

2006-1508: WEBCT – A POWERFUL WEB-ENHANCED INSTRUCTION TOOL FOR ENGINEERING TECHNOLOGY COURSES

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WebCT – A Powerful Web-Enhanced Instruction Tool for Engineering Technology Courses

Abstract:

We started using web-enhanced instruction in Engineering Technology (ET) courses in 2000 when BlackBoard – CourseInfo (also called CourseInfo for simplicity) was made available. It was a very user friendly web tool that both instructor and students could learn quickly. In 2003 our university decided to adopt WebCT for its compatibility with the existing Student Information System (SIS). Although it took longer to learn different tools and the process was very involved, we soon found out that WebCT is more powerful than CourseInfo. The author is using WebCT in several ET courses including Engineering Fundamentals, 2-D CADD, 3-D CADD, Statics, Dynamics, Strength of Materials, Thermodynamics, Fluid Power, and Industrial Safety. WebCT's excellent file management system is very helpful in the CADD classes particularly when students are required to submit several files for each project. The files are grouped under each student's ID and zipped so that the instructor needs to download only one file and unzip it. This feature was not available on CourseInfo. The digital drop box lets students submit their assignment, tests, term papers and project reports electronically while eliminating the need for hard copies, floppy/zip disks or CD's. The instructor can edit the drop box settings such as deadline, multiple submissions, late submission and release of grades etc. When multiple submissions are allowed, students can submit the updated files only after retrieving the old files so that the instructor need not deal with dozens of unnecessary files whereas this was a major problem we faced while using CourseInfo. Built-in tools such as the organizer page, single page, and *url* page can be effectively used to customize and present the course information neatly on the WebCT site. Posting and editing of announcements, assignments and projects, and keys to test problems has been made easy on WebCT. There are several communication tools for the students to interact with the instructor and among themselves. The e-mail feature can be used to communicate with a particular student, a group or the entire class. Currently on WebCT, there is no limit on the disk space or file size to be uploaded and therefore, instructional *mpeg* videos, PowerPoint presentations and slide shows are made available to the students. We could not do this on CourseInfo for reasons unknown.

Introduction:

Web-based and web-enhanced instruction^{1,2} has become a very powerful tool and many instructors and students have embraced it. In the spring of 2000, our university adopted Blackboard – CourseInfo (also called CourseInfo for simplicity) for web-based and web-enhanced instruction. The author attended workshops on CourseInfo and learned several tools and techniques. He developed course sites for several ET courses including Dynamics,³ Fluid Power,⁴ CADD,⁵ Statics, Strength of Materials, and Thermodynamics on CourseInfo. In reference 5, he has discussed the advantages and limitations of web-enhanced instruction in Engineering Technology citing examples from Fluid Power which is a lecture/lab course. He has discussed the advantages of adopting CourseInfo for CADD courses which are essentially lab courses.

CourseInfo:

CourseInfo offered many new features including unlimited disk space and easy access to its main page from our university's homepage. Students are given an e-mail account as soon as they are enrolled at our university. Instructor, students and guests (with some limitations) could access the Courseinfo site using their e-mail user name and password and select any course in which they have enrolled. The *Announcements* page for Dynamics is shown in Fig. 1. Announcements were displayed automatically with the option of viewing all of them or those posted in the previous two weeks or four weeks. Links were provided on the left side of this page to other sites such as *Course Information*, *Staff Information*, *Course Documents*, *Assignments*, *Communication*, *External Links*, and *Student Tools*. Instructors and students could also access *Resources*, *Course Map*, and *My Blackboard* sites. There was also a search option provided on this page. The *Control Panel* (Fig. 2) allowed the course instructor to post or modify announcements, course material including syllabi, contest guidelines, homework, term projects and solution to test/quiz problems.

