating on eight learning vehicles. Second, each student’s visits in WebCT virtual classrooms were tracked. The tracked statistics were used to compare with student learning outcome in different stages throughout the semester.

In the second year, in addition to student’s rating on the same eight learning vehicles, effective learning environments for different subjects were investigated by questionnaire. At the end of the semester, there were a total of 54 subject components delivered. These subjects can be categorized into four groups:

1. information-related,
2. theory-based,
3. calculation-oriented, and
4. application-associated.

For example, “learning objective” is information-related; “open channel hydraulics” is theory-based; “computing time of concentration” is calculation-oriented; and “locating and sizing detention ponds” is application-associated.

Procedure
Course requirements in both the first and second-year courses were similar except for the one that requested students to preview lectures of the week prior to the face-to-face class time. The requirement was tentative in the first year but became mandatory in the second. In the first year, the instructors would still lecture over the subject that students were supposed to preview prior to the class time. In the second year, by requiring students to preview lectures, instructors only addressed subjects different from those
accessible online. The intention was to save time for face-to-face in-class discussion, and for covering more other subjects.

Students in both the first and second years participated in the survey of rating eight learning vehicles. These eight different learning vehicles were:

- WebCT online lectures, each premade and released according to the schedule.
- In-class chalkboard/transparency lectures.
- In-class exercise feedbacks using digital slides of scanned exercises to provide visual feedback regarding landform grading, graded exercises.
- Help from instructors in the studio.
- Help from classmates.
- Working on “homework assignments” primarily consisting of mathematical calculation problems that could be downloaded from WebCT.
- Working on “exercise assignments” primarily consisting of graphical hands-on practice, also to be downloaded from WebCT.
- Textbook reading.

Only students in the second-year courses participated in the survey regarding the effective learning environments for the 54 subject components delivered in that semester.

RESULTS

The first-year assessment study reported by Li and Murphy (2004) can be further summarized fourfold. First, a high percentage of students were satisfied with the web-enhanced studio courses. Seventy-three (73%) of all students reported satisfied in the first month. The satisfaction percentage later improved to 87% in third month. Second, the majority of students perceived their grades would be worse without web-enhanced teaching. Overall, 67% of students believed that their learning benefited from the use of WebCT in the courses. Third, undergraduates and graduates had a preference difference on the learning format. Graduate students felt capable of and favorably disposed to independent learning while undergraduates preferred interactive learning with instructors and classmates. Fourth, tracked statistics of students’ visits to online course materials also showed a promising result – a significantly positive correlation ($r = 0.53, p = 0.0016$), that is, the more the visits to WebCT, the higher the grade.

In the analysis of eight learning vehicles, results of the first- and second-year studies agree with each other. Table 1 presents the average rating result of each learning vehicle. Note that the lower the number, the more effective the vehicle perceived by students. “WebCT online lectures” was rated less effective by undergraduates than by graduates in both years. By sorting the
order of the eight learning vehicles according to their rated effectiveness, it
is interesting to observe that undergraduate students preferred interactive
learning in studio over lectures in classroom and then over independent
learning individually (Figure 1[a]). However, this was not obvious in grad-
uate students (Figure 1[b]).

Table 2 presents the survey results of students’ perceived effective learn-
ing environments for 54 different subjects in the second year. For informa-
tion-related subjects, most (46% undergraduate; 65% graduate) thought they
could effectively learn them online. Oppositely, if the subject is application-
associated, the majority of students (52% undergraduate; 48% graduate)
would prefer learning it in studio. Most of both undergraduates and gradu-
ates would like to learn calculation-oriented subjects in classroom (43% and
42%, respectively). There was a difference on the perception of effective
learning environment for theory-based subjects: a classroom was preferred
by undergraduates; online by graduates.

**LEARNED LESSONS**

Learned lessons are summarized as challenges and opportunities as follows.
Figure 1. Perceived learning effectiveness by (a) undergraduates and (b) graduates

Challenges

First, selection of teaching/learning environment should depend on the subject matter. Landscape architecture knowledge and skill areas cover a broad spectrum from information to theory and to hands-on application. Traditionally, these are all taught in a classroom or studio. With the Web,
instructors now have an additional teaching option – online. If all subjects are taught online with prerecorded materials, students may not learn all of them effectively. Difficult subjects such as theory or mathematical calculation should be repeated in the classroom. Hands-on exercises should be again demonstrated in the studio. Interactivity in classrooms and studios will enhance learning.

Second, interaction is a critical component in learning that fosters a strong sense of class community (Harasim, 1990). In particular, undergraduate students will benefit more from intense interaction with their instructors and classmates as their independent learning skill may not be as mature as graduates’. Interactive components of course management software such as chat room may be included if web-based or web-enhanced teaching is used.

Third, software changes put an additional burden on instructors. Current course management software such as WebCT is not yet intuitive and quickly changing versions requires significant training.

Opportunities

First, online access to supplemental course materials is perceived as an enhancement for learning by students. It is the unlimited access anytime anywhere that benefits student to preview and review course materials.

Second, new students are becoming more technology-savvy. New students are more adaptable to problems regarding the use of computer or Internet, for example, software glitches or network crashes. The threat of technology breakdown to learning enthusiasm (Katz & Yablon, 2002) is reduced because of both the technology improvement and new students’ better computer skills.

Third, the use of WebCT or the like may enhance off-campus study, study abroad, or an internship typically required in a landscape architecture cur-

<table>
<thead>
<tr>
<th>Subject types</th>
<th>Undergraduate (N=27)</th>
<th>Graduate (N=11)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Online</td>
<td>Classroom</td>
</tr>
<tr>
<td>Information-related</td>
<td>15</td>
<td>46%*</td>
</tr>
<tr>
<td>Theory-based</td>
<td>9</td>
<td>28%</td>
</tr>
<tr>
<td>Calculation-oriented</td>
<td>23</td>
<td>19%</td>
</tr>
<tr>
<td>Application associated</td>
<td>7</td>
<td>13%</td>
</tr>
</tbody>
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* Bold fonts indicate the highest percentage for the specific subject type.
The Internet offers the faculty better control and monitoring of student learning with timed assignments, online status reports, term papers, or online real-time discussions when students are spread across the country or the world. Further, it could maintain the connections between the students and the university, the faculty, and with other students.

CONCLUSION

Landscape architecture is a field heavily relying on visualization and interactivity for communication. Differing from typical classroom lecturing, core landscape architecture education mainly takes place in a studio environment, where creativity, knowledge, and experience are nurtured from intensive student-to-teacher as well as student-to-student interactions. Educators in landscape architecture are challenged by the creation of a virtual classroom on the Web because using the Web in teaching also poses as an opportunity. To make such an opportunity a reality and effective teaching, the design of a web-enhanced or even web-based studio course must take into account who the students are, what the subjects are, and how/where to deliver.

References