Offering a Web-based Course for the First Time: Lessons from Faculty

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Abstract *- Offering a course over the World Wide Web requires faculty to develop new technical skills and to develop course materials in a different manner than would be required for a traditional classroom based course. This paper reflects faculty experiences in developing web based courses for the first time and offers lessons learned to those who might consider doing so in the future. The data were derived from interviews with and surveys of faculty members at North Carolina State University (USA) during the first semester that such courses, dubbed "Project 25" were offered on an experimental basis to the university community. Students had the option to take the classes either in the traditional classroom-based manner or asynchronously via the web. Many participating faculty taught their classes both ways during the semester. This paper seeks to present some of the lessons learned by the faculty about designing and delivering a web-based course. The topics to be addressed are: necessary skills, time requirements, student characteristics, managing and facilitating student interaction, course pacing guidelines, suitability to the online medium, some helpful "don'ts," and expectations.*

Introduction

Offering a class over the Internet for the first time is a daunting task, the magnitude of which is often not realized until one has committed to it. During the 1997 Fall semester, 29 faculty members at North Carolina State University (NC State) volunteered to offer their courses to students using the World Wide Web as a delivery medium in lieu of traditional face-to-face classroom sessions (in some cases the on-line lessons were coupled with in-person laboratory experiences). The courses offered through "Project 25" represented a wide range of disciplines including engineering, computer science, other sciences, English, agriculture, business, and philosophy. The university offered grants to faculty members to develop their on-line courses as well as training in the pedagogical and technical aspects of web course development.

This paper seeks to report some of the lessons learned by the faculty as they were developing and teaching their web-based courses. It provides a general discussion of the elements of a web-based course and useful strategies rather than specific recommendations of methodology or technology (e.g., software and hardware). The topics to be addressed are: necessary skills, time requirements, student characteristics, managing and facilitating student interaction, course pacing guidelines, suitability to the online medium, some helpful "don'ts," and expectations. The data were gathered from surveys of 17 participating faculty members and two in depth interviews with six of them. Although the majority of the participating faculty were not engineering faculty, their experiences may prove useful in guiding engineering faculty in the development of web-based courses. Interested readers may refer to the complete evaluation report of this project at NC State at: http://courses.ncsu.edu/info/f97_assessment.html [1].

Methodology

Six of the 29 participating faculty members were interviewed approximately six weeks after the beginning of the semester and again during the last week of the semester. These faculty members volunteered to have their classes studied in depth (which included interviews with their

students and monitoring of their web sites) throughout the semester. The first round of interviews focused on faculty activities related to the planning and design of their courses and on their experiences after a few weeks of contact with their students. The second interview asked them to reflect on the entire semester's experience and to provide feedback and recommendations to those who might consider offering similar courses in the future.

In addition to the interviews, all 29 participants were surveyed via electronic mail at the end of the semester for their opinions of the entire semester's experience. Seventeen responses were received, for an overall response rate of 61 percent. While the size of the obtained sample precludes generalization to the populations of interest, the results nevertheless present a very informative picture of faculty opinion on developing and running courses in a web-based environment.

Necessary skills

Familiarity with HyperText Markup Language (HTML), the creation and editing of files, and transferring files to a Web site are basic skills that online course developers need. Many software packages are currently available which can assist instructors in web page design and HTML editing so that learning the intricacies of HTML is not generally required. However, basic familiarity with HTML can speed editing for the experienced user. In addition, if creating audio or video files or using graphics or Java programs on a Web page, familiarity with these file formats and their incorporation into a Web site will be necessary. Awareness of instructional design principles is also a valuable asset. Basic principles might include the following:

- gaining an understanding of the learners' goals, needs, preferences, and anxieties about learning and the content being explored;
- considering the variety of learning environments in terms of technological resources and the physical environment surrounding the computer being used;
- developing learning purposes and/or objectives that take into account these personal and learning environment factors;
- examining alternative technologies as teaching tools;
- selecting technologies that are appropriate for the objectives or purposes based in the learners' needs, their learning environment, and the content;
- monitoring and reinforcing their learning progress through course design and opportunities for continual interaction throughout the experience; and
- providing opportunities for learners to evaluate their progress and the learning experience.