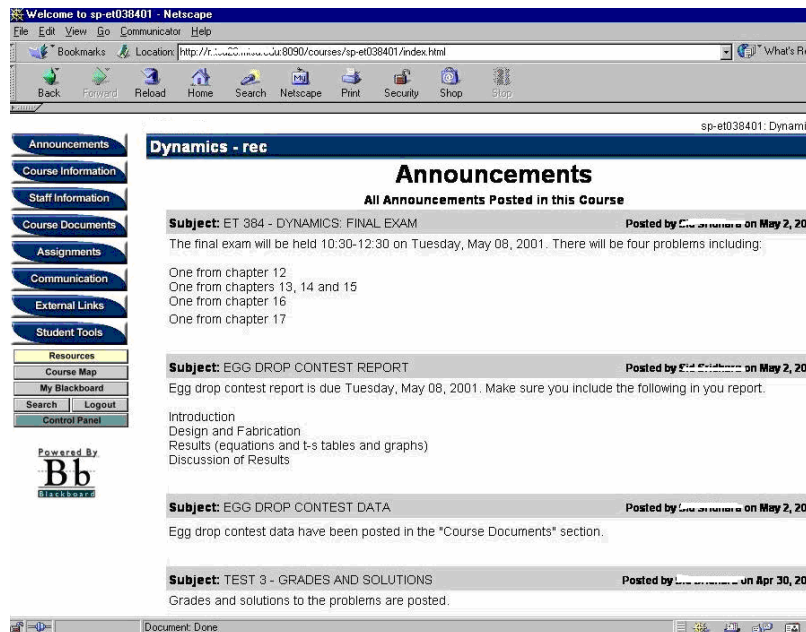


Fig. 1. BlackBoard – CoursInfo Announcements Page

WebCT:

In 2003 WebCT was adopted for its advanced capabilities as well as compatibility with the existing Student Information System (SIS) software. Although it took longer to learn different tools and the process was very involved, we soon found out that WebCT is much more powerful than CourseInfo and offers a variety of teaching/learning tools for both instructor and students. The author developed sites on WebCT for Engineering Fundamentals⁶ and all ET courses mentioned before. Course materials such as syllabus, staff information and homework problems were posted on these sites at the beginning of the semester. Announcements regarding test dates, take-home exam due dates, keys to test problems, assignments, and contest/project information were posted as the semester progressed. Students could drop their assignments,

projects and take-home tests in the digital drop box and the instructor could download and grade them. The electronic mail feature let students ask questions and helped the instructor answer their questions as well as send notifications and reminders to all or selected students. Grades were posted online and the students checked their grades at their convenience either at home, during work or on campus. Video files of the egg drop contest conducted previously for the Dynamics students and at other events were uploaded to the WebCT site for the benefit of all ET students. In the next few sections we discuss the special capabilities of WebCT in comparison with those of the 2002 version of CourseInfo.

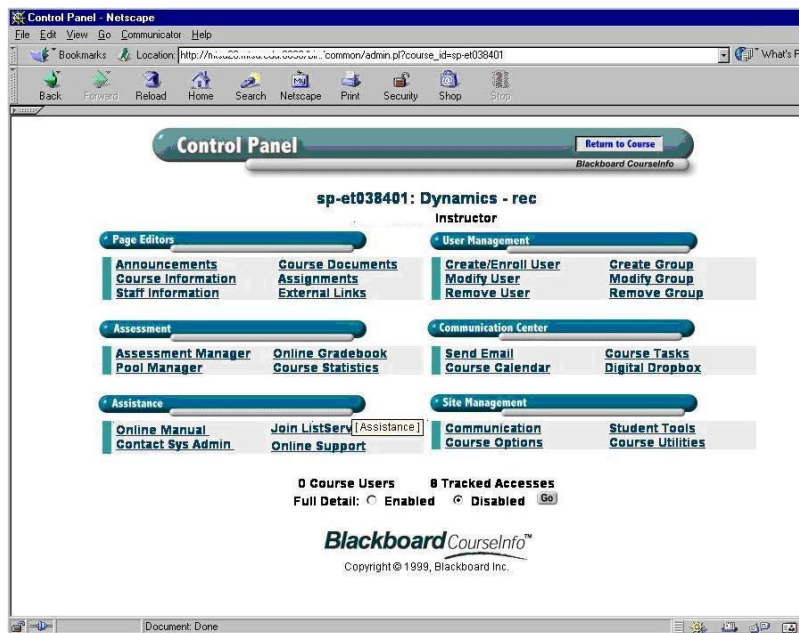


Fig. 2. BlackBoard – CoursInfo Control Panel

Page Tools:

WebCT has several built-in page tools under organization pages such as Homepage, Course Content, and Discussions as seen on the left and at the bottom of Fig. 3. Under each organization page, there are several single pages or tools. CourseInfo also had pages such as Announcements, Course Information, and Assignments as seen on the left of Fig 1. While these pages were preset and only files could be uploaded, WebCT allows instructor to add organization pages and single pages and edit them using the menu shown on the right side of Fig. 3. Comparing the WebCT control panel (Figs. 4 and 5) with the CourseInfo control panel (Fig. 2) we see there is more flexibility and freedom for the instructor to create and edit pages/tools. Also, there is a large number of standard tools such as course content tools, communication tools, evaluation tools and student tools. Instructors can use these tools by simply clicking and uploading appropriate files. The author created several organization pages for tests, assignments, contests, course documents, video and PowerPoint presentations, and test grades in his ET courses.

