

EFFECTIVENESS OF ONLINE COURSES: A CASE STUDY

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Abstract $\frac{3}{4}$ One of the first Civil Engineering courses at the University of Sharjah to offer online faculty–student interaction was "Foundation Engineering." Through the course website students have access to complete course notes, assignments, project resources and self-assessment exam problems. In addition, students had e-office hours during the evening whereby they can interact with the instructor by e-mailing their questions. The course was monitored for two semesters (Fall 2000 and Fall 2001). During Fall 2000 the average number of hits per students was 16.7 with an average of 7 e-mail questions per student. In Fall 2001 these averages were, 24.2 hits and 10 e-mails per student, a respective increase of 50% and 43% over the previous semester. A survey was conducted to assess the effectiveness of the online course. The results showed that 94% have used the site, 78% of these students found the site very valuable. All students that used the site indicated that the most beneficial part was the self-assessment section.

Index Terms $\frac{3}{4}$ Civil engineering, design-intensive courses, effectiveness, online courses

INTRODUCTION

Courses delivered over the Internet, or "online" are one version of a type of education called "distance learning." Distance learning can take place by correspondence, by broadcast television or video-conferencing, or through computer network. All these methods share an important factor for success in online learning, which is the ability of the student to self-direct learning. With the aforementioned philosophy in mind, The Department of Civil Engineering at the University of Sharjah (UOS) is in full gear to have all of its course resources online. They are designed to compliment, not replace, the assigned textbook and class lectures. Furthermore, these online course materials are intended to assist students to become self-directed learners thereby enhancing their initiative, independence, and persistence in learning. As they accept responsibility for their learning, they see problems as challenges rather than obstacles. They share a high degree of curiosity, a strong desire to learn, and the capacity for self-discipline. They can set goals, make plans, organize their time, and set an appropriate pace for learning [1] – [2].

This paper presents an investigation to assess the effectiveness of online courses. The case study used was that for "Foundation Engineering." The course resources were placed on the web for the first time in fall 2000 and students' progress has been monitored for one year and reported in the paper.

FOUNDATION ENGINEERING WEB RESOURCES

The "Foundation Engineering" course is a Civil Engineering course, which involves the design of "Geotechnical Engineering Structures" including:

- Footings (Spread and Combined)
- Soil Retaining Structures (Retaining Walls)
- Deep Foundations (Piles).

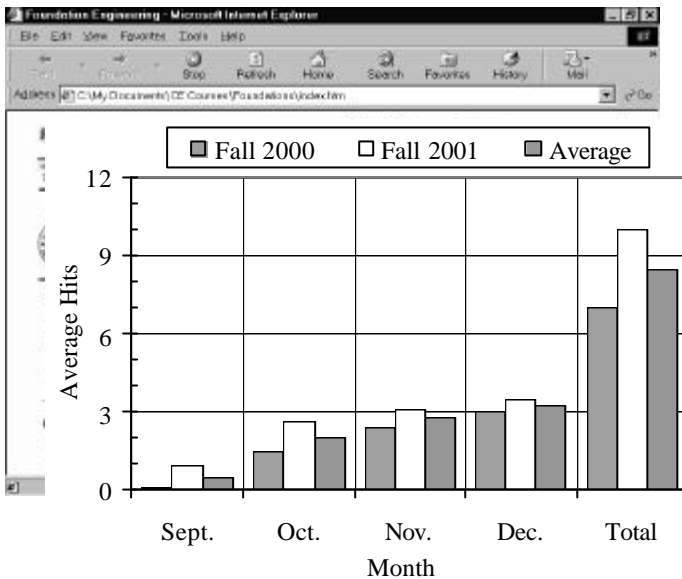
This course is offered at the junior level in the Civil Engineering Department at the University of Sharjah. The web resources for this course were the first to be available to students in the Department of Civil Engineering. They were initially placed online in September 2000 [3]. Through the course website students had access to complete course notes, assignments, projects and self-assessment exam problems.

