

Project cms@wbw.edu
Pilot Study Report

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Introduction

Many institutions of higher education are struggling to determine the best way to support their educational missions with course management systems (CMS) and other Web technologies. Before such determinations can be made, it is necessary to ask in what ways such systems provide significant benefits to the teaching and learning process for faculty and students. This report details a pilot study—*cms@wbw.edu*—that addresses this question using data gathered at three selective residential institutions: Wesleyan University, Brandeis University, and Williams College. The study was carried out with a Learning Network, Teaching and Technology grant from AT&T, administered by the Foundation for Independent Higher Education. Senior partners at an e-learning consulting company called Eduworks were responsible for planning and executing the project in cooperation with a team of representatives from each of the three institutions.

This report offers an overview of the pilot project. For details see Perry Hanson and Robby Robson: *An Evaluation Framework for Course Management*.¹

Goals of the Study

The primary goal of Project *cms@wbw.edu* was to develop, document, and apply a methodology for determining which instructional uses of the Web provide the most benefit for teaching and learning, and to take into account faculty and student views of benefits.

A secondary goal of the project was to support future product selection and strategic planning processes. To this end, the methodology developed during this study includes a framework for analyzing costs as well as benefits.

It must be emphasized, however, that the primary goal of this pilot study was to identify and quantify the benefits provided by Web technology, not to compare products or evaluate possible future strategies.

The Environment Studied

The methodology used in this study is applicable to all higher education settings. The pilot included many variables that could affect the use and benefits of CMS processes and features. The three institutions, however, are relatively small residential colleges or universities with selective admission policies. The specific results of this study may apply only to smaller institutions of higher education, and may reflect different results from data obtained in a different environment, such as the application of Web technology in distance education. Larger institutions may reach different conclusions.

Methodology

The Project cms@wbw.edu study consisted of three stages: planning, data collection, and analysis.

Detailed **Planning** began in November 2002 with all three institutions. A preliminary focus group met to provide information for the development of uniform instruments for data collection. Eduworks and the project team then developed instruments (such as surveys and formats for reporting usage and cost data). Planning was completed in December 2002.

Data collection took place from January to March of 2003. The primary sources of data were CMS server logs; student, faculty and staff surveys; student, faculty and staff focus groups; laboratory sessions and demos; and cost data provided by staff at each institution.

The **analysis** consisted of statistical analysis of survey results and usage data, as well as a compilation of results from focus groups and observational sessions.

Evaluative Framework

The core of Project cms@wbw.edu is an evaluative framework that can be used to assess the benefits and costs of CMS products (regardless of their origin) after they have been purchased and implemented. This framework was developed by Educause and the cms@wbw.edu project team, and builds on work done by Halloran², Landon³, Wiley⁴ and others.

The evaluative framework used for the cms@wbw.edu pilot study examines processes and features, and analyzes these in terms of learning benefits, efficiency gains, usability and cost. These can be used to create decision matrices. The cms@wbw.edu study demonstrates how large parts of this framework can be applied in an evaluative mode and how necessary data can be gathered.

Processes and Features

The evaluative framework starts with a list of processes that can be supported by technology:

- Create online course content
- Prepare a course for use
- Manage technological and administrative aspects
- Teach a course
- Take a course

Through consultation with support staff at all three institutions these were reduced to a list of capabilities provided by the technology at hand—capabilities about which data can be obtained.

The resulting list included such processes as:

- Providing course materials and general information
- Delivering student exams and quizzes
- Handling the submission and return of assignments
- Providing students with access to grades
- Organizing course materials

In addition to processes, the evaluative framework looks at supporting features available through existing technology. This list will vary from institution to institution. In cms@wbw.edu these features included:

- Calendar of events
- General announcements to the class
- Online readings
- Multimedia materials
- Online Discussion board (posting comments, questions and responses)
- Graded online exams and quizzes
- Digital drop box (For collecting and handing back student assignments)

Benefits

Having established what should be evaluated, it is necessary to define metrics for their evaluation. The evaluative framework uses two qualitative metrics:

- The learning benefits derived from a process or feature
- Gains in efficiency derived from a process or feature

These were measured with survey instruments and focus groups.