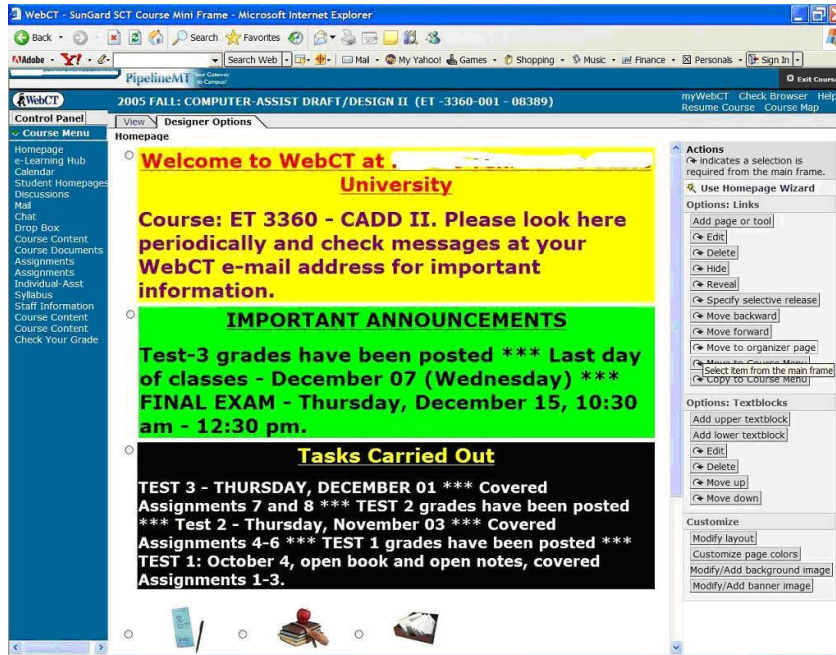


Fig. 3. A Typical WebCT Homepage

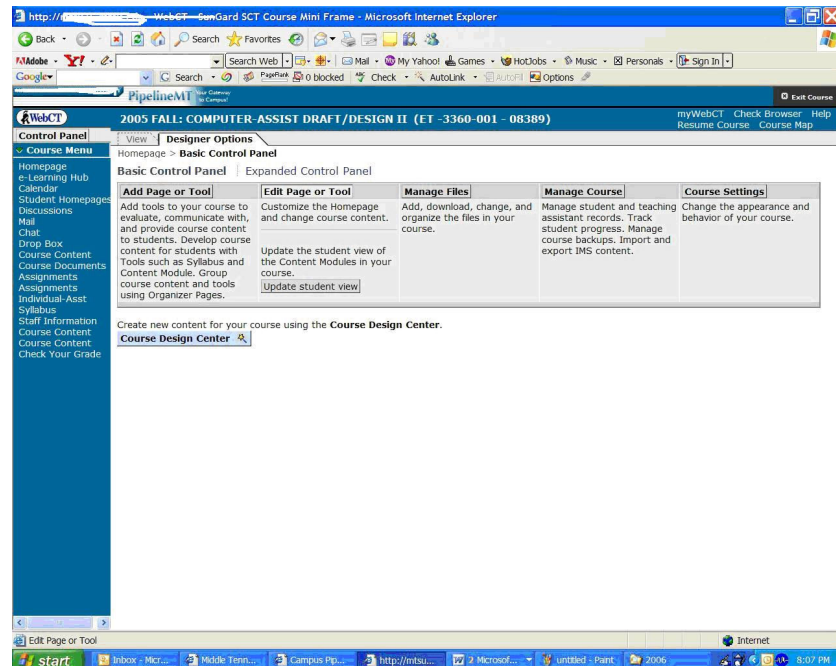


Fig. 4. WebCT Control Panel

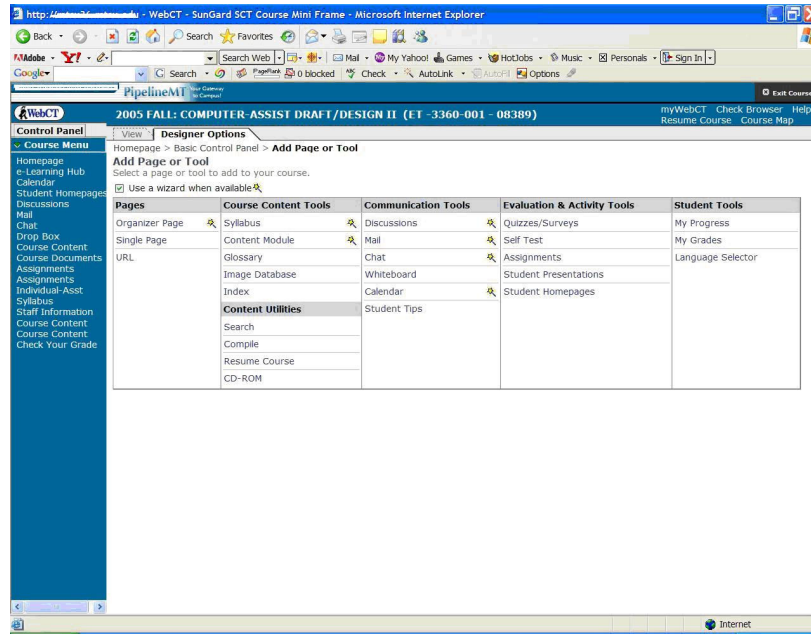


Fig. 5. WebCT's *Add Page or Tool* Site

E-mail Features:

The instructor can send e-mail messages to all or selected students using the WebCT's e-mail system. Students can communicate with the instructor and fellow students using this system without taking up the disk space on their regular e-mail account. These facilities were also available on CourseInfo but WebCT has additional features such as pasting student records, attaching files, and *html* and equation editors as shown in Fig. 6.

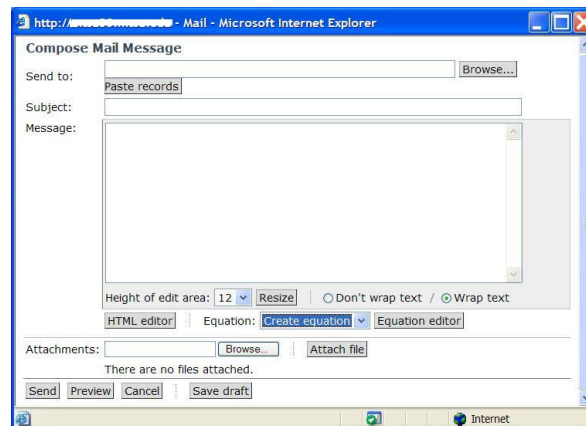


Fig. 6. WebCT's E-mail Features

Digital Drop Box:

The digital drop box lets the students submit their assignments, tests and project files electronically. The instructor can download these files at any workstation with an Internet access

and grade them. This facility is very useful especially in CADD classes and the instructor need not deal with floppy, zip, or compact disks. On WebCT a digital drop box is automatically created whenever a page or tool is created for assignments, tests, projects, etc. The instructor can set the opening and closing date/time for each drop box. CourseInfo also had digital drop boxes with these features and allowed multiple submissions before the due date. Typical CourseInfo and WebCT digital drop boxes showing student submissions can be found in Figs. 7⁵ and 8.

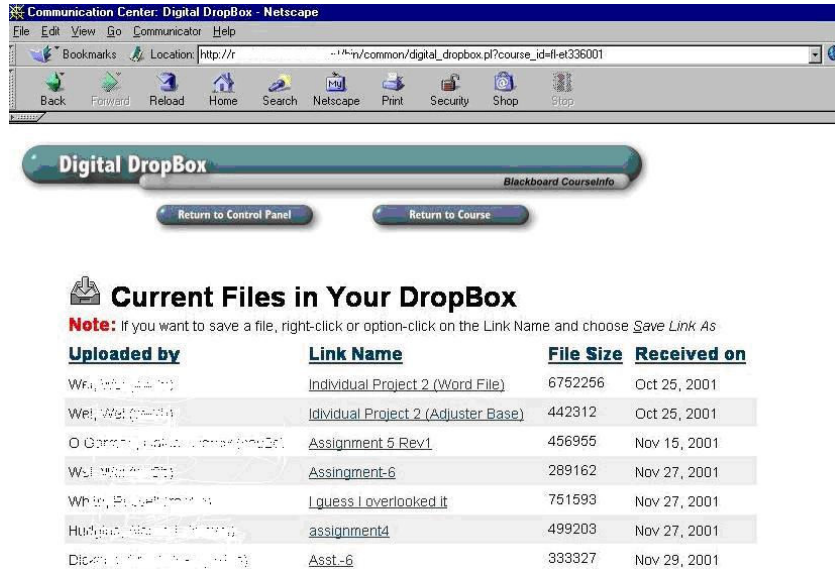


Fig. 7. CourseInfo Digital Drop Box

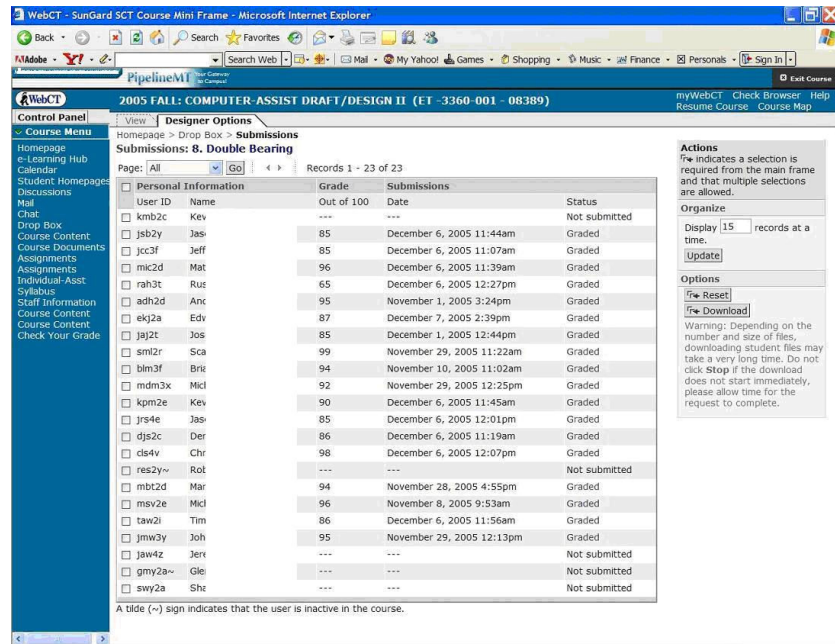


Fig. 8. WebCT Digital Drop Box

But WebCT gives additional controls for the instructor such as allowing late submissions, releasing of grades, and a textbox for posting instructions to drop files. It also has the e-mail notification options to the student sent by the system and/or the instructor when a file is submitted.

File Management:

CourseInfo displayed the drop box files in the order they were submitted listing the student's name and the file name along with other details (Fig. 7). Students could submit as many updated versions of their assignments as they wished before the due date. The instructor could download only one file at a time. In a CADD class of 25 students and an average of 5 submissions from each student for a given assignment, the instructor had to scroll up and down and browse through the long list of 125 files. He/she had to carefully locate the latest version for each student and download that file. If the students submitted the files with the same name such as Assignment 1 for example, then the instructor had to rename the file linking the student's name and the assignment number to prevent overwriting. Otherwise, the instructor had to create a folder for each student and download the file to that folder. The above was a typical scenario in a two-dimensional CADD class (ET 2310) where each student was required to submit one *dwg* (drawing) file and it took almost an hour to download the files correctly. We use AutoDesk Inventor in our three-dimensional modeling class where the students are required to submit several *ipt* (part) and *idw* (drawing layout) files in addition to the *iam* (assembly), *ipn* (presentation) and *avi* (video) files for a given assignment. One can only imagine how much time and effort would have been required if we had used CourseInfo for downloading the Inventor files.

2005 FALL: COMPUTER-ASSIST DRAFT/DESIGN II (ET -3360-001 - 08389)

Control Panel | Designer Options

Homepage > Drop Box > Submissions > Grade Assignment

Grade Assignment: 8. Double Bearing

Name: ...

Maximum grade: 100

Due date: December 8, 2005

Status: Submitted November 1, 2005 3:24pm

Student files: To view a file, click its filename.

Files	Modification date	Size
A.H 8 assembly.iam	November 1, 2005 3:21pm	168.5 KB
A.H 8 assembly View.idw	November 1, 2005 3:21pm	314.5 KB
A.H. 8 Bushing.ipt	November 1, 2005 3:21pm	152.0 KB
A.H. 8 Bushing view.idw	November 1, 2005 3:21pm	266.0 KB
A.H. 8 Nut.ipt	November 1, 2005 3:22pm	156.5 KB
A.H. 8 Nut View.idw	November 1, 2005 3:22pm	307.0 KB
A.H. 8 Washer.ipt	November 1, 2005 3:22pm	153.0 KB
A.H. 8 Washer Views.idw	November 1, 2005 3:22pm	265.5 KB
A.H. 8a.ipt	November 1, 2005 3:22pm	171.0 KB
A.H. 8a view.idw	November 1, 2005 3:22pm	271.0 KB
A.H. 8b.ipt	November 1, 2005 3:22pm	182.0 KB
A.H. 8b view.idw	November 1, 2005 3:23pm	289.5 KB
A.H. 8c.ipt	November 1, 2005 3:23pm	204.5 KB
A.H. 8c View.idw	November 1, 2005 3:23pm	283.5 KB
A.H. Bolt.ipt	November 1, 2005 3:24pm	172.0 KB
A.H. Bolt Views.idw	November 1, 2005 3:24pm	262.5 KB

Graded files: None
To upload the graded files for this student, click Upload file.
[Upload file](#) [Remove files](#)

Comments: Graded.

*Grade: 95 out of 100

Fig. 9. WebCT Digital Drop Box Details for a Given Student

WebCT has an excellent file management system for the digital drop box and submitted files can be downloaded easily. The digital drop box displays student *id* (e-mail user name) and name, date/time of submission and status (not graded, not submitted or graded) in the alphabetical order (Fig. 8). Only when a particular student's name is clicked, the number of files submitted by that student along with other details will be displayed (Fig. 9).

As multiple submissions are allowed students can submit revised versions of their files before the due date but only after retrieving the already uploaded files. This ensures that there is only one set of files exist in the drop box at any given time. Sometimes students with health or work related problems are allowed late submission. The instructor can open the drop box permitting the students to drop their assignment files. However, this will not let the others retrieve their submitted files and resubmit revised versions without the instructor clearing their existing files. This feature ensures fairness to all students and was not available on CourseInfo.

To download files, the instructor can select (for each assignment) all or certain student files by checking the appropriate boxes and click the *download* button. WebCT will save all selections into one zip file which can be saved to the hard drive or other media either renaming the file or using the default name. When this file is unzipped, automatically a folder is created using each student's e-mail user name and all those files submitted by him/her will be saved to the respective folder. The entire process takes about thirty seconds.

Large Video Files:

The author conducts the egg drop contest in Engineering Fundamentals and Dynamics. Video (MPEG) files of previous contests are uploaded to the WebCT site so that the students could view them at their convenience. There is no disk space limitation and we can easily upload 200-MB or larger files. Although there was no disk space limitation on CourseInfo the MPEG files could not be uploaded even after several hours.

Conclusions:

It has been the author's experience that WebCT is a much more powerful web-enhanced instruction tool than the 2002 version of CourseInfo. He has been using this site for all his Engineering Technology courses and finds it extremely useful in the three-dimensional modeling CADD class. WebCT has a more involved learning process than CourseInfo but is well worthy of the time and effort spent.

The author would like to reiterate that CourseInfo was a very user friendly web tool. He used it from 1999 to 2003 which included the one year phase-out period and both CourseInfo and WebCT were available at our university during this time. The present-day version of CourseInfo is probably as good as or better than WebCT. The author is highly confident that engineering educators who read this article will not be unduly biased towards WebCT. They can, with their educational qualifications and teaching experience, make a well-informed decision. Besides, adopting a web tool such as CourseInfo or WebCT is decided at the university/college level with involvement from faculty, staff and administrators. An individual faculty member can choose a web tool of his/her choice if their university has sufficient resources to provide several such tools

simultaneously. We are a state university with an enrollment of over twenty two thousand students and do not have such a luxury.

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