

A Template-based Approach to Online Content Delivery: An Alternative to Blackboard

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Abstract

As student access to computers and the Internet becomes more commonplace, professors have come to rely on a variety of tools to deliver course materials for both classroom-based and distance learning courses. Software products such as WebCT, Learning Space, and Blackboard are among the most popular. They all provide the instructor with an easy-to-use environment for delivering content and communicating with students. This paper gives a brief overview of these three products along with a detailed description of an HTML template approach as an alternative to the more costly software tools. Comparisons are made to Blackboard as a representative product based on seven criteria – general design, setup, delivery of materials, interaction, assessment, support and security, and site maintenance. Advantages and disadvantages are discussed.

Keywords: Content Delivery, Blackboard, e-Learning

Introduction

Of the 15.3 million college students in the United States, about 12.9 million have high-speed Internet access on campus. Besides high-speed connections in libraries, labs, and other facilities, nearly 67 percent of schools with broadband access extend this service to dorms (Berman, 2001). Professors are becoming increasingly more reliant on Web-based content delivery tools to support their classes. As of June 2000, more than 1,600 colleges, universities and K-12 schools had adopted software packages for course content delivery (Rodgers, 2000). Support can range from the posting of a syllabus to fully-integrated Web-delivered courses. Online courses use a variety of tools including discussion groups, chat rooms, online testing, and so forth. Advantages of Web-based delivery include location and time independence along with the ability to serve more students at a reduced cost (Goldberg, et.al., 1996). Furthermore, according to Rodgers (2000) "Students benefit when their teachers use Web-based communication. Different learning styles are accommodated through text, sound, images, and video. Students have a chance to share perspectives on course content, and communicating using the Web seems to promote a greater sense of equality. Students have 24-hour accessibility to course materials and resources. Their instructors tend to be more accessible in a greater variety of ways: office time, voice mail, email, chat, discussion board, and drop-box."

A number of options have emerged to support online content delivery including Serf TopClass, ClassNet and Web Course in a Box (Frederickson, 1999). Blackboard's Course Info, WebCT, and Learning Space

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(using Lotus Notes) are among the most popular, and are being used to support both the college classroom as well as corporate training facilities. This paper will provide a brief overview of these products, along with an alternative, HTML template-based implementation. The alternative will be compared to Blackboard as a representative tool. While many professors have built their own course

delivery Web-sites, they often involve significant Web-site development skills including knowledge of HTML and scripting (Frederickson, 1999). The approach presented here does require a basic familiarity with Web development, but relies heavily on pre-defined templates and freely available tools so that a person with limited technical skills can build and maintain a course site that provides much of the functionality of the more elaborate packaged products. No HTML or programming experience is required.

Web-based Course Delivery Products – a brief overview

The World Wide Web Course Tool (Web-CT) was developed by the University of British Columbia for course material presentation. It allows educators to create sophisticated WWW-based courses. The interface to create the course is entirely WWW-based which allows for platform independence. Web-CT is not an HTML editor and most people find a basic subset of HTML easy to learn. The author has the option of using an HTML editor or simply using plain text for course notes.

Web-CT uses a Web browser as its GUI for building Web-based courses. None of the software is installed on the users' machines and each course runs from a server.

Servers are maintained centrally in an organization like a university and used by members of that organization.

The software product offers most tools that would be needed in a course. The student can go through the course in linear fashion or can deviate from the path whenever he or she desires. The course has the usual material like the syllabus and readings plus provides a glossary of the site, external search tools, bulletin board, chat facility, timed quizzes and exams, student evaluation site and basic administration tools for the site.

WebCT is a full service program. It has discussion groups, in-house email, file sharing, student grading, course content searches, student assessment, course use tracking by the instructor, external links to references and is multimedia capable. It also has a searchable image feature, a student self-evaluation component, a student presentation area, note-taking page annotation abilities, and a team grouping ability. An attractive and personalized feature that WebCT has is its "tip of the day" which is presented whenever the student enters the system.

