

Distance Learning between Two Countries: A Rationale for Distance Education Methodology

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Abstract

Systems Modeling, a graduate level course taught as a distance-learning course in the winter 2001 semester. Students at the University of Missouri-Columbia and students at the University of Puerto Rico-Mayaguez engage in a Web-based course taught over the Internet. The course is primarily asynchronous with several synchronous online interactions between instructor and student throughout the course. Topics are divided into slide presentations with vocal commentary produced by the instructor. Each session is between ten and fifteen minutes in length with the scripted voice, images, and audio merged into one visual display. This is done using Real Media software.

During the scheduled synchronous times the instructor hosts question and answer sessions. Both computers have touch screens with electronic pens to allow freehand drawing of equations and other information. Students and the instructor also converse in real time using Voice-over-IP. Students utilize e-mail, whiteboards, and message boards to contact the professor. Each presentation is available for downloading from the Internet and can be reviewed as necessary. Students scan homework and e-mail or either post their solutions to problems. Test materials are developed in a standard format and sent to the site where the exams are locally distributed and proctored.

The design features two servers, one local for students and one remote for remote use and maintenance of the course. Real-time text and graphic interaction and exchange will take place permitting the archiving and storage of important interchanges of materials. Technicians will resolve software problems via remote access of the servers and software.

Assessment of the course entail early surveys and evaluation tools used to determine how to best improve the course, mid surveys and tools to evaluate the improvements and other potential or newly developed problems, and an assessment of the course at the end.

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Methodology

I. Introduction

Distance learning is a booming market. In 1998, there were 1.6 million students taking more than 54,000 courses online, according to the US Department of Education (Roberts 2000). That is more than double the number of distance learners recorded in 1995 by the National Center for Education Statistics. The implementation and increase in usage of online courses interests the fields of engineering and education because it is a culmination of the fields potential that will aid in the assessment of the online course tools as they become more widespread.

The ultimate aim of the technological developments in Web-teaching is to improve instructional approaches and support courses directed towards the enhancement of an effective Web-based instructional application. This paper offers a look at the structure, methodical reasoning and assessment of a distance-learning course taught over the Internet between two countries. In addition, this paper describes the necessary elements, issues, and methods central to developing a distance-learning course via the Web to meet the needs of the online students.

Our goal is to take what we know about education and combine it with what we know about the technology available to us and assess the effectiveness of Web teaching. To achieve this goal, we conduct a graduate level University course, Systems Modeling, over the Web to students at the University of Missouri-Columbia and the University of Puerto Rico-Mayaguez. The central target is to conduct the course in a manner that is

conducive to learning. Web pages are posted daily but the course presented in this research aims to assess the Web as the medium through which teacher and student share and learn. Student feedback and ongoing evaluation of the course, its content and its structure will benefit future efforts in this area. The initial implementation of the course, Systems Modeling, via the Web began in the winter semester 2001

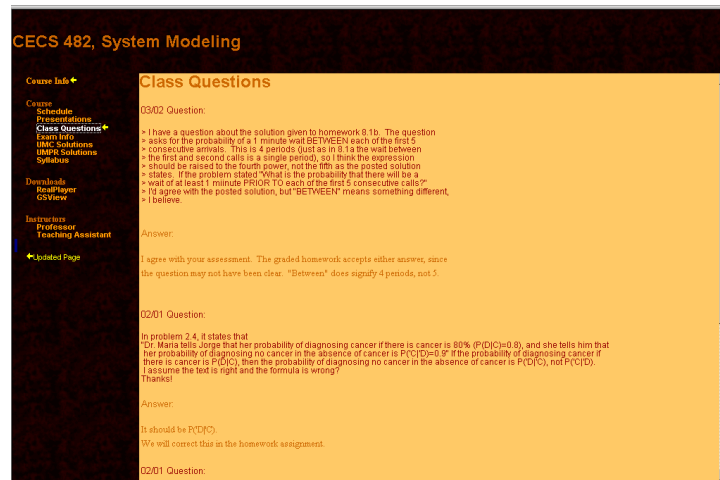


Figure 1. Syllabus of Webpage

II. Background

Owston (1999) poses the question “Can the Web promote improved learning?” He argues that the issue becomes further complicated when the Web is used as a tool for learning, as opposed to a medium for delivering pre-determined content. It further becomes important to understand that no medium in and of itself will likely improve learning in a significant way when it is used to deliver instruction. He believes that there are at least three distinct learning advantages to the use of the Web: (1) Web appeals to student’s learning mode- visual and interactive, (2) Web provides for flexible learning – synchronous and asynchronous, (3) Web enables new kinds of learning – improving critical thinking, problem solving, and written communication.

Boettcher and Cartwright (1997) recommend going back to the fundamentals, or core processes, of an educational experience that make up courses in order to reduce the amount of ineffective attempts at using the Web for instructional purposes. They emphasize three modes of dialogue and communication: 1) the dialogue between the faculty member and student, 2) the dialog between among students, and 3) the dialogue between the student and instructional resources.

Grasha (1996) has defined learning styles as “personal qualities that influence a student’s ability to acquire information, to interact with peers and the teacher, and otherwise to participate in learning experiences” (Diaz and Cartnal 1999). Ross and Schulz 1999 explain how the Internet can be directed towards accommodating the personal qualities that create learning styles. They suggest the use of online virtual labs with instructions, posting detailed solutions to problems, Power Point slides of lectures, detailed course requirements, and independent study ideas with resource links in order to associate Web interaction with learning styles and maintain communication between students and the professor.

III. Specifications and Methods

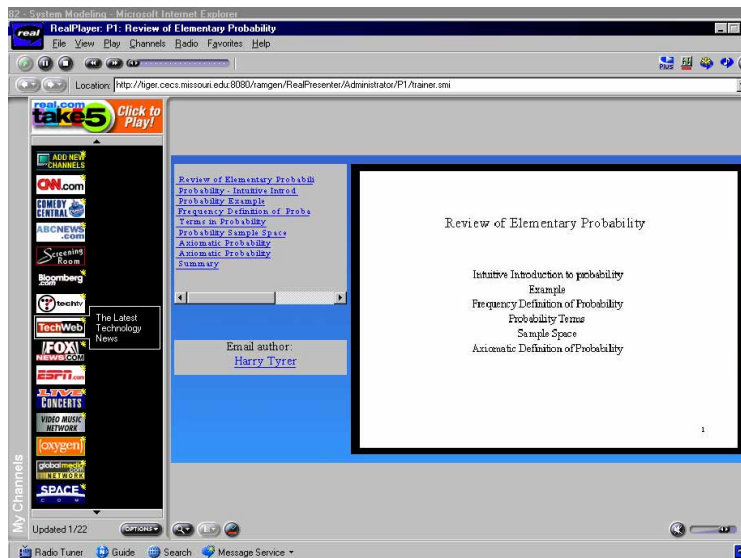
The issue of Web Teaching and its effectiveness involve the goals of the course, the student, and the efforts of the institution or instructor implementing it. The advantage of having an additional option in education is prompting professors to investigate the interactive capabilities of the World Wide Web for the purpose of housing and distributing course content. The look and feel of the classroom is changing. Students now have the option to log into lecture and obtain notes without physically being present.

The Systems Modeling course is primarily asynchronous with several synchronous online meetings between teacher and student.

The methods used in this research are as follows:

- Combine what we know about effective education and interactive technology to compose a Web course.
- Centralize communication between professor, student and resource as a gage for assessment
- Utilize the benefits of interactivity and multimedia capabilities of the technology.
- Assess the course effectiveness of the course. Topics are divided into slide presentations with vocal presentations produced by the instructor. The methods of communication include the use of the Web site, email, discussion boards, Voice over IP, and touch screens equipped with electronic pens for free hand writing of equations.

Figure 2. Presentation Slide from Course



IV. Assessment and Learning Experience

Evaluation is conducted throughout the course with student and teacher feedback and observation of the high traffic portions of the Web course. Checks for clarity in the presentation and expectations of the course will also follow. The assessment of the course will help determine the areas of improvements in teaching efficiency with technology as a central component in education.

The use of HTML forms with questions will provide an informal assessment of the students' evaluation of the course. The primary goal of this informal assessment's is to provide opportunities for the students to give feedback concerning the course. Students reinforce their grasp of course content and strengthen their own skills at self-assessment. Furthermore, student motivation is increased when they realize that faculty are interested in their success as learners (Angelo and Cross 1993).

Many scientists agree that the Web has the potential to meet student's learning needs and once developed, online courses can allow the professor to refocus the use of his/her time and possibly permit more time to clarify students' questions and doubts. Higher education faculty have had decades of experience in designing instruction for the classroom using books, journals, slides, films, videos, and other static resources but until recently many had no experience with web tools. There seems to be agreement in the literature that developing the material is a time consuming task. On average, the preparation per presentation yielded a ratio of approximately 10:1 – ten hours for the thorough evaluation of one presentation.

As with any initial effort when developing multimedia courses we predict a steep learning curve. Researchers who have tried similar approaches warn that technology may

not work when professor needs it most and bandwidth intensive media may be unattainable for students with slow access to the Internet (Ross and Schulz 1999). The presentations for this course are loaded locally on UPRM's server for faster access and students are provided with links to the presentations for both high and low bandwidth.

We support Kuzma's argument that technology should not be viewed as an end in itself but is used as a means toward reaching active learning education goals. A comparative study of the exam scores of the traditionally taught students and the Web based students will benefit in the evaluation process.

Since this project began many new tools have been developed to handle more of the backend networking concerns. It is advised to anyone who takes on Web-based teaching to start small and be certain that the goals are presented clearly in an effort to help students understand what is expected. Highlight and date changes in an effort to keep students informed of current events and changes, and prevent Web pages from disappearing without notice. Consistency and stability are pivotal to the use of a new medium and the motivation of the students. Evaluation and assessment is due completion by June of 2001 when the course ends and an addendum of results will follow.

Summary

The rapid growth of the Internet and the World Wide Web is allowing new developments in the transference of information to students and it has the potential to enhance the learning experience. Its communication and publication abilities has the potential to aid in the development of students cognitive skills as they learn to filter through the enormous amounts of information enhancing critical thinking abilities.

Distance learning via the Web, although different presents an opportunity to explore the possibilities of further diversification and enhancement of educational style and substance.

If Instructional Technology can aid in developing student's critical literacy skills, students can become better information managers, knowing how to access organize, and present information. Therefore those implementing the courses must first master these skills and then model the skills in such a way to present the material that will aid students to do the same.

Web interactivity is becoming a resource and commodity for many areas and the potential that exists within the new technology concerning education is worth exploring. In order to accept the new revolution we must thoroughly analyze and evaluate the effects of Web teaching in order to derive a sound judgment of the effectiveness of Web courses across educational streams.

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