

AC 2009-1001: TEACHING ENGINEERING TECHNOLOGY COURSES USING DESIRE2LEARN (D2L)

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Teaching Engineering Technology Courses Using Desire2Learn (D2L)

Abstract

In the last ten years the author has used course management software (CMS) such as CourseInfo (BlackBoard) and WebCT in several Engineering Technology (ET) courses. Due to the nature of our ET courses these software were adopted mainly for web-enhanced instruction. WebCT was a major improvement over CourseInfo as it offered several new and efficient tools for developing our ET course sites. The file management system was very useful particularly in our computer-assisted design/drafting (CADD) classes where it was necessary to download approximately a hundred student submissions (files) for each assignment. WebCT created a folder for each student and downloaded the part and drawing files to the appropriate folders.

In 2007 fall our board of regents decided to adopt Desire2Learn (D2L), a new CMS, for its improved features and better compatibility with the current student record management system. Many faculty members were hesitant to switch over to this software because of the learning process involved. But they readily adopted D2L after finding out about its new and better tools. Since 2008 spring the author has developed course sites for CADD (solid modeling), Statics, Dynamics, Strength of Materials, Vibration, Thermodynamics, and Fluid Power. It is very easy to create tools and pages, and edit and reorder them on D2L. There are numerous tools available under the navigation toolbar which can be loaded as necessary and avoid overcrowding of the course site. Assignments, tests and other course-related materials posted on the D2L can be edited online if they are saved in the *html* format. This feature provides a greater flexibility for the instructor by eliminating the dependency on a particular PC or any portable media device. D2L's better file management system allows students to resubmit files without the need for retrieving the old files. The system downloads student submissions with the student's full name along with assignment information and this feature is very helpful to the instructor while grading. D2L allows the instructors to easily change their role to a student and see the posted course information as a student without registering under some fictitious name. The e-mail system is good but has some drawbacks. All messages sent by an instructor will be delivered to the same inbox. Students taking more than one course under the same instructor cannot easily relate the messages to the courses. This requires the instructor to mention the course name/number for each message that is sent to the students. The grading tool is very efficient because it allows posting of grades in different formats such as letter grades, points or percentage. It also calculates the adjusted and final grades. In conclusion we feel our university has made a better choice by adopting D2L for our web-enhanced and web-based instruction. Although the author uses D2L for web-enhanced instruction some instructors in our department use it for web-based instruction.

Introduction:

In the last ten years there has been tremendous improvement in the areas of web-based and web-enhanced instruction. More and more people are teaching Engineering Technology (ET) courses using these methods. Engineering educators are using commercially available course management software (CMS) such as BlackBoard, WebCT and Desire2Learn (D2L) or develop their course sites using web design software such as FrontPage or DreamWeaver. The author has adopted web-enhanced instruction in ET courses such as statics, dynamics, thermodynamics, strength of materials, vibration, design of machine elements and fluid power due to the math and/or lab component involved in these courses. In the last ten years he has taught the above mentioned courses using CourseInfo (BlackBoard)^{1,2,3} and WebCT.^{4,5} WebCT was a major improvement over CourseInfo as it offered several new and efficient tools for developing our ET course sites. The file management system was very useful particularly in our computer-assisted design/drafting (CADD) classes where it was necessary to download approximately a hundred student submissions (files) for each assignment. Other instructors in our ET department are teaching engineering economy, operations management and industrial safety as web-based courses.

Ssemakula⁶ has studied the learning effectiveness of online courses by offering engineering economy online and as a traditional course simultaneously as a parallel section. The course materials were posted on a website. This study indicates that the online course was as effective as the traditional course. Kaw and Hess⁷ have studied the effectiveness of four different instructional methods such as traditional lecture, web-enhanced lecture, web-based self-study, and combined web-based self-study & classroom to teach a course in numerical methods. They have used the web-based instructional modules developed at their institution. Based on the two assessment tools, student performance on a multiple-choice examination, and a student satisfaction survey, they have found out that web-based modules for instruction used in conjunction with a face-to-face lecture delivery mode resulted in higher levels of student performance and satisfaction. Fidan, et al⁸ have restructured their rapid prototyping class and taught it as a web-enhanced course. Their students were able to prototype their parts through a remotely accessible rapid prototyping laboratory. The students were able to interact with students in Western Nevada College and prototype joint project parts. The authors of Reference 8 have used D2L as their course management software and briefly described the usefulness of a few tools of D2L. The summary of Reference 8 indicates that that they were able to convert an on-ground rapid prototyping laboratory into a remotely accessible format and these remote laboratories have various advantages in cost, time, and maintenance. Bury, et al⁹ have discussed their ongoing development of a web-based baccalaureate degree program in Architectural Engineering Technology. The curriculum has been designed to operate in their own interactive web-based environment for submission of coursework. Aghayere¹⁰ has developed a web-based distance learning course in structural design. They have used the course management software Prometheus to create the e-learning environment. The software's a few features such as an integrated e-mail list, discussion boards, live chat rooms and an online grade book are briefly discussed in this paper. In conclusion the author of Reference 10 states that based on the students' comments, the structural analysis course notes developed for this online course has been proven to be very successful in aiding student learning of the course material. Sridhara has discussed the various features of BlackBoard (CourseInfo) and WebCT in References 3 and 5.

Salient Features of D2L

In 2007 fall our board of regents decided to adopt Desire2Learn (D2L), a new CMS, for its improved features and better compatibility with the current student record management system. Many of our faculty members were hesitant to switch over to this software because we were used to WebCT for four years and did not want to go the learning process once again. However, all of us rapidly adopted D2L because of its many useful tools. The D2L access requires username and password entry and after login the faculty/students see the *My Home* page which lists the courses offered by the instructor and those taken by the students.

Course Home

After clicking a particular course one will see the course homepage where the instructors can post welcome messages and contact information. Other items such as test announcements, due date reminders and industrial visit details can be posted on this page (Fig. 1). Starting and ending dates can be set for these announcements and avoid overcrowding of the homepage.

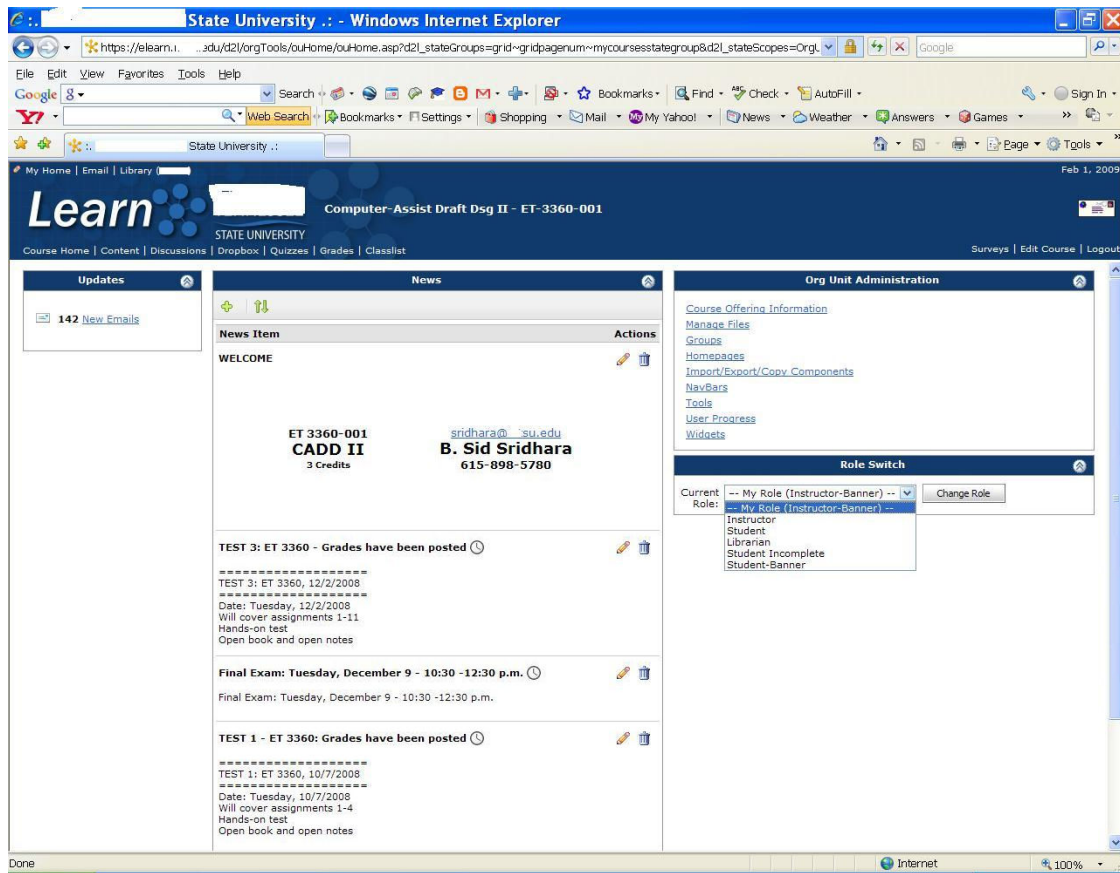


Fig.1. Course homepage

Organization menus such as course offering information, manage files, import/export/copy components, navigation bars, tools, and user progress can be accessed from this page.

Role Switch

This very useful tool can be accessed from the course homepage that will allow the instructor to change his/her role to *student*, *librarian*, and *student incomplete* (Fig. 2). This will allow the instructor to view the course material as a student and edit the material as necessary and make sure the display, links, etc work properly.

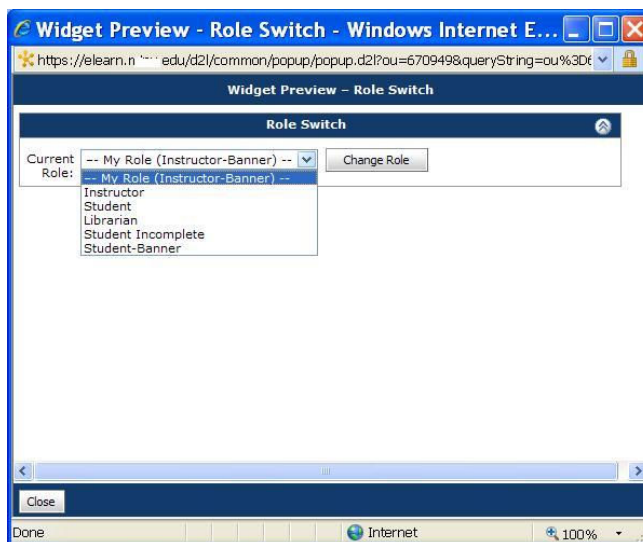


Fig. 2. Role Switch

File Management

This tool will allow us to create new folders, upload files, create topics, and zip and download files including student submissions. When an existing file on D2L is overwritten by a modified one the updating is automatically done at the corresponding link on the *Content* page and the instructor need not put in any additional effort. If, for example, the course syllabus file is overwritten by a modified one, then the student will be able to access the modified file by clicking the syllabus link

Import/Export/Copy Components

This is probably the best feature of D2L because it allows the instructor to copy components from other D2L course (sites) the instructor taught in the previous four semesters. Sridhara teaches most prerequisite ET courses in the fall and sequential courses in the spring/fall depending on the course level. It takes less than two minutes to copy all components from a previously taught course even if it has a large number of files including Word, JPEG, PPT, Excel and PDF formats.

Navigation Bar

This menu offers approximately forty different tools including *content*, *discussions*, *dropbox*, *grades*, *classlist*, *e-mail*, *checklist*, *survey* and *edit course*. D2L will not load all these

tools by default and allows the instructor to select the tools of his/her choice. This menu also allows us to choose a particular tool display location such as top left, bottom right, etc.

User Progress

This tool will allow the instructor to monitor the progress of selected or all students. It is very useful particularly when we receive requests from the athletic department to monitor the progress of certain athletes who are taking our ET classes.

Content

This is the main section of D2L where instructor can post course materials such as syllabus, homework problems, assignments, solution to test problems, project instructions, useful web links and other course related documents (Fig. 3). The instructor can use the *Manage Content* tool to create new modules and single topic (page) or multiple topics, and edit the

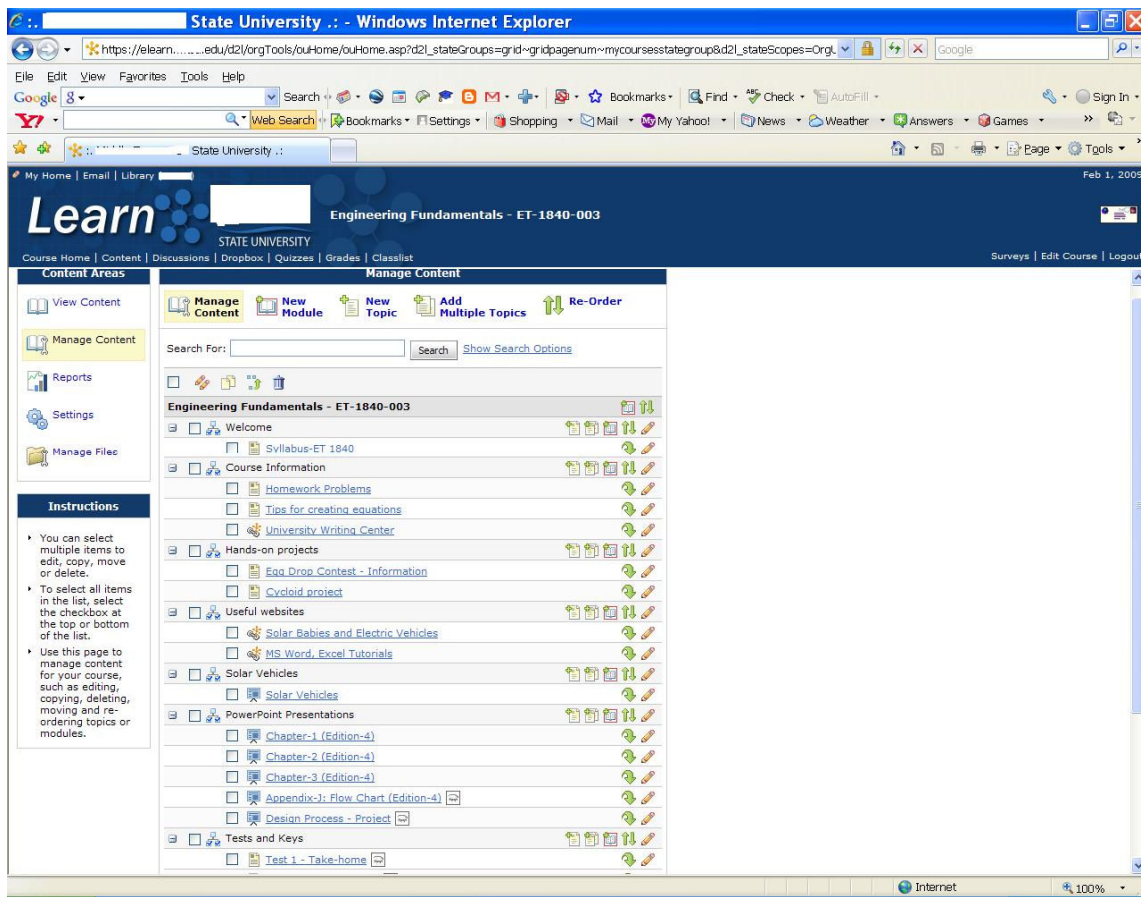


Fig. 3. Content Center

existing modules and topics, and reorder all content items. We can also view just the content, change the content settings and manage files from this site. The instructor can also view the report generated by D2L on the student usage of each item posted on the content page.

Drop Box

This is an electronic drop box into which the students can drop their assignments in the Word, Excel, *ppt*, *dwg*, *ipt*, and other formats. The instructor can download all submissions for a particular assignment, test or project as zip file. The zip file can be unzipped and to view or grade individual files. This feature is very useful in the CADD classes because nearly a hundred files are submitted for parts, assemblies, presentations, drawing layouts and animations for each assignment. After unzipping files are automatically saved with the student's full name and the assignment number/title. This feature is very helpful in a class where there are several students with the same last name.

Grades

The grading tool is very efficient and allows posting of grades in different formats such as letter grades, points or percentage. It also calculates the adjusted and final grades which can be exported and opened using MS Excel.

E-mail

The e-mail is system operates within D2L lets instructor attach files. This tool is particularly useful to let the students know about a test date, posting of grades or project/assignment due date. All messages sent by an instructor will be delivered to the same inbox. Students taking more than one course under the same instructor cannot easily relate the messages to the courses. This requires the instructor to mention the course name/number for each message that is sent to the students.

Conclusions

Currently we are using D2L and the objective of this paper is to discuss the usefulness of its tools in teaching our ET courses. We are not comparing different CMS because we do not have access to the latest version of all software. Therefore, it is not possible to recommend any particular CMS. However, one can review the references listed at the end of this paper and get an idea about the usefulness of different software. They can, with their educational qualifications and teaching experience, make a well-informed decision. Adopting a CMS 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-four thousand students and do not have such a luxury.

It has been the author's experience that D2L is a powerful web-enhanced instruction tool. In the last two years he has been using this CMS for all his Engineering Technology courses and finds it extremely useful in all courses including the solid modeling CADD class. As mentioned before the e-mail communication within D2L has certain limitations and needs some improvement. Currently D2L does not have colorful screen menus and background as a default setting but with some time and effort one can import these from its library.

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