Cost / Benefit / Usability Analysis

Studying benefits gives information about what processes and features provide value. It does not address implementation issues or costs—important when deciding how to improve existing services or when selecting new services.

In its full form, the evaluative framework will require that processes and features be ranked according to their usability and the costs of supporting them. This instrument has not been fully developed and was not applied to the cms@wbw.edu study. It is intended to be used in follow-up studies. The cms@wbw.edu study focused on gathering the data needed for such an analysis.

Usability

Although this report makes a few interesting usability observations, it does not provide a CMS usability ranking or include details. The purpose of the cms@wbw.edu project was not to compare the usability or functionality of different CMS products.

Costs

The evaluative framework tries to estimate the total cost of supporting a process or system. Total cost includes both the direct costs and the fully loaded personnel costs associated with each cost category. Cost categories include, for example:

- Hardware costs
- Software licenses
- Consulting and integration services
- Server administration and maintenance
- Training
- Faculty and student support

The one factor *not* included in this model is the cost of developing content. This is omitted because much of that is done by faculty and is very hard to measure, and also because content must be developed in some form for all solutions, Web-based or not.

Although cost data was collected at all three institutions, the cms@wbw.edu study did not have cost comparisons as its goal, so such comparisons were not made.

Data Collected

The following types of data were collected as part of the study:

- Faculty and student surveys
- Focus groups run separately for faculty, students and staff
- Technology demonstrations provided by staff
- Cost data provided by administrative staff
- Data on the actual use of CMS features, derived from server logs

This section describes the data collection processes and discusses issues encountered. Raw data, to the extent it is permissible to make it available, will be posted online.

Surveys

Faculty surveys were distributed via the Web to all faculty at all three institutions. Student surveys were distributed to all students at Brandeis and to a sampling of students at Williams.

The following table shows sample sizes and return rates:

Table 1: Survey Return Rates

	Brandeis	Wesleyan	Williams
Students Surveyed	~ 3000		~ 550
Student Surveys Returned	768		233
Faculty Surveyed	~ 400	~ 300	~ 300
Faculty Surveys Returned	99	87	155

Focus Groups

The following table shows the number and sizes of focus groups run on each campus:

Institution	Groups	Participants
Brandeis	4	28
Wesleyan	3	20
Williams	4	24

Usage Logs

The most objective data came from server logs. The study requested data on features used for each course taught at each school during the most recent semester for which the data was available.

Collecting this data proved problematic for a number of reasons. It was in some cases hard to establish equivalencies between Blackboard and WebCT features and data. More fundamentally, server logs do not indicate how something is used. A feature might be accessed without being used and features do not always correspond well to functions. For example, quizzes are often

posted as files in the document library and hence show up under document uploads and downloads rather than under quizzes, or a discussion forum might be used to submit assignments instead of a drop box.

Nonetheless, the server-log data helped paint a picture of how much and in what classes CMS systems were being employed. The data analyzed addressed only whether a CMS product was used and not the level of that use.

Results

Faculty Surveys

Surveys were distributed to all faculty at all three institutions

CMS and Web Usage

The following table shows how faculty members divide among those who currently use CMS products and those who currently have a non-CMS class web site. It further shows the numbers of survey respondents who do not use a CMS product now but who intend to use CMS products in the future.

Table 2: Usage of CMS products and class web sites reported by faculty members

	Brandeis (N = 99)	Wesleyan (N = 87)	Williams (N = 155)	Combined (N = 341)
Use CMS	54.5%	25.3%	45.2%	42.8%
Have Web site	77.8%	70.1%	70.3%	72.4%
Future New CMS User	6.1%	19.5%	12.3%	12.3%

When those who do not use a CMS were asked why they were *not* CMS users, they gave the following responses:

- **About 40% feel a CMS is inappropriate or of insufficient value**
- **About 30% lack information needed to make a decision**
- **About 30% would like to use a CMS but lack the time or information to get started**

Perceived benefits by ALL faculty respondents

All faculty respondents (including those who did not use CMS products) were asked for an opinion on the *efficiency* gains offered by CMS products.

- **About 40% felt the features were time-savers,**
- **About 40% said they had insufficient information and**
- **About 11% said they were net negative.**

Faculty respondents were also asked for opinions about how well CMS products support specific teaching and learning processes. Negative ratings were very low. The highest perceptions of negative effects were recorded for:

- **Online exams and quizzes (14.9%),**
- **Using a drop box to collect assignments (12.5%),**
- **Holding discussions online (10.9%), and**
- **Using an online grade book to compute and make grades available to students (8.7%).**

There were several capabilities about which large numbers of faculty had no opinion. These included

- **Making audio / visual materials available online (48.4%),**
- **Using online discussions (43.4%),**
- **Online exams and quizzes (66.7%),**
- **Using a drop box for collecting and returning assignments (53.7%) and**
- **Using a grade book (58.3%).**

Perceived benefits by faculty members who use Web-based learning technologies

Faculty members who used Web-based learning technologies were asked to characterize the benefits they observed. The choices were exclusive. These are the results:

Table 3: Characterization of benefits by faculty who use Web-based learning technology (N = 298)

Improved learning	Better access	Saved time	No effect	Don't know
14.8%	38.9%	7%	11.7%	27.5%

Faculty usage of specific features

Faculty members who used Web-based learning technology were asked to report on their usage and the usability of specific features. The following lists features in order of reported usage.

- Course syllabus [72%]
- General announcements to the class [70%]
- Providing supplementary readings and links to other text-based course materials [62.2%]
- Providing online readings [55%]
- Class face book (only available at Williams) [50.6%]
- Calendar of events [35.3%]
- Providing access to sample exams and quizzes for learning purposes [32.8%]
- Online Discussion board (posting comments, questions and responses) [32.5%]
- Providing access to audio / video materials [26.9%]
- Using digital drop box to collect/hand back student assignments [19.6%]
- Tracking student grades on assignments and tests [17.3%]
- Using electronic signup sheet to organize lab sessions and/or office hours (only available at Williams) [12.3%]
- Having students take exams and quizzes online for grading purposes [6.4%]
- Real time chat [5%]
- Online whiteboard [1.5%]

Faculty were also asked:

Consider the web tool that you were evaluating in the previous question. Pick the statement that most closely approximates your overall experiences when using this web tool.

This produced the following results:

Table 3: Overall usability as reported by faculty members (N = 209)

	Brandeis (N = 62)	Wesleyan (N = 62)	Williams (N = 85)	Total (N = 209)
All the capabilities are very easy to use. I figured it out myself in a few minutes.	16.1%	22.6%	24.7%	21.5%
Some of the features take a bit of time to figure out, but they can be learned with a bit of research and help from colleagues.	24.2%	27.4%	40%	31.6%
Some features are fairly obvious, but others are clunky and very hard to figure out.	46.8%	21.0%	18.8%	27.8%
I needed a considerable amount of help from others before I could figure out how to get started using this online environment.	9.7%	3.2%	4.7%	5.7%
I have insufficient information to make a definitive statement on this.	3.2%	25.8%	5.7%	13.4%

Student Surveys

Surveys were sent to all students at Brandeis and a subset of students at Williams. Student surveys were not conducted at Wesleyan. Return rates are given in *Table 1: Survey Return Rates* above.

Students were asked how many of their classes used Web learning technologies. Results were analyzed by academic level and by major. For undergraduates, there was no statistically significant difference found in the use of Web learning technologies based on academic level (freshmen and sophomores versus juniors and seniors). There was less use of Web learning technologies among graduate and professional students at Brandeis. Williams does not have graduate or professional programs.

The following table summarizes use of the Web in classes for calendar years 2001 and 2002 as reported by students at Brandeis and Williams.

Table 4: Reported number of classes using the Web for calendar years 2001 and 2002. N = 1001

0 Classes	1 – 2 Classes	3 – 5 Classes	More than 5 Classes
8.9%	13.3%	56.8%	21%

Student opinions on efficiency gains

Students were asked to describe the gain in convenience and efficiency offered by course Web sites. Of 973 valid responses, over 80% said they saved time because it is faster and easier to access course materials online.

Students were asked to choose among the following options for describing the effect of specific processes and features.

Improves learning – helps me learn better than in courses that do not use it

Saves time - more efficient than non-web techniques

Improves learning and Saves time

No effect - no better and no worse than non-web techniques

Negative effect - it is not as good as non-web techniques

The percentage of respondents who chose "saves time" or "improves learning and saves time" is given for the following survey items. The items are listed in order of positive responses. Items with fewer than 100 responses were not included.

- Keeping track of my grades on assignments and tests [77.9%]
- Turning in assignments online [72.3%]
- Course syllabus [72.2%]
- General announcements from the professor [72.1%]
- Calendar of events [71.3%]
- Sharing materials among students [68.6%]
- Online readings and links to other text-based course materials [68.1%]
- Getting assignments back from professor with comments and grade [65.8%]
- Taking exams and quizzes online for grading purposes [65.2%]
- Access to sample exams and quizzes for learning purposes [61.8%]
- Class face book [57.2%]
- Access to audio / video materials [51.2%]
- Online Discussion board (posting comments, questions and responses) [33.9%]
- Real time chat [Count too small]
- Online whiteboard [Count too small]
- Electronic sign up sheet to sign up for lab sessions and office hours [Count too small]

Student Opinions on Learning Benefits

The following list shows the percentage of student respondents who chose "improves learning" or "improves learning and saves time" in order of positive responses. It is instructive to contrast this to faculty opinions about the processes these capabilities support (see Faculty Surveys, above.)

- Access to sample exams and quizzes for learning purposes [88.2%]
- Access to audio / video materials [78%]
- Sharing materials among students [71%]
- Online readings and links to other text-based course materials [61.8%]
- Online Discussion board (posting comments, questions and responses) [49.6%]
- Taking exams and quizzes online for grading purposes [46.3%]
- Getting assignments back from professor with comments and grade [46.2%]
- General announcements from the professor [36.2%]
- Class face book [29.7%]
- Course syllabus [26.3%]
- Keeping track of my grades on assignments and tests [25.4%]
- Calendar of events [25%]

Turning in assignments online [19.3%]
 Real time chat [Count too small]
 Online whiteboard [Count too small]
 Electronic signup sheet to sign up for lab sessions and office hours [Count too small]

Student opinions of ease of use

When rating the same list as "easy" or "difficult" to use, the only features with more than 10% of 100 or more respondents reporting that they were difficult to use were:

Access to audio / video materials [22.1%]
 Getting assignments back from professor with comments and grade [18.5%]
 Online Discussion board [14.1%]
 Taking exams and quizzes online for grading purposes [13.7%]
 Turning in assignments online [10.2%]

There were clearly no usability issues with respect to web learning tools in general as far as students were concerned. Over 83% said they "figured it out myself in a few minutes." And less than one percent said they needed considerable help.

It is valuable to compare this to faculty responses on usability in *Table 3: Overall usability as reported by faculty members (N = 209)*,

CMS Usage Data

Results from usage data (server logs) differed in format among the three institutions, and could not be used to examine features. The results looked at overall usage, at usage by broad disciplinary categories (humanities versus sciences), usage by level of course (lower division, upper division, graduate), and usage by class size.

Notes on Usage Data Analysis

Several things should be noted when interpreting the results in this section:

- In its raw form, data was correlated with course designators. Classifications into discipline (academic subject type and area) were done by hand and therefore involved some judgment.
- The levels of courses were derived from interpretation of course numbers. This could also be inaccurate in some cases.
- Data from all three schools treats separate sections of the same class as separate classes.
- Usage logs apply only to campus CMS systems (WebCT and Blackboard in the cases studied) and do not reflect other uses of the Web. It is possible that a class has an extensive Web site but does not use the campus CMS. This appears to particularly be the case at Wesleyan University where the number of courses using a CMS was particularly low. Therefore, the usage logs only reflect part of the actual course support Web usage.

Brandeis Data

Brandeis data was based on enrollment in the spring 2003 semester. There were 1283 classes offered of which 274 (21%) used WebCT, the CMS offered at Brandeis.