Learning Space was developed by Lotus Development Corporation and was designed to add to Lotus' efforts in the knowledge management area. It has strong collaboration and messaging capabilities which are critical in virtual learning environments. Learning Space has built in templates for course information. It has a scheduling database that links students with their assignments; a section for readings; a section for assessments which can have timed and dated examinations; a whiteboard; and team capabilities. It also maintains the students grades and allows the student to perform self-assessments and individual profiles. Students can also create portfolios to store completed assignments. It allows scheduling of events by lessons or by date and has a Help feature that is very context-sensitive.

Since Learning Space is owned by Lotus Notes, all of Notes' interfaces and features work in Learning Space. The instructor can spell check, change fonts, add color and bring in attachments with the same menu items and icons familiar with Lotus Notes. Overall the interface is very attractive.

It runs on a Notes/Domino server and is easily accessed from a Notes client or from a web browser. The Learning Space Forum is divided into four learning centers: Schedule which provides students with their assignments, materials and assessments; Media Center which allows immediate and searchable access to all materials for the course; CourseRoom which hosts collaborative interchanges between student groups and or students and instructors; and, the Profiles which helps students and instructors get to know each other and to help form teams. Self-paced courses can be highly structured with controlled paths and prerequisite assessments, and can provide flexible learner access designed to suit individual student leaning needs.

Learning Space combines the self-paced learning capabilities of the course module with the extensive collaborative learning capabilities that enable learner and instructors to work and learn together using discussion databases or real-time virtual classrooms. This capability makes it possible to bring together groups located throughout the world and enables them to learn together. Notes is known for its collaborative capabilities and security, and Learning Space benefits from this knowledge.

Overall Learning Space is easy to use and Lotus Learning Space 5.0 does not require a Domino environment as previous versions.

Blackboard (Bb) Blackboard Inc. offers a complete suite of enterprise software products and services that can power a total "e-Education Infrastructure" for schools, colleges, universities and other education providers. Blackboard 5 is a web-based course delivery system. It can be used to offer complete distance free courses or it can be used to support traditional classroom based courses. It can be locally installed or hosted via Blackboard ASP solutions.

Blackboard 5 includes four primary areas of functionality: Content Management, Communication, Assessment and Control. The Content Management area includes personal information about students and instructors, course elements and documents, academic Web resources and publisher-provided digital material. The Communication area includes asynchronous and synchronous collaboration tools. The Assessments area includes test and quiz capabilities and a grade book. The Control area includes instructor management utilities. The following section will further detail the capabilities of Blackboard.

An HTML Template-based Approach

The following sections will describe an alternative method for online course delivery. We have used both Blackboard and Learning Space, as well as a standard Linux server to deliver course materials. While all of the delivery packages have strengths and weaknesses, overall, they provide similar functionality. Comparisons will be made to Blackboard based on the following criteria:

- General design;
- Installation and setup;
- Delivery of course materials;
- Interaction (contact, collaboration, etc.);
- Assessment (testing, gradebook, etc.);
- Security, support and administration;
- Site maintenance

General Design

As with Blackboard, HTML frames are used to present an interface with links to various functions on the left and content on the right (see Figure 1). Since Blackboard is the default delivery tool on our campus, attempts were made to match operational functions in order to minimize confusion for students who use both tools. All Web pages and images used to support a course are stored in a directory on a Linux Web server. Any other Web server, such as Windows NT/2000 should also work. Each course has its own directory. A directory called "classes" is used to store common pages. Sub-directories such as "slides" are used to store special items related to the course such as PowerPoint slide presentations. A directory called "template" is used to store Web pages and images for creating new courses or new sections of courses. This will be discussed in further detail in the next section.