It takes more time than you think

Most of the professors indicated that they learned how truly difficult and time consuming it is to put a course on line and do it well. One commented that "the effort required to make the material comprehensive is exponentially related to the depth of the information provided." All of the professors interviewed spent an extraordinary amount of time (4-10 hours per week) preparing their materials for the web section. Even those whose materials were already substantially developed and ready for the web spent considerable time enhancing those materials and recording lectures. Sixteen of our 17 survey respondents indicated that preparing a web-based course required at least somewhat more time than preparing for a traditional course. Some professors likened the development of the web course to writing a book and indicated that the same amount of time (12-18 months) should be allowed for it.

Surveyed faculty were asked to rate just how time-consuming various aspects of web-based course preparation had been. Learning the technologies was regarded as very time-consuming by most respondents; creating and enhancing instructional aids, designing and constructing the web site, and ensuring adequate coverage of course materials moderately so. Other aspects of course preparation rated very time-consuming included:

- Dealing with inadequate discussion tools and difficulties in delivering tests.
- Managing the volume of e-mail.
- Heightened individual contact with students.
- Pre-lecture transfer of notes to the web and post-lecture editing and transfer of audio to the web.
- Content preparation.
- Organizing the material in a new way appropriate for presentation on the web.

Future course preparation time was also assessed. Results indicate most respondents believe that preparation for the same course they taught as part of Project 25 will take much less time in future, but that having prepared this course as a web-based course will *not* substantially shorten the time needed to develop future web-based courses.

Student Characteristics

In our conversations with students we noticed that students taking the courses on the web were highly computer literate. A few had their own web pages and all reported having considerable experience using the internet for study and recreational purposes. Interestingly, the amount of "internet savvy" required for taking these courses on-line was relatively low (i.e., students only accessed material,

they did not create it) and all of the classroom-based students with whom we spoke appeared to have the internet skills to successfully interact with the course materials. The difference between the groups of students was primarily in their willingness to take the risk of taking a class on line as well as the degree to which computer use was a part of the students' lifestyle.

In our interviews, faculty observed that their online students tended to be more mature than many of their students taking the same course in person. This maturity would manifest itself in the thoughtfulness of questions directed to the professor about course material. This finding is consistent with research that shows that a typical distance learning student tends to be older, more likely to be working full time, and more motivated and mature (see for example, [2] and [3]).

Managing and facilitating student interaction

How instructors approach interaction with students enrolled in an online course may depend on how much value is placed on interaction for achieving the purposes of the course. No matter what value is placed on this interaction, many instructors found that their interaction with online students was greater and often more substantive than interactions with in-class students, although the majority of our survey respondents indicated that the quantity and quality of the interactions was the same particularly in graduate and upper-level undergraduate courses. Unless the course design includes opportunities for synchronous meetings, there appear to be several things to consider about online interaction as the course progresses.

1. Students are interacting with the course at all times of the day.
2. Students are interacting with the instructor (via e-mail or other means) at all times of the day. Project 25 instructors estimated that their interaction with online students was as much as three times the interaction with classroom students. This interaction increase was mainly due to the volume of e-mail. However, while the instructors had to learn how to manage their time responding to e-mail, they also found this interaction to be of a high quality and useful to the delivery of the course both technically and pedagogically. Online instructors will find it useful to establish guidelines for communications as soon as the course begins.
3. Students are not going to be present at the next class meeting to hear announcements.
4. Students probably do not see themselves as interrupting or taking time away from other students when they interact with the instructor via e-mail while they are engaged in whatever learning experience the course is providing at the time. They are also able to reflect on that experience before posing questions to the instructor.
5. More opportunities are available for providing useful feedback to students, but those opportunities bring additional time management, privacy, and integrity concerns.
6. On-line students will need much the same support systems and resources that traditional students need, but they may need to access them in different ways. [4]

Participants reported that students in the web sections contacted them most frequently via e-mail and face-to-face outside of the classroom environment. They responded to student queries most frequently via e-mail, via electronic forum, through face-to-face interaction, and less so through other means, such as fax and in person help sessions. This last finding is reasonable when one considers the advantages of an electronic forum: the answer to a student question or concern that may apply to all students in a section can be easily posted to the forum and made available for all to read.

Students need course pacing guidelines

The Project 25 instructors, for the most part, designed their online courses much like their classroom courses. Specifically, this design was patterned after a class period, lecture, or section format that matched the class time of the classroom course. While this may seem to be the easiest way to move a course to an online format, Web-based instruction offers opportunities for learners to have flexibility and control over how they organize learning the content of the course. This suggests that alternative formats of design such as learning modules based around sets of concepts or other learning experiences may be useful. Whatever the format, there are some lessons learned by the Project 25 instructors about course pacing that will be helpful.