Results showed a statistically significant correlation between academic discipline and whether or not WebCT was used. For example, almost 43% of computer science and technology courses and over 36% of foreign language courses used WebCT whereas only 2 out of 54 Mathematics courses (4%) used this tool. However, there was no significant difference between use in all humanities courses and in all science courses (20.9% versus 20.4%).

There was a highly significant difference between use in undergraduate courses compared to courses at the graduate or professional level. Only 34 out of 447 graduate or professional courses used WebCT (under 8%), whereas 224 out of 795 (28.2%) undergraduate courses used WebCT. Within undergraduate courses, there was a significant difference in WebCT use between lower division courses (23% usage) and upper division courses (36% usage).

Finally, the use of WebCT in courses increased significantly in correspondence with the size of the course. This is shown in the following table where N is used to denote the total number of classes in the given class enrollment size bracket.

Table 5: Usage by Class Size at Brandeis

Class Size	Small: 0 – 20	Medium: 21 – 50	Large: >50
Percent CMS Usage	14.5% (N = 1024)	39.8% (N = 196)	62.5% (N= 40)

Wesleyan Data

Wesleyan usage logs were based on the fall 2002 semester. A total of 561 classes (or sections of classes) were offered, of which 31 registered any use of Blackboard and 7 registered any use of WebCT. Within this small sample size, there was a clear trend towards more use with larger class size:

Table 6 Usage by Class Size at Wesleyan

Class Size	Small: 0 – 20	Medium: 21 – 50	Large: >50
Percent CMS Usage	.5% (N = 365)	.6% (N = 160)	11.4% (N = 35)

Williams Data

Although usage logs were obtained from Williams, no data was available on courses that did *not* use the Williams CMS (Blackboard), so percentages could not be computed (N was unknown). The following table shows raw counts:

Table 7: Usage by Class Size at Williams

Class Size	Small: 0 – 20	Medium: 21 – 50	Large: >50
Percent CMS Usage	73 classes used CMS	42 classes used CMS	14 classes used CMS

Qualitative Data

This section reports some of the qualitative data obtained from focus groups, observations of users, and technology demonstrations given by staff, organized by topic.

Tools Used to Support Instruction

Support staff and faculty from all three institutions reported significant use of the Web to support classes through methods other than the use of CMS products. Class home pages, electronic library reserves (e-reserves) and multimedia libraries (such as collections of digitized slides) were the most common. At Brandeis, a project is under way to integrate e-reserves into the CMS environment.

Some faculty reported using assessment tools (such as Hot Potatoes) and there are bulletin board and list serve programs in use everywhere. Some faculty members are involved with projects that extend beyond their own institutions, such as a national Web site for social psychology courses and national digital library projects.

Although faculty survey data concentrates on CMS usage and benefits, focus groups revealed that many of the benefits and capabilities offered by a CMS are also being achieved through other means. There are departments and individuals at all institutions who have class Web sites and who see no benefit in switching to CMS supported sites. They would only consider a change if they needed specific features (such as a bulletin board or drop box) provided by the CMS.

It is interesting to note that when students and faculty were asked to demonstrate exemplary Web sites during the observation labs ("show us your favorite and most effective class web site"), they did not show sites that were built with a CMS. The exemplary Web sites were built for a specific class and organize information in economical and direct ways. The home pages for these sites usually focus almost exclusively on directly relevant class content and events, and do not devote space to navigation icons or unused features. There is no need to 'click around' to discover the content of these sites, it is all organized right there on the front page, in a way that makes sense for the specific course.

Use of CMS Features and Processes

Throughout focus groups, the use of the Web that was consistently cited as valuable was the distribution of information, such as syllabi and readings. Many students and faculty felt that the increased availability of information made it more likely that students would come to class prepared and thereby increase the quality of classroom instruction and discussion. Although the classroom was still seen as the primary source of announcements and information, having syllabi and grading policies on the Web was seen as a convenience and as a means to remove any possible credence from the "nobody told me that" argument.