A Template-based Approach

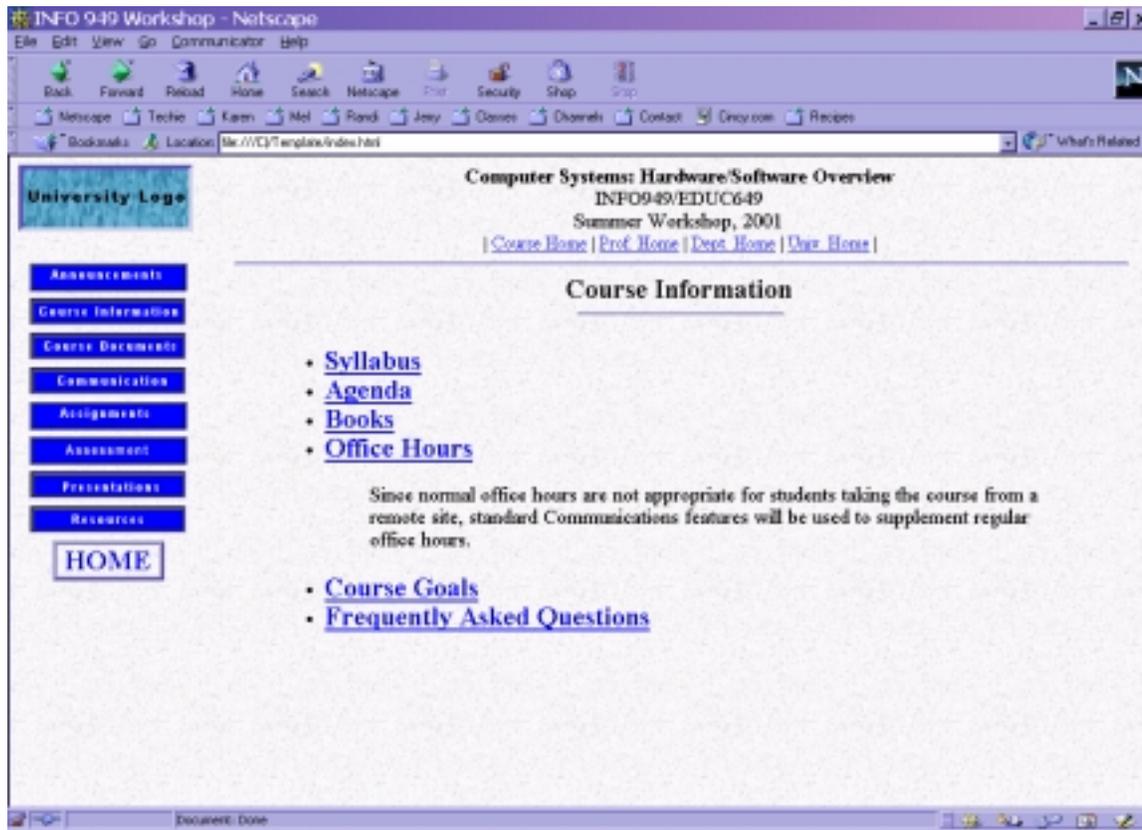


Figure 1. Sample screen shot for a course using the template approach.

Installation and Setup

Blackboard is fairly straightforward and easy to set up for basic functions and minimal training. However, more advanced features can be more complex, particularly for the non-technical user. The software makes it easy to deliver plain text and to import documents such as MSWord and PowerPoint, but does not provide an intrinsic mechanism for delivering formatted text. To format text requires the user to code HTML tags. You can import an HTML document, but to make modifications, you must modify the code with an HTML editor and then delete the existing document and reload the file through the Control Panel. This process is less than intuitive and can be quite cumbersome to make a simple change.

Blackboard provides a special section for External Links to link to other Web sites, but to link to a Web site from other areas requires the use of HTML coding for anchor tags and associated attributes – not easy for the average user.

Once you have a course assigned to your Blackboard account, you set up a course using the Control Panel, which gives you access to six major functions:

- Content areas for adding course materials;
- Course tools for setting up a course calendar, tasks and collaboration tools;
- Course options for configuring the interface, setting availability options, etc.;
- User management for adding and modifying users and setting up groups;
- Assessment managers for setting up exams, surveys, a gradebook, etc.
- Assistance for online support.

For the template-based approach, any basic Web development tool such as Microsoft FrontPage, Dreamweaver, Netscape Composer, or FrontPage Express (the last two are free), along with a basic file transfer utility such as WS_FTP LE (free for educational use) are needed to build and maintain a site. A global search and replace tool which will scan multiple files is also useful. Several of these are available as freeware or inexpensive shareware from standard download sites.

