Presented and Published, Am. Soc. of Engineering Educ, (ASEE) 2000 Conf., June 18 - 21, 2000 St. Louis, MO

Section 2358

Increasing the Usage of Web Tools by Engineering Professors to Develop Engineering Courseware

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Abstract

Software development for both course management and content development tools for educators have increased over the past few years. However, professors using these tools have not increased at a proportional rate. This paper focuses on how the University of Oklahoma has initiated various programs to promote and assist engineering professors to make effective use of these software tools. Also included is a discussion on how students have participated in working with professors to develop course related media for the Internet. Furthermore, the paper discusses and identifies factors that limit the development of web courses and what incentives worked to encourage both faculty and students to use the current web tools.

At the University of Oklahoma, the Multimedia Technology Center (MTC) initiated a new program called Student Assistant in Multimedia (SAMM) that is designed to assist students, professors and staff in developing technology proficiency in the areas of teaching, learning and collaboration. SAMM consultants assist the professors in developing their course content and tools in the multimedia area. Through this program, the multimedia center fosters a closer relationship with the professors. The advantages and disadvantages of using student consultants are mentioned, including the difficulties faced during the implementation period. Also, highlights of several courses are presented along with comparisons to other course development strategies.

I. Introduction

Over the last few years, there has been a tremendous increase in course management and content development tools that are well suited for use by educators to develop electronic media and web-based courses. Course management programs, such as WebCT [1] and Blackboard [2], are user-friendly and do not require in depth computer knowledge. However, even with the availability of these new tools, many professors are not developing courseware for their course.

This could be due to a number of reasons. These include the professors not seeing the need, believing that the course is not suitable or necessary for courseware development, or they feel that the size of the class is too small for the required effort. Many professors also prefer traditions teaching methods since they are successful with that mode. Thus, modifying their current teaching methods is not justifiable in their time.

On the other hand, there are professors who see the need to develop courseware but are lost due to the large number of software tools available in the market. Additionally, purchasing these software incurs additional expenses that further discourage them from making progress in developing or using electronic media. In order to produce a stimulating courseware unlike course management tools, content development tools such as the html editor, photo editor, drawing program animation etc., require time to learn.

Understanding these problems, the University of Oklahoma initiated various programs to promote and assist the professors to use the available software tools to their advantage in developing courseware. One of them is the Student Assistant in Multimedia (SAMM), which was introduced by the Multimedia Technology Center [3] (MTC) at the University of Oklahoma, to provide assistant to professors in developing electronic media for their course. This service is incorporated with other methods, such as a faculty-students collaboration multimedia course and multimedia workshops.

This paper looks into how SAMM consultant service assisted professors in courseware development. The advantages and disadvantages of the service are mentioned in the following sections. A comparison between the methods used at other Universities to the SAMM consultant service is also mentioned. Furthermore, to better understand the service, example of the past projects are highlighted, and suggestions for improvement cited. These suggestions are made based upon the survey response conducted on the SAMM consultants.

II. SAMM and other methods

Alike many universities, the University of Oklahoma has a multimedia center that provides support to professors in developing and using multimedia software and courseware. MTC, which is operated by the Engineering Computer Network (ECN), created the SAMM group and introduced WebCT to professors through seminars and workshops. WebCT, a commercial web-based course management tool assists professors in organizing courseware for web delivery. The cost of WebCT, maintaining SAMM consultants and all development software needed to be used for courseware development are absorbed by MTC.

MTC conducted a multimedia course[4] that is similar to the University of Texas at Austin. In this course, each student was attached to a professor to work on a courseware development project. During the semester, the students learned software and programming languages such as HTML tags, CGI, JavaScript, Microsoft FrontPage, Adobe Photoshop, Flash, Freehand, and Extreme 3D. Throughout the semester, the students contact the professors they were working with to coordinate course work. In the

final week of the semester, the students presented the work to the professors. When the students completed the electronic media for the course, they became potential candidates for SAMM consultants.

MTC also conducts workshops for professors during the semester. In each workshop, MTC introduces basic multimedia tools to the professors including hands-on lab sessions. The professors are introduced to the multimedia software so that they are aware of what can be done with the software tools and can work better with the SAMM consultants. These workshops also allow the faculty to have a better understanding about courseware development and encourage them to develop additional material.

When the professors are ready to develop their courseware, MTC provides them with SAMM consultants. Usually, a consultant assists from one to three professors [5], depending on the intended size of the project. Throughout the semester, the consultants act as facilitator between professors and MTC. To the professors, they assist them in developing courseware. Also, SAMM consultants will inform professors on new software available to them and the workshops conducted by MTC. The SAMM consultants, on the other hand, are responsible to inform MTC on the professors' needs in term of both service and software.

All consultants have a bimonthly group meeting where they report on their latest development with each professor and the problems they faced. In the meeting, each consultant has the opportunity to share the problems with others and everybody will contribute ideas and solution to it. In subsequent meetings, the consultant will review the methods used to the other SAMM members. Through this way, the SAMM consultants are able to learn from each other.

IIa. Advantages

By introducing SAMM consultants, the professors are more willing to develop courseware since the consultants are doing the majority of the work. Furthermore, there is no additional cost for using the service. Plus, the developed courseware will assist the professors in teaching the course. In comparison to professors, SAMM consultants have much better development skills since they spend more time to explore each software tool. This will enable them to develop courseware in a shorter time and with better quality. Also, they have generally more time per week to work, 10-15 hours, compared to professors.

Another advantage of SAMM consultants is that they act as group, which helps with the continuity of the project when someone leaves the project. The courseware developed by the consultants is more suitable and appealing to the students since the course layout will be standardized and the interface looks more familiarize to students who use the courseware developed by the SAMM consultants. This is because the consultants can share ideas between projects with different professors.

IIb. Disadvantages and Difficulties in implementing

One disadvantage of the SAMM consultants is the high turnover rate. For almost every semester, senior students graduate and new consultants must be employed. This requires additional training for new consultants and their developing rate is much slower than the previous experienced consultants. Also, looking for a qualified SAMM consultant is not a simple task. Students usually do not have the appropriate multimedia knowledge to handle the courseware development unless they have taken the multimedia course, which is a technical elective at the University of Oklahoma. However, the multimedia course offered by MTC is only eligible for students who are at least in their junior year, which minimizes the time they can be SAMM consultants. Generally, the students who took the course are usually in their senior year and have only a semester or two left before graduation.

Professors who use the SAMM service usually have set a lower priority in developing courseware since they do not have to bear the cost of employing the consultants. Thus, they put the consultants aside when they are busy with classes and research. This causes the consultants to complain that their courseware development is halted. Another difficulty is that professors do not trust the consultants to develop quizzes. They are concerned that the questions may be given to other students. Also, many professors who are not exposed to electronic media do not understand or appreciate the content development tool, they have difficult time to identify the appropriate use of electronic media in the class and how to creatively use animations and simulations.

III. Comparison with other method

In the University of Texas at Austin, the Center for Instructional Technologies developed a "Faculty-Student collaborations in multimedia" course [6], which is similar to the course offered by MTC. It was started to help address some of the obstacles in developing courseware as well. In 1997, this course was expanded into a two-semester course. The first course provides basic training in using multimedia tools and the second course concentrates on hands-on experience. The students in the second course become partners with professors in either groups or on a one-on-one basis to work on a professor-sponsored project. The students are given a semester to develop the courseware for the professor.

With this method, the professors who participate are more committed in developing their projects since they are the sponsors. Both the students and professors want to complete their courseware within the given semester due to the restricted time frame by the multimedia course.

In contrast, the SAMM consultant service at the University of Oklahoma encourages professors to create an on-going courseware development rather than just a single semester project. This allows professors an opportunity to create an online distance learning courseware after a few years of continued development.

IV. Results and Examples

This is the first semester that the MTC offered SAMM consultant service. At this moment, there are 5 SAMM consultants assisting 13 professors in developing courseware. The results are encouraging. Throughout the semester, most of the professors are active participant in courseware development. In the future, MTC should expand this service at a faster rate so that more professors can participate. The examples of the projects are:

a. WebCT course contents development for Computer Architecture [7] (Figure 1) by John Mulhausen for Dr Linda DeBrunner (School of Electrical and Computer Engineering). In this project, he assisted Dr DeBrunner to set up course notes, quizzes, old examination and calendar for students in the class. The students are able to log into WebCT to complete quizzes, refer to old examinations, review class notes and check for the important class dates.

Figure 1: WebCT content development - Computer Architecture

b. Optimization Electronic Modules [8] (Figure 2) by Choon-Guan Lim for Dr Alfred G. Striz (School of Aerospace and Mechanical Engineering). Dr Striz uses the web to display class notes. It was created using HTML, JavaScript, Macromedia Flash and Adobe Photoshop. HTML is the basic language for World Wide Web. JavaScript was used to create interactivity in static html. Macromedia Flash was used to create interactive simulation examples. Adobe Photoshop was used to edit the images used on the website.

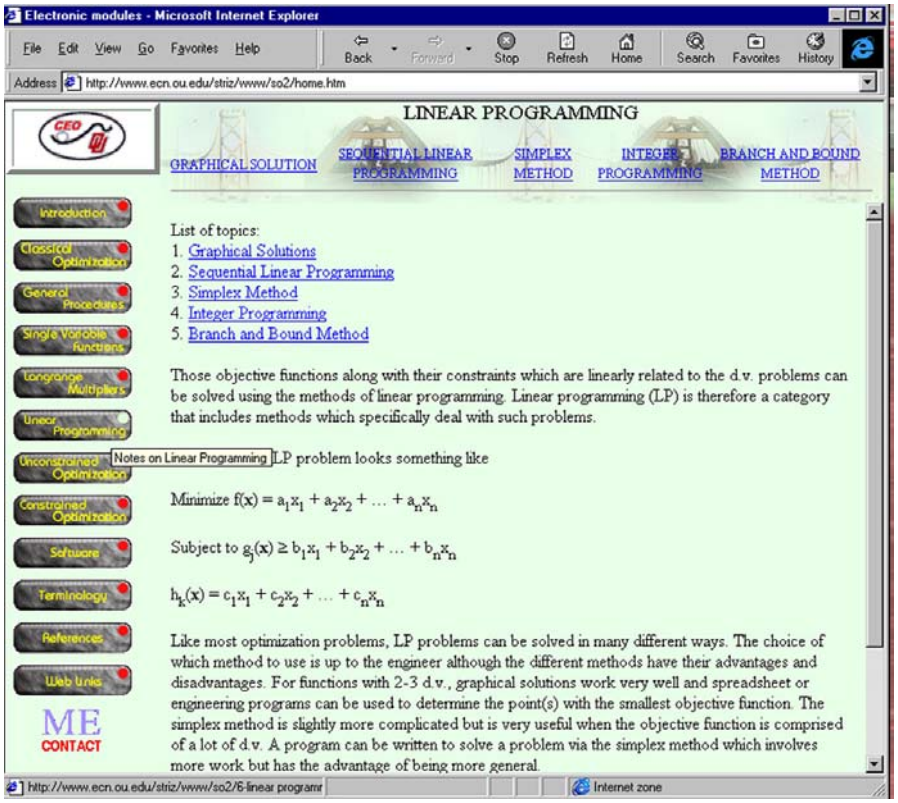

Figure 2: Optimization Electronic Modules

V. Conclusions and Suggestion

As distance learning and visual classroom concepts become more popular, professors will need to develop courseware, or risk losing students to other classes and schools. The SAMM consultant services incorporated with workshops and a technical multimedia course was able to support professors in developing courseware at the University of Oklahoma. Fall 1999 was the first semester the SAMM consultant service was used and hence, numerous disadvantages were detected. The examples were the consultants were not fully used by the professor. Professors have a hard time trusting SAMM consultants in developing examination and quizzes. Apart from this, it is hard to get qualified

SAMM consultants especially when the turnover rate is high too. To correct these, the following will be done in the next semester so that the services are more effective.

In the future, MTC will require professors and SAMM consultants to work out a guideline for the proposed project at the beginning of each semester. In this way, SAMM consultants will be able to proceed even when the professors are not available. During each workshop, examples of past projects will be shown to professors to give them a better idea on how to develop courseware.

If the graduate assistants understand the performance and limitation of the software and at the same time, know the course content, then they are able to help their professors in providing guidance to the SAMM consultants in the direction of the courseware development. The graduate assistant could also help in developing quizzes and examination questions. Therefore, encouraging the graduate assistant to take up the multimedia course is needed.

To better recruit students to become SAMM consultants, the multimedia course offered by MTC should be promoted to students in their junior year. With this strategy, each consultant would have a longer period to serve the professors in courseware development.

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Biographical

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