Discussion groups were seen as quite valuable by some students and faculty and as unnecessary and even artificial by others. In some cases, faculty members and students felt that discussion groups were not indicated for a particular teaching style or subject, or that classrooms were a better place for discussions. Some faculty felt they needed to frequently monitor discussions and post responses to make discussion groups valuable, and were concerned about the time this takes. In other cases, usability of the discussion tool itself was an issue. Almost uniformly, faculty members and students reported that participation in discussion groups was low unless it affected

grades or was required in some other way. Some faculty and students (but particularly students) had a very negative perception of using discussion tools just for the sake of using them. This was referred to by some as a 'post counting' approach where the quantity discussion postings were measured, but not their quality. However, a small minority of faculty reported that they had incorporated the discussion tool into their classes as an important part of their pedagogy. Where this was done, the perception of value was very high by both students and faculty.

Faculty members and students report that email is used for a variety of instructional purposes including informational exchange, class discussions, collecting and distributing assignments and disseminating class information. A great deal of variance in the degree of use of email was also reported. Some students said they were uncomfortable sending email to their professors and some felt that professors do not respond. Others reported good experiences. Some faculty reported using email extensively and some don't use it at all.

Many faculty members discussed grading Microsoft Word documents using the change-tracking feature as a very useful technique. This does not involve the Web *per se* but is facilitated by drop box features on CMS products, or by the use of email.

Online testing was not a frequent topic and evidently not in wide use. Posting practice quizzes was seen as very valuable by students. However, it appears from the focus group discussions that such quizzes are usually posted as word documents, not through the online quizzing tools.

Synchronous communication (chat, white boards, instant messaging) was not seen as necessary. Students used a lot of personal IM (Instant Messaging), but many commented that they saw it more as social than academic. Significant use for academic purposes was not reported. Focus group participants see the classroom and office hours as the place where synchronous communication occurs in residential institutions such as Williams, Wesleyan and Brandeis.

Validity of Content on the Web

In focus groups, many faculty members and students indicated a shift from using the library to using sources on the Web. Some expressed concern about this and a few faculty and students expressed strong concern. Some feel it is hard to discern when content on the Web is valid, and others feel that students are not critical enough of Web-based content. Another feeling expressed was not so much that the Web is a bad source of information but that the library is a good source of content and services that is being neglected. However, some students also pointed out that the Web provides a source of alternative political and scientific views, thereby giving them the opportunity to undertake their own analysis of their validity. They argued that learning to accept or dismiss materials based on analysis rather than on the basis of a 'pre-screening' authority is an important skill, particularly in the world of the Web.

CMS Usability

Observations and student comments indicate that students have no trouble using CMS products. However, some students who considered themselves well-versed in Web or user-interface design felt that the CMS products could significantly improve both in usability and aesthetics.

Faculty members had a range of complaints about the usability of CMS products and of their support. In general, most faculty members use a limited number of the full set of CMS features. They are not expert users who have explored the products thoroughly. A lot of exchange of knowledge (tips and tricks) took place in the course of focus groups and laboratory observations,

and faculty seemed to appreciate the opportunity to learn more about effective use of the Web from their colleagues. There was particularly strong interest whenever a faculty member discussed ways of enhancing learning through the Web.

Several faculty members commented that they were interested in working with others in their subject areas to find out how best to use the Web to support learning in a way that is designed specifically for the unique needs of their subject areas.

Conclusions

The framework this pilot study applied is structured to be used for a number of purposes, including:

- Research into use patterns and benefits
- Audits of existing e-learning programs for the purpose of evaluation and improvement
- Cost / benefit analyses
- Strategic planning
- Technology selection processes

This study focused on the first two of these. The data collected gives a good overall picture of CMS usage and benefits.

CMS and Web Tool Use and Benefits

Classes at the cms@wbw.edu institutions make wide use of the Web. 30% of faculty responding to the survey report having Web sites for all their classes and an additional 20% have web sites for some of their classes. Over 90% of student respondents reported using Web tools in at least one class during the last two years. Although there are differences in use and perceptions of benefits between subject areas, the Web is mainly used to disseminate class information and reading materials. Students and faculty also see this as providing the most benefit. In other words, content is king.

Faculty reported themselves as users of CMS products in differing amounts at the three schools: Brandeis (54%), Williams (45%) and Wesleyan (25%). At Brandeis and Wesleyan, where actual usage data was available for all courses, the percentage of classes using a CMS in a given semester was considerably lower (fewer than 7% in fall 2002 - 2003 at Wesleyan and 21% in spring 2002 - 2003 at Brandeis). This is to be expected since faculty would presumably report that they used CMS products even if they had only used them in previous semesters. However, the large discrepancy at Wesleyan may indicate a bias in survey returns.

CMS products are primarily used as templates for organizing class materials. Some features, such as bulletin boards and drop boxes, are used less. They are considered very important by those who see educational benefits in them and seen as unnecessary by others. Professors with existing class Web sites are likely to switch to using a CMS only if they want to use one of these features. In the cms@wbw.edu setting, online quizzes and real time communication features were hardly used at all.

Overall, usability of CMS products is a non-issue among students. Usability may be a factor in faculty adoption of CMS products and features, but the study is inconclusive on this point.

When asked to select the benefits of CMS features and processes, "saves time" was chosen more often than "improves learning" by both faculty and students. Interestingly, students perceived course Web use to have more benefit of both kinds than did their professors. As mentioned above, the features and processes that faculty members and students consistently found to bring the most benefit were those that supported making class information and class readings available online. Students see online access to materials and information both as a time saver and learning enhancer, although more so the former. Online access to grades, sample quizzes and audiovisual materials was seen by students as having strong learning benefits. Faculty did not value these as highly and the majority of faculty did not make use of these features. Online discussions were higher on the faculty list of learning benefits than they were on the student list.

Lessons Learned

As befits a pilot study, the project produced valuable insights and lessons about data collection and experimental design. Observation sessions proved very useful, but they are also time-consuming. The student and faculty survey instruments were valuable, but could be improved and made more consistent with each other to enhance the ability to make comparisons between the two groups. Cost data is still not available as of the time of this writing.

The most problematic area was analyzing actual usage data from usage logs. Mapping WebCT and Blackboard logs to each other was harder than expected and, CMS usage logs do not accurately reflect feature use. Also, these usage statistics were sorted by subject areas, but these areas had to be assigned to classes by hand and classes with generic numbers and titles like "Professor Ruiz Seminar" are hard for independent researchers to classify. In addition, the CMS logs do not include all of the other technologies used to support classes, and hence are incomplete records of actual Web technology usage.

Further Research

Some questions that should be asked and further researched are:

- *Are there natural saturation points for the use of the Web in classes and for the use of CMS technologies?*
 - What is the saturation point?
 - What can be done to encourage use by current non-users who are interested?
- There are features that students value but faculty don't use. Why? How much do usability, support, and awareness affect faculty decisions to not use features?

Is the approach of bundling many features into a single product justified in contrast to the approach of providing individual tools through a portal or other framework?

Dissemination and Next Steps

The intent of the cms@wbw.edu study was to run a pilot study and disseminate the results for use by other institutions. Materials from the study will be available on the Web to the extent allowed by confidentiality and privacy considerations. It is envisioned that the evaluative framework will be applied to selection processes at some of the cms@wbw.edu institutions in the future and that research papers and experimental designs based on the results of this study will be available in the future as well.

We presented the framework for this pilot study at the Summer ECAR (EDUCAUSE Center for Applied Research) Symposium in July [Panel Discussion on Course Management Systems—Perry Hanson, Brandeis University; Susan Metros, The Ohio State University; and Glenda Morgan, University of Wisconsin System]. This presentation was extremely well received and subsequently became the second-most accessed publication on the EDUCAUSE web site.

¹ EDUCAUSE Center for Applied Research, Research Bulletin, Volume 2003, Issue 14, July 9, 2003

² M. Halloran. "Selecting Course Management Software to Meet the Requirements of Faculty and Students," Educause Center for Applied Research, Research Bulletin. Vol. 2002, Issue 8, April 16, 2002

³ B. Landon. Course Management Systems portion of the WCET Edutools site.

<http://www.edutools.info/course/index.jsp>, last accessed April 3, 2003.

⁴ D. Wiley. "Online Course Management Tools Research and Evaluation Report Executive Summary," http://wiley.ed.usu.edu/dle/research/final_report.pdf, last accessed April 3, 2003.