To set up a class, you must perform the following steps:

- Build or download template file into a folder on your hard drive. Templates described in this paper are free, available from our Web server.
- Make a template folder on your server for the intended class. For instance, the folder “info200s02” might be used for a course for INFO200 for the Spring term of 2002. This folder will store templates and images for the site, with sub-folders for PowerPoint presentations, grades, tests, etc.
- Using FTP software, transfer all files and subfolders from the template folder on the server. (Note that you may want to use a separate folder to store Web pages such as “office hours” which are common to multiple classes.)
- Modify file names in the course folder to match the course number. For instance, you would change “info xxx” to “info200” in all file names.
- Using a global search and replace tool, change all occurrences of “infoxxx” to “info200” and all occurrences of “INFOxxx” to “INFO200” in all of the files in the folder.
- You should now be ready to add content to your site. If you click on “Course Information” and then “Syllabus”, you can edit the syllabus with any Web development tool, such as FrontPage, and re-publish it to the server. This process is similar to using a word processor.

You would follow this same procedure with all of your courses. For multiple sections of a course, you could either use the site for all sections or set up a separate site for each section with common elements, such as PowerPoint slides, stored in a common “classes” folder. To set up the same class for a subsequent term, you would merely set up a new directory (for the new term) on the server and transfer files to it, and modify content appropriately to start the new term.

Delivery of Course Materials

Blackboard provides seven content areas for delivering course materials (see figure 2):

- Announcements
- Course information (syllabus, materials, etc.)
- Staff information (instructor, assistants, etc.);
- Course documents (presentations, lecture notes, etc.)
- Assignments
- Books
- External links

A Template-based Approach

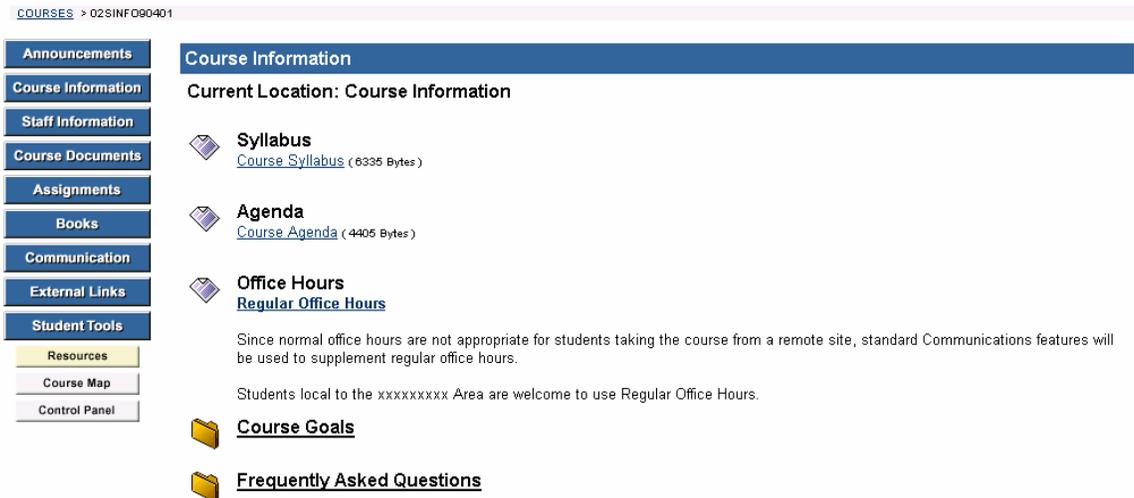


Figure 2. Sample screenshot for a Blackboard course.

Some or all of these areas can be made available to students. Buttons will appear in a left-hand frame for selected areas. The course information and documents components are quite versatile and are used to deliver primary content. The only real limitation is the ability to present formatted text and external links from within Blackboard itself, without the coding of HTML tags.