Figure 1 shows the main (front) page of the course web site as linked by the above address. From this page students have links to:

- Author's Profile
- Course Content
- Questions (e-mailed to author)
- Help Page
- Overview of the course
- Information Page (Conversion Factors and Soil Properties)
- All topics covered in the course
- Assignments
- Projects
- Design Problems (Solved)
- Exam Problems
- Related Pages and Links

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As was noted, through the course website students had access to complete course notes, assignments, projects and self-assessment exam problems. In this latter section, three sample tests were provided for each of the first, second and final exam. Students were informed that all sample tests in this section were actual exams given in this course by the instructor. The first sample test was completely solved on the same page for review by the students. The second set presented the exam with the solution on a separate page. Students were asked to solve the exam and grade themselves. The third section presented the exams without the solution. Students were asked to solve the exam and have the tutor of the course grade their solution. In addition to all this, students had e-office hours. This was done by e-mailing their instructor questions at home between 8:30 PM and 10:30 PM on Saturdays and Mondays.

MONITORING THE USAGE OF THE WEBSITE

A hit counter was placed on the site of this course to observe students' usage of the online resources. The course was monitored for two semesters (Fall 2000 and Fall 2001). The numbers of hits recorded on the site is shown in Table I.

TABLE I
NUMBER OF HITS RECORDED

Month	Semester		Total
	Fall 2000 (38 Students)	Fall 2001 (36 Students)	
September	18	112	130
October	111	210	321
November	221	253	474
December	287	295	582

Total	637	870	1507
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In addition, the numbers of e-mails sent was also recorded. The results are shown in Table II.

TABLE II
NUMBER OF EMAILS SENT

Month	Semester		Total
	Fall 2000 (38 Students)	Fall 2001 (36 Students)	
September	4	32	36
October	56	94	150
November	92	111	203
December	114	124	238
Total	266	361	627

To standardize the results for both monitored semesters and compare them, the averages/student/month of the number of hits and e-mailed questions were calculated. The results are plotted and shown in Figures 2 and 3.

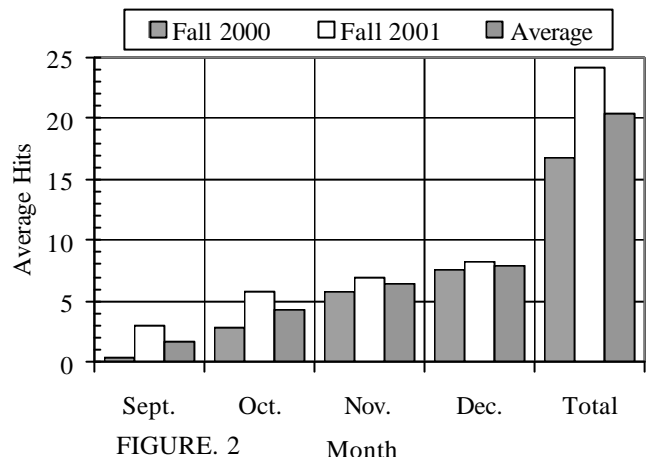


FIGURE. 2
Month
Summary of the Number of Hits

FIGURE. 3
Summary of the Number of E-mails Sent

Based on the results shown in Tables I and II and in Figures 1 and 2, the following observations can be made:

- The numbers of hits increased as the semester progressed.
- The numbers of e-mails increased as the semester progressed.
- The number of hits increased from Fall 2000 to Fall 2001 even with lower enrollment.
- The number of e-mails increased from Fall 2000 to Fall 2001 even with lower enrollment.
- The average number of hits & e-mails per student per month increased as the semesters progressed. The increase in both average numbers of hits and e-mail per student can also be observed from Fall 2000 to Fall 2001.

Above results clearly demonstrate that students became more interested in using the web resources of the course as the semester progressed. Further, students in Fall 2001 would seem to have learned about these resources and made better use of them than their peers in fall 2000.

STUDENT SURVEY OF COURSE RESOURCES

To assess the effectiveness and benefits of the course resources to the students, a survey was distributed at the end

of each semester. Figure 4 shows a copy of this survey, which included the following main questions:

Q.1 : **Do you have access to Internet?** Yes No
If Yes, where? Home On Campus

Q.2 : **Have you used the web resources of this course?**
 Yes No
If Yes, how often?
 Daily Why?
 Weekly Why?
 Monthly Why?

Q.3 : **Did you find the site easy to navigate through?**
 Yes No
If no, Why?