First and foremost, and with the exception of minor adjustments or synchronous learning experiences, instructors will probably find it helpful to have the entire course online from the beginning. Some students will want to move through the course at the pace set by the instructor (possibly because this expectation was communicated with the course design), while others may want to move at their own rate. One instructor found that a student who moved through the course quickly became an informal "assistant" whose help was of great benefit to him and other students. However, when the students have the ability to set their own pace, the instructor has to be willing to work with each student at his or her own point of progress

Whether self-paced or more traditionally designed, a key factor to the success of the pacing is the communication of clear objectives or purposes of the course. Project 25 instructors quickly learned that this did not stop with the objectives laid out in their syllabi. More specific objectives or purposes attached to each section, lecture, module, test, assignment, or quiz were critical in order for students to stay on track. This clear communication also aided in the management of e-mail communications with students. Clear objectives up front meant less communications later trying to establish that clarity. Project 25 instructors also learned that students following an established pace of the course often wanted more dates than just when assignments were due and tests scheduled. They wanted study schedules, including what to read and review in a particular order [4].

Courses should be suitable to the online medium

Although for the most part, all courses that were part of Project 25 were completed successfully by students and faculty, courses that seem well suited to online delivery are those where the traditionally taught sections are relatively large and hence do not require a large amount of interaction between the students and professor or between students for understanding of the material. Several respondents thought that the visual nature of their content was a good fit for Internet courses, and that content that provided opportunities to link to information at other Web sites was enhanced through web-based designs. Others thought that web-based courses were a good medium for a writing course and for providing feedback through testing and assignments. We found that some of the more successful courses were those where the instructor used media such as PowerPoint presentations for their traditional classes and provided an audio overlay to those presentations for their web sections, essentially giving the web students the same experience that they would have had if they had attended a large lecture with the added benefit of being able to interact with the material on their own time and terms.

Courses in which a hands-on laboratory experience is critical and unavailable in the online environment has been found to provide a lower quality experience for students taking such course at a distance [5]. For courses where the laboratory experience was critical, we found that a hybrid course, by complementing the web-based environment with a hands-on laboratory experience where there was direct contact among instructor and students, worked well.

Some helpful "don’ts"

One of our instructors provided us with some helpful “don’ts” on communicating with students online that relate to what Project 25 instructors learned while implementing their courses. These include the following:

1. Don’t expect all students to be successfully reading and participating in your “class discussion list” in the first week of the semester.
2. Don’t be vague about the names of assignments.
3. Don’t be available to your students all the time.
4. Don’t assume that electronic mail is received or read in any specific time frame.
5. Don’t structure the communication flow in a course so that you are the gateway for all communications This will save you time and create a better learning environment.
6. Don’t forget to structure feedback on evaluation of the students’ progress and learning.
7. Don’t put anything in your correspondence that you would not want to see on the front page of a local or national newspaper.
8. Don’t go unprotected from viruses [6].

Beware of lofty expectations

A few faculty members cautioned against having higher expectations of the professor teaching a web course than a traditional course. These expectations could manifest themselves in a number of ways. For instance, students expected to be able to read ahead and wanted their questions to be answered instantaneously, neither of which would be expected in a traditionally taught course. Administrators as well may hold participating faculty to higher teaching performance levels for two reasons. First, there is a perceived risk to the department or university of offering courses in a nontraditional (and often very public) fashion and second, many of them do not understand either the power or the limitations of the technology.

Conclusions

Our interviewees had one overriding piece of advice for professors who might develop web courses in the future. That is that they need to know what they are getting into in terms of the time commitment. They need to ensure that they have enough lead time to develop the course in sufficient depth to be able to stand on its own. Many recommended an incremental approach by which professors would develop web materials to supplement traditional classes over a period of years until they had been sufficiently developed to stand alone.

Many engineering professors may have the advantage of already possessing many of the technical skills necessary for developing and presenting materials on the web. However, they may benefit from assistance in the instructional design aspects of offering their courses in a manner that facilitates learning for their students. We hope that some of the lessons reported here and learned by our faculty prove useful to those who may offer web-based courses in the future.

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