A drawback to the Blackboard setup process is that each course must be built separately. Common information, such as office hours or presentations, must be imported and maintained for each course. This can become cumbersome and time consuming. With the template approach, common files are placed in a common directory that can be accessed by any course. Blackboard does provide for duplication of course materials for multiple sections of a course, but once a course has started, subsequent modifications must be made for all courses. You can combine sections of a single course into the same session, but this also has its drawbacks.

Our template provides similar functions including announcements, course information, course documents, assignments, assessment presentations and resources as shown in Figure 1. Staff information and book sections are included in the course information template. External links can be incorporated into other sections, including resources.

Clicking on the Course Information button will take you to another template with links to specific documents such as the syllabus, course goals, and office hours. Content area selections can be modified for the main menu or for sub-menus with any site development tool. We use Banner Maker Pro (www.bannerstogo.com) to generate or modify individual buttons and banners. If you click on Syllabus from the Course Information sub-menu, a syllabus template will be loaded and modified as necessary.

A separate section, with an associated template is provided for presentations. Using a file transfer utility, PowerPoint slides or other presentations are loaded to the assigned directory on the server and texts and appropriate links are entered into the template. Presentations in HTML format can be transferred and accessed in a similar fashion.

With Blackboard, presentations are imported to the Course Documents area. To add PowerPoint presentations you must either store files on a separate server and hard code a link to it, or use a zip archiving tool such as WinZip to make files available. The latter method is suggested by Blackboard, although the steps necessary to do this are quite complex for non-technical users. A number of other templates for assignments, readings, etc. are also available.

Interaction

Blackboard's student-to-student and student-to-instructor interaction is a definite strength, and should improve with subsequent releases of the product. Staff information for instructors and assistants, as well as personal information about each student is available. Email functions include individual student-to-instructor, student-to-student, and instructor-to-student functions. Group and mass mailings are also possible. Other collaborative functions include a discussion forum, a chat room with virtual classroom, a digital drop-box, and group collaboration tools. All of the tools are nicely integrated and relatively easy to set up.

Our template approach uses HTML forms with FormMail (free from Matts Script Archive) CGI scripts. Separate templates are provided for submission of assignments, article reviews, projects, and peer reviews. To use the templates, "formmail.pl", a PERL script must be available on the server and the code associated with each HTML template must be modified to point to the file. Most servers support some kind of mail script, and MS FrontPage automates the process.

Templates for discussion forum and chat room are set up through MultiCity (www.multicity.com). Basic versions suitable for classroom use are free of charge for educational purposes. An alternative would be to use forums set up locally on your server. A local Novell server with group folders is used to support a digital drop-box.

Assessment

Blackboard provides reasonably decent test generation and gradebook tools. The test generator supports multiple formats and timed delivery. Personalized gradebook entries are available to each student.

With our approach, templates are used for essay and short-answer exams. We use Web-based quiz generator for multiple-choice quizzes and exams. However, for many classes, especially when students do not have classroom access to computers, paper-based exams with optical scanning works fine. Grades are manually posted to an Excel worksheet. The worksheet is saved as an HTML file and transferred to the server. A Grades template links to the gradesheet. The last four digits of the student ID are used for identification. Personal grades are not available.

Support, Security and Administration

Blackboard provides online help and email support, plus manuals and training with licensing. Extended fee-based training and support are available. The software is intended to be supported by a System Administrator. Our campus currently has five people assigned on a part-time basis for training, support, and administration – a library technician, two audio/visual technicians, and two information systems professionals who serve as administrators. Each faculty member who uses Blackboard must attend a one day training session.

An administrator registers students for classes. A guest function is available to allow non-registered students access to certain materials. Faculty can use the Control Panel to set security locks for different content areas. For instance, you could lock out Course Information and make the Books section available for guest viewing.

The HTML template approach assumes a certain degree of Web site development and publishing experience. Appropriate training and support would be needed for faculty not familiar with these processes. However, tools such as FrontPage and Composer function a lot like word processors, and skills can be developed fairly easily.

Security is provided through the Web server by password protecting individual directories. You could protect the entire site or just the slide presentation or assessment directories. The individual faculty members are responsible for administrative functions beyond basic Web server management.

A Template-based Approach

As with Blackboard and most of the other available tools, the HTML template approach is easy to use. Following the links is fairly intuitive. Our experiences show that, for both Blackboard and the HTML approach, most problems occur with students during the initial process of accessing a course – setting up accounts, logging into the server, etc.

Site Maintenance

With the HTML template-based approach, site maintenance is fairly straightforward. To add announcements or assignments, you would edit the appropriate template, make changes, and re-publish the Web page. A similar approach would be used to make changes to the syllabus, office hours, etc. to make changes to a PowerPoint presentation, you would open the presentation in PowerPoint, make changes, save the document, and transfer it to the Web server. No modification to the template is necessary. Updated grades with Excel would use a similar approach.

With Blackboard, simple maintenance such as adding announcements or simple assignments is an easy task. However, modification of documents used for a syllabus, office hours, or complex assignments can be more time consuming. You must open the document with the appropriate software, make changes, save the documents, open the Control Panel, delete the existing document, and re-import the modified document. If you are using the same file for multiple courses, you must go through the Control Panel process for each course or section. This can be quite cumbersome for a simple change to the syllabus. To modify a PowerPoint presentation, you would use a similar procedure. Modifying presentations in HTML format using Blackboard's suggested methodology is much more time consuming.

You can simplify maintenance to some extent by using HTML tags in Blackboard or by storing common documents on a separate server and pointing to them with anchor tags, but this requires the same skill set as necessary for using templates.

Conclusions and Future Modifications

Blackboard, Learning Space, WebCT, and other tools provide multiple resources and a convenient mechanism for delivering course content. While they are relatively easy to use for basic functions, more advanced functions can be complex. A template-based approach can have advantages over these tools.

The most obvious advantage is cost. The template approach is virtually cost free. Tools are either free or low cost and ongoing administrative and support costs are lower.

A second advantage of the template involves site maintenance and course setup. After using both Blackboard and the template approach, we have found that both setup and maintenance are faster and less cumbersome with HTML templates once a faculty member is familiar with the process. Web site information and document sections are much easier to manage.

Furthermore, template are less constrained and more configurable than the packaged software products. Blackboard does allow you to configure the interface for cosmetic effects such as button shape and color, and it allows the user to enable or disable individual components. With our approach, image templates for buttons (Banner Maker Pro .BAP files) are stored with the images and the HTML files for each course. Using minimal Web development skills, components can be easily added, modified, or removed to suit the needs of a particular course.

There are also some disadvantages. The packaged products supply more tools and functionality and they are generally more closely integrated with the product. Assessment and collaborative tools are available, but they are more difficult to set up and do not fit as well with the other components.

Blackboard is also a bit less intimidating for the non-technical user. Although basic Website development and maintenance is not as difficult as it sometimes appears, many faculty members may hesitate to try it.

However, with proper training and support, for the template course setup, the process is really not all that difficult.

Overall, we have found the template-based approach to be quite useful and easy to work with. It can be a reasonable alternative to the more expensive software tools, either for the delivery of basic course content or for the support of an online, distance-learning course.

Future improvements might include a more integrated approach to collaborative tools, based on in-house software developments. An improved tool for the management of content pages using forms and scripts is also being designed. Data for materials such as the syllabus, announcements, and assignments would be stored in a database and pages would be modified through Web-based forms rather than with site development tools, making it easier for the non-technical users to manage a course once it has been built. XML and .Net tools are also being explored as alternatives to HTML.

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Biographies

Gerald F. Braun, Ph.D., C.D.P. has been a full-time professor in the Information Systems Department at Xavier University for the past sixteen years. He currently teaches Web development courses and offers an online distance learning class for MBA students. All course materials are delivered electronically for both the online classroom and the traditional classroom. Overall, he has had more than 36 years of professional IS work experience.

Elaine A. Crable, Ph.D. is the Chair of the Information Systems Department and has been a full-time professor in the Information Systems Department at Xavier University for the past twelve years. She currently teaches database management and the MBA core Information Systems course. She has used Lotus Notes Learning Space and Blackboard to deliver many of her courses.