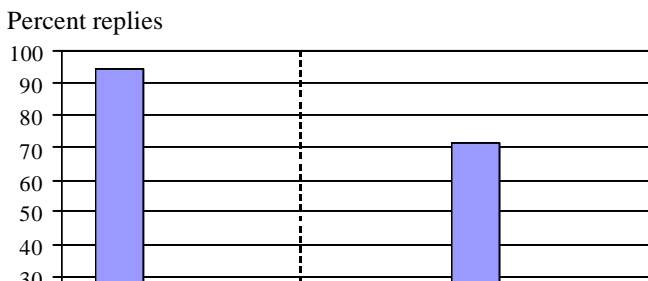
Q.4 : **Did you find the site useful in improving your knowledge of the course?**
 Yes No

Q.5 : **What is the best feature of the web resources for this course?**

Per
10
10
90
80
70
60
50
40
30
20
10
(

FIGURE. 4
 Survey Document Distributed to Students

The results of the survey are shown in Figures 5 – 8



- a) **100%** of the students had access to Internet (either from home or on campus)
- b) **94%** used the web resources
- c) **72%** accessed the web site on weekly bases.
Why? Most answers indicated that students were interested in the web resources to learn more.
- d) **79%** found the site easy to navigate through, while **21%** found it difficulty.
- e) **93%** found that the site is useful in improving their knowledge of the course.
- f) The replies to question 5 indicated that all students that used the site found that the most beneficial part was the self-assessment section.

SUMMARY AND CONCLUSIONS

Through this paper, the authors wished to share the effectiveness of online course resources and the mode of online faculty-student interaction in promoting the learning process. It is strongly believed through this pilot study that online interaction is extremely beneficial in design-intensive courses for all students, including those that are shy in nature and avoid questions in the classroom.

Generally speaking the results of this online course had shown that students benefited from the online course resources. Most students were interested in using the resources and had indicated that the most useful part was the self-assessment (exams) section.

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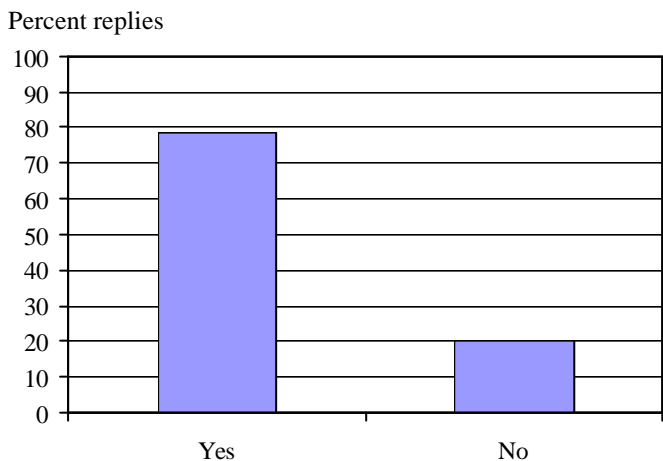


FIGURE. 7
Results of Question 3

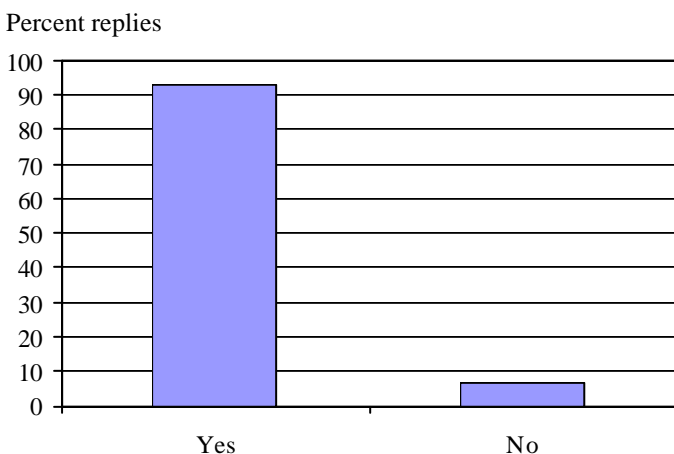


FIGURE. 8
Results of Question 4

In summary, the results of the survey showed that: