Developing Web-Based Lecture Notes and Conferencing for an On-Campus Course in Nonprescription Drugs

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An on-campus nonprescription drug course utilizing web-based lecture notes and conferencing software is described. Besides conducting three live lectures per week, students were provided with supplemental online lecture notes that included text, images, and hyperlinks that could be accessed at any time. In addition, students were asked to complete assignments and submit them to the instructor utilizing conferencing software. Online practice quizzes were also made available to the students for self-assessment. Although implementation of an online course was challenging for the instructor, the students indicated that they learned more about course topics and course satisfaction increased. They also stated that they had more interaction with the course faculty than in a normal class that did not utilize conferencing software.

INTRODUCTION

The development of an on-campus nonprescription drugs course using the world wide web (WWW) is described. The course incorporates web-based lecture notes, graphics, hyperlinks, practice quizzes and asynchronous conferencing with traditional on-campus lectures. This course is primarily taught with didactic lectures in a large lecture hall. Students commented that they didn't always have enough of an opportunity to interact with each other or with the course faculty. Although slides with pictures of the products being discussed were shown in class, students felt that they needed more time to study the pictures than what was possible during class. Students also requested an opportunity to take practice "quizzes" to help them master the material. Therefore, the objectives of adding technology to this course were to encourage students to explore course topics using internet resources, provide convenient and ready access to course faculty, provide the students with text, images and hyperlinks to additional information that the student could access whenever was convenient, to take quizzes and complete assignments online using conferencing software and to evaluate student outcomes and satisfaction. It was anticipated that the addition of technology to the course would furnish a mechanism to provide continuous learning after class and to foster continued dialogue about course topics between faculty and students. Finally, our plan was to test the course framework and if successful, make it available to other courses and members of the faculty.

METHODS

The University administration has prioritized the availability of courses that utilize distance learning techniques. Use of technology in on-campus classes is encouraged. The College of Pharmacy faculty had indicated their interest in pursuing using technology in coursework but only a few faculty had begun to experiment in this area. One of the authors had recently been assigned the administrative task of managing the computer center as well as the task of developing and implementing an information technology unit. Since that individual had limited

experience in using technology in the classroom, it was decided that she would incorporate online learning in her course in order to develop a template for other faculty use.

COURSE DESCRIPTION

PMPR 365: Nonprescription Drugs and Herbal Medicinals (OTC) is an elective course in an entry-level (2-4) Doctor of Pharmacy curriculum. Students enrolled in the course are comprised of second and third year professional students. Although it is currently an elective, most students take the course. In Spring 2000, this course will become a required course in the curriculum.

The OTC course is a traditional lecture based course. Students are required to attend three 50-minute lectures per week throughout the semester. Weekly quizzes are administered worth 50 percent of the final grade. In addition, students take two hourly exams which comprise the other 50 percent of their grade.

In order to evaluate whether certain forms of computer technology could enhance learning and increase student satisfaction, the decision was made to teach this course in two different ways. During the first half of the semester, the instructor utilized web-based lecture notes with hyperlinks and graphics, practice quizzes and conferencing software in addition to a print-based syllabus, handouts and classroom lectures. There was no change in the number or kinds of topics that were discussed as compared to previous years the course was taught. All of the topics covered during the section using technology were enhanced with similar features. During this section, students were also required to take portions of the weekly quizzes online using the conferencing software. The second half of the semester, the course was taught in a traditional manner using only print-based handouts and lectures and served as a control. During Spring 1998, there were 95 students enrolled in the course. Students were informed on the first day of class that the course would require them to use the internet and conferencing software to complete certain assignments. Students have a 10-day period in which they can drop a class. Two students elected to drop the course for unknown reasons leaving 93 students enrolled.

PROJECT OBJECTIVES

Before moving any course to an online format, faculty must consider the purpose of changing format. Will the change enhance student learning and better meet student needs? Course goals and objectives for the use of technology must be determined before any online material is developed. The objectives for using technology in our course included:

- providing students with supplemental online lecture notes including text and images that could be studied at any time;
- providing a mechanism for students to explore course subject matter using pertinent web sites;
- encouraging students to utilize the practice quizzes to assess their knowledge of a topic;
- providing asynchronous access to course faculty via the use of conferencing; and
- evaluating student outcomes and satisfaction.

By providing students with anytime, anywhere access to course material via technology, it was anticipated that student learning would be enhanced.

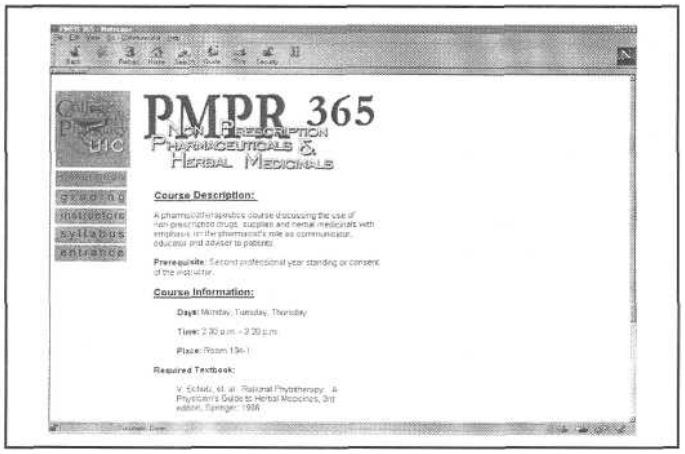

Fig. 1. Course homepage.

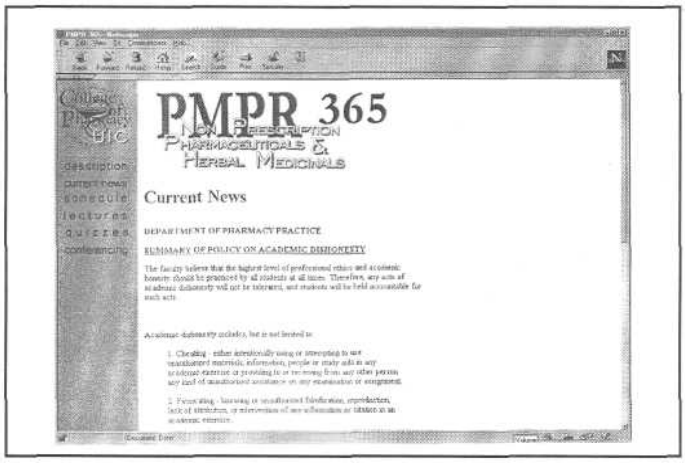

Fig. 2. Homepage after password protection.

WEBSITE DESCRIPTION

The website for the course was based on a template that was developed by the College's Office of Academic Affairs for online courses. The template can be used in various web design software packages such as FrontPage 98 or 2000[1] or the course material can be coded using HTML (Hypertext Markup Language) and inserted into the template.

Design. The online course is designed using frames (frames divide a browser's window into separate areas, each of which can display a separate, scrollable page). A left-hand navigation frame is always present regardless of which page the student is looking at within the course site. This allows the student the ability to easily navigate throughout the various areas of the course website. Since students at this institution have not had much exposure to online courses, navigational ease of the website was an important consideration. Figure 1 illustrates the course homepage with a navigational frame on the left.

Once the students access the course homepage which is linked to the College of Pharmacy homepage, they have a variety of options. From the initial screen, the student is able to access the description of the course, grading policies for the course, a list of instructors, and the syllabus which lists the topics that are covered during the semester. To access any other

[1]FrontPage 98/2000, Microsoft Corporation, http://www.microsoft.com.frontpage/

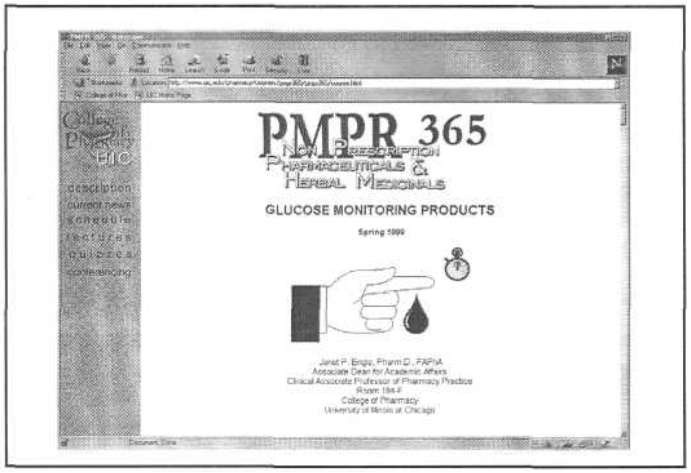

Fig. 3. Online lecture notes.

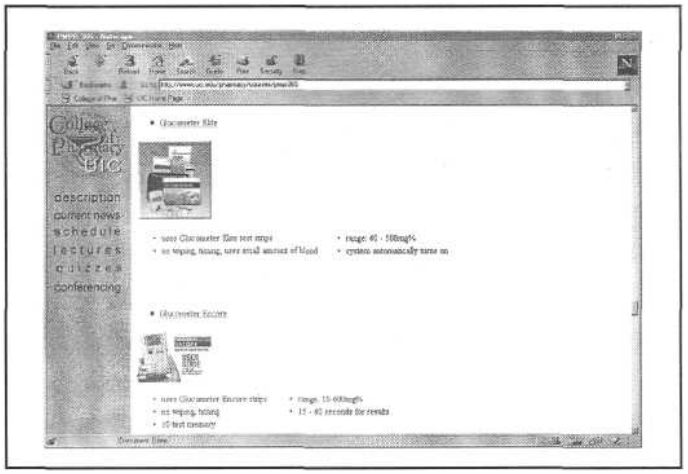

Fig. 4. Graphics and links contained in online lecture notes.

information the student must click on "entrance". The student will then be required to enter a login ID and a password. The course is password protected for two reasons. First, in order to receive permission to use certain copyrighted figures, access to the course had to be limited to students enrolled in the course. Second, password protection prohibits consumers from accessing the pages and possibly misinterpreting some of the information presented regarding nonprescription medications.

After the student has successfully entered the login ID and password, additional navigational tools becomes available to them (see Figure 2). Besides accessing the aforementioned information, students can also now access current news about the course, online lecture notes, practice quizzes and conferencing.

ONLINE COURSE ELEMENTS

Current News. This section of the course allows the instructor to post information regarding course policies, changes in schedule, etc. Students are told that they are responsible for frequently checking this section of the website. Most announcements posted to this section are also repeated during the class period.

Schedule. This section of the course website lists the dates that the course meets and the topics to be covered during the class period. In addition, the instructors for the topic are listed in this section as well as the quiz and exam schedule. All of the lecture topics in this section that are available online are hyperlinked to the web-based lectures notes pertinent to that topic. In addition, the instructors' names are linked to email addresses so a student can easily contact a faculty member.

Lectures. When students click on the lecture section, a hyperlinked list of all of the topics available online appear. The student can then choose the topic of his/her choice, click on it and the online notes will appear on the screen (see Figure 3). While the online notes are similar to handouts that are distributed in class, several features have been added to enhance student learning. Pictures of many of the products that are discussed or passed around in class are provided in the online notes (Figure 4). In addition, hyperlinks have been added to allow the student to learn more about a particular topic as well as to familiarize the student with useful web sites. Slides shown in class are also available online in this section. Additional topics are covered in the online notes. Students are sometimes asked to complete assignments based on the additional material such as pictures,

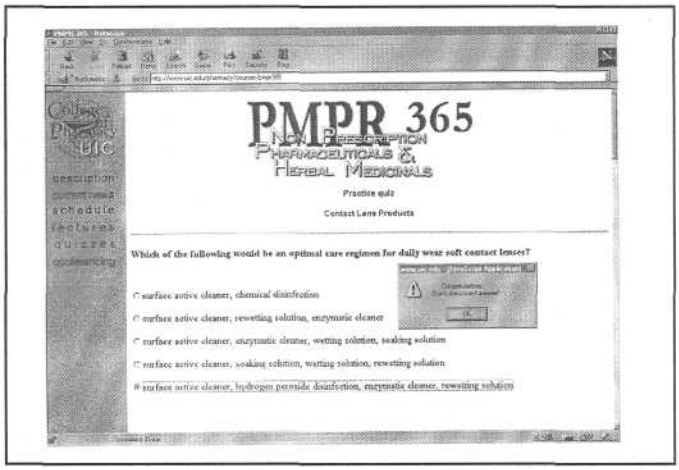

Fig. 5. Practice quiz question.

cases or websites provided in the online notes. As the online version of the course continues to evolve, additional modifications will be made to the online notes to increase interactivity between the student and the material presented.

Practice Quizzes. For each topic covered in the online portion of the course, multiple choice practice quizzes are made available for the student to assess their knowledge. Using javascript (programming language), the quiz pages were coded such that the student will be told whether the response is correct or incorrect when they click on it. In future versions of the course, an explanation will be added to each answer explaining why it is right or wrong. Figure 5 shows an example of one of the practice quiz questions.

Conferencing. An important part of this online course is the conferencing feature. Conferencing is a collection of messages, attached files, and graphics that are posted by students and faculty participating in the course. Conferencing software allows the course coordinator to set up various "conferences" or topics where students can post their questions, comments or assignments. Conferencing can be done synchronously (in real time via live chat when the instructors and students are online at the same time) or asynchronously (learners and faculty are not online at the same time but rather when it is convenient). Asynchronous interactions may result in delayed feedback although the course instructor made every effort to respond to postings within 24 hours.

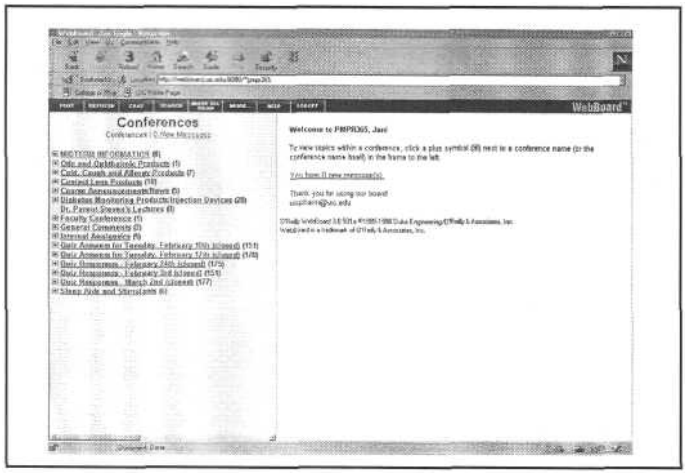

Fig. 6. WebBoard conferencing screen.

Students were asked to submit graded assignments via asynchronous conferencing. The conferencing software chosen for this course was WebBoard[2]. WebBoard is internet based and only requires a browser such as Netscape or Internet Explorer that is javascript and cookie enabled (these settings can be activated within the browser) to access it. Other software programs were considered but many of these require the user to download a software client. Due to the experimental nature of this course and our students' lack of experience, it was decided to use a conferencing product that did not require special software. In order to access the conference, the student must enter his or her netid (assigned by the university) and a password. All postings made by the student automatically carried the student's name, the time and the date.

The conferencing software was used in the following way. A separate conference was established for each lecture topic (see Figure 6). Every Tuesday, the instructor would post a case or series of questions on the topic being covered. The students were then given until 6AM on the following Sunday to post their answers to the conference. Before the assignment deadline, the conference is set up as a moderated conference meaning that only the instructor can see the student's answer. This hinders students from reading responses from classmates who post early in the week and using their answers as a template for their own. After the deadline has passed, the instructor adds comments to each answer submitted by the student. The students' answers and the instructor's comments are then made available in WebBoard so that the entire class can review them. Each assignment is worth 2-3 points towards that week's "quiz" grade. While each student was asked to post their own response and to work individually, the instructor had no way to verify that the student didn't give their netid and password to somebody else or that the students were working alone. As such, the point value for these assignments was kept low. Students were also assessed in a proctored environment with pen and paper quizzes and exams.

Initially, the students only used the conferencing feature of the course to do assignments. After 3-4 weeks, many of the students began to spontaneously use conferencing to communicate with the instructor and other classmates. This included posting interesting web sites related to the topics we were discussing and posting interesting patient cases they encountered in their part-time jobs in pharmacies.

Conferencing was the most interactive portion of the online course. The software allowed the instructor to post pictures and active links to web sites which enhanced the assignments students were asked to complete.

OUTCOMES AND LESSONS LEARNED

The project was assessed using a survey instrument. Survey questions were adapted from the American Association of Higher Education Flashlight Project3 Questions were also adapted from the University of Illinois at Urbana-Champaign SCALE4 (Sloan Center For Asynchronous Learning Environments) assessment surveys.

Out of the 93 students enrolled in the course, 90 students responded to the survey. Survey results indicated that just over half of the students used the conferencing software for purposes other than answering required assignments. The majority of students (88 percent) found the conferencing software to be easy or somewhat easy to use. Most students (58 percent) used computers that were located on campus to access the course materials. Sixty-nine percent of students felt that their overall experience using computer conferencing was good while 28 percent of students were neutral and 3 percent felt that the experience was a waste of time. When the students were asked if they would take another course utilizing computer conferencing, 81 percent indicated that they would. Only 27 percent students felt that conferencing increased the amount of interaction with other students in the class. The rest of the students felt it had no effect. This may be due to the fact that not all students took advantage of the conferencing software other than to do assignments. Regarding interaction with the instructor, 38 percent students felt that their interactions increased. No students reported that their interaction with the instructor decreased. From the instructor's viewpoint, interaction with the students was much higher when using technology than in a traditional classroom. When students were asked if conferencing increased the quantity of their learning, 74 percent reported that their learning was increased or somewhat increased. No students reported that their learning was decreased. When students were asked if using conferencing to answer quiz questions helped them to learn the material more effectively than using a closed book quiz, 87 percent felt that conferencing was more effective. Four percent of the students disagreed and felt that closed book quizzes were better tools to learn material. Answers to the free response questions are listed in Table I.

Although implementation of the online portion of this course was challenging, the student responses indicated that they felt they learned more and they enjoyed the online enhancements to the course. Students became active learners and had more interaction with the course faculty and other students. Students reported that the course was more interesting and that the information presented was easier to visualize with the online format. Students commented that looking up web sites and links for quiz assignments helped them to learn more about each topic.

The online version of this course required a significant time commitment on the part of the faculty member. Besides the time necessary to design the website and place the information online (approximately 120 hours), many additional hours (approximately 10-15 hours/week in addition to regular class time) were needed to answer the increased load in email, posts to WebBoard, to grade the students' online assignments and to problem-solve technology related problems. Internet access was necessary to grade the assignments which created a minor barrier when the instructor was traveling or over weekends. An advantage to the online version was that the faculty

Table I. Responses to survey free response questions

Response	Number of students
List the three barriers to use of conferencing and web-based lecture notes	
Getting access to computers/connection with modem	48
No familiarity with computers/internet/other technical problems	9
Posting answers: no confirmation as answers are hidden until after the deadline(how do we know it went through)	9
Lack of time	9
Too many links to be following to reach the conferencing portion of the course	4
Too time consuming	2
Had trouble accessing the course with AOL	1
Prefer a due date of Sunday night rather than Sunday 6am	1
Too little time (5 days) to answer the questions	1
How did conferencing affect the way you learn in this course?	
Looking up websites and links for quizzes helped a lot and gave me more information	19
Makes the course more interesting	14
Makes the material easier to visualize and easier to remember	14
Interactive learning/need not memorize	6
More detailed answers made it easier to learn and I got more information	5
It works at you own pace	1
Online practice quizzes were helpful	1
Can get class notes from the web even if I miss a class	1
How would you improve the use of computer conferencing in this course?	
Make the assignments worth more points	2
Add more practice quiz questions	4
Make our grades available online	1
Make the groups teach each other	1
Get rid of the frames on the webpages	1
The page is crowded and difficult to read	1
Delete old quiz questions after one week	1
Other comments?	
Very innovative	4
Start giving us homework assignements using conferencing - i.e. search the web for some OTC product	2
Reserve the student computer lounge for a specific period of time	2
I like having access to sample quiz questions	1
Can we have access to the course after the semester is over? Good reference	1
Spend more time in class teaching us how to search the internet	1
Give us a project to do. We could work with local pharmacists and give them useful information, too.	1
Liked the professors' enthusiasm and willingness to work with students	1

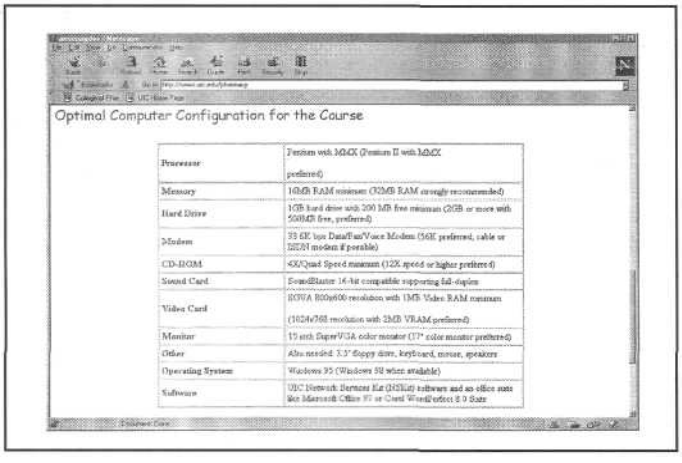

Fig. 7. Recommended computer configuration.

was able to address different learning styles via the use of graphics, discussion groups, and cases.

In the future, powerpoint slides with audio narration and a section of streaming video clips will be added to enhance the website. These tools will allow the instructor to show examples of items such as patient interviews, patient education tools, and patient assessment examples in more detail than can be reviewed in class.

Some barriers that were encountered in the first offering of the course online included student lack of access to computers. Although the College does have a computer lounge for student use, many times other students were using the computers for other projects resulting in long waiting times. Some students and the course co-coordinator did not have JAVA enabled browsers which created problems accessing the course material. Future offerings of the course will include a recommended computer configuration for the course (See Figure 7). Finally, if students accessed the course materials using an Internet Service Provider (ISP) from an off campus site, they were denied access to certain campus resources (library resources) as a campus IP address is necessary to access those resources. The campus has developed a proxy server that students can use that assigns a campus IP address to the student using an ISP to avoid this problem in the future.

CONCLUSION

While most of the features of the course will continue to be used, changes are being developed for the next offering of the course. Additional interactive practice cases where students will have the opportunity to problem solve and interact with

the concepts presented in the case will be available for student use. Video clips of patient interactions will be included in the next version of the course. In addition, students will be asked to do more assignments using the computer including writing assignments.

Finally, barriers that were noted by the students will be addressed. Additional computers have been ordered for the student computer lounge. Times will be reserved each week for students enrolled in the class to have sole access to most of the computers in the student computer lounge. Better documentation will be provided to the students that will give them instructions for downloading recent versions of browsers as well as instructions regarding cookie enabling, utilizing the campus proxy server, etc.

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