

5

The Promise and Performance of Course Management Systems

Almost every course I've taken has used a course management system. I find it invaluable for accessing papers, assignments, and syllabi.
—An undergraduate student

A course management system (CMS) is a suite of software designed and marketed to colleges and universities for use in teaching and learning. Common course management companies and systems in the higher education environment include, but are not limited to, ANGEL, Blackboard, Desire2Learn, eCollege, First Class, Oncourse, Sakai, Moodle, and WebCT.¹ Today's typical CMS includes tools for course content organization and presentation, communication and student assessment tools, grade books, and tools for managing online course material and activities. Increasingly, course management systems are enabling faculty and administrators to track and analyze students' CMS use and to derive a better understanding of how students learn and how to improve student learning.

Faculty can use other technologies, such as PowerPoint, in conjunction with a CMS to assist in teaching and learning. Lecture notes can be posted as PowerPoint slides to a course site and accessed via a CMS. They can also be combined with a learning management system to facilitate noncredit instruction. Course management systems are just that, management systems. In some ways they can be viewed as a first wave (or perhaps a second wave following the "thwarted innovation" wave of the mid-1990s) in what has been

Key Findings

- ◆ Of the 72 percent of students who report using a course management system (CMS), more than 75 percent report a positive or very positive experience with it.
- ◆ The more students use a CMS, the more they like it.
- ◆ Students most value tracking grades on assignments and tests and accessing sample exams and quizzes in a CMS.
- ◆ Students least value online discussions in a CMS.
- ◆ Perceptions about instructor IT skills are strongly associated with students' satisfaction with course management systems.
- ◆ Students who agree or strongly agree that courses using IT allow them to take greater control of their course activities have the most positive experience with a CMS.
- ◆ Students report that using a CMS improves their learning.

heralded a learning revolution (Oblinger and Rush, 1997). It's possible that learning activity management systems, learning objects, and newer technologies will focus their espoused impacts more directly on learning itself.

Despite the growing acceptance and use of course management systems in higher education, little is known about how students use them or their effects on learning. Much of the work done to date is in the form of

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student satisfaction surveys by individual higher education institutions seeking to understand how these systems are being used and how to improve their use. There is little comparative analysis by institution and student demographics (Hanson, 2003). This chapter seeks to develop a broader overview of how students perceive and use CMS features and to what advantage. Several other studies cited throughout this study appear in the bibliography.

This study is also informed by faculty observations of CMS use at the University of Wisconsin System institutions and elaborated upon in the ECAR study *Faculty Use of Course Management Systems* (Morgan, 2003). Using these data in addition to our own lets us contrast faculty and student perceptions of course management systems and gain some insight into effective practice. We expect to find that faculty and students agree that course management systems are useful and convenient tools for distributing and managing information and for communication. We also expect that their perceptions differ on how effectively faculty are using course management systems and their impact on learning.²

Today's Course Management Systems

It is fair to say that when students comment on technology used in their courses, they are often making reference to the use of a CMS. Today, a CMS is often the first technology undergraduate students experience in university courses, just as a Web-enabled enterprise administrative system is the first technology students encounter in support of admission and related administrative student services.

The number of students who have used a CMS has increased dramatically since these systems were first introduced about eight years ago. Fully 72 percent of this survey's re-

spondents have taken a course using a CMS. While the number of students reporting some CMS experience is high, the number of faculty who use these systems regularly and the percentage of CMS-enabled courses offered by institutions overall are growing, but they're still not likely to be high (Morgan, 2003). While students take the vast majority of their courses without using this tool, our data suggest that students are critical of this varying pattern of use.

Course management systems and their implementation are a work in progress. They promise to reduce time and space restrictions on learning for students and faculty, much as their predecessor enterprise administrative systems did for student administrative services. Used properly, they have the potential to improve students' access to information and communication with their instructors, enhance the quality of learning, and increase learning productivity (Twigg, 2001). Instructors can use course management systems to convey information more effectively and to better meet the needs of students with varied learning styles. These systems make it possible to enrich the interactions students have with each other and with their instructors. While the direct relationship between course management systems and student learning needs more study, students in our study are positive about course management systems. These systems are clearly gaining acceptance and momentum.

Course management systems also offer the promise of increasing learning productivity. A CMS can allow students to learn more and faster, in part by automating or rationalizing the "administrivia" of instruction (convenience), in part by streamlining communications (connection), and in part by expediting and refining faculty feedback, thereby enabling students who use them to focus on learning-related tasks. Over time, institutions hope to see a return on their CMS

investments through higher retention and graduation rates and higher levels of student satisfaction. A question we ask is whether we can demonstrate measurable returns on an institution's CMS investment.

This chapter addresses the following questions about students and course management systems:

- ◆ What value do course management systems provide in teaching and learning in higher education?
- ◆ How many students in the survey have used a CMS and how do they rate their experience using it?
- ◆ What do students perceive to be the primary benefits of a CMS?
- ◆ What impact does CMS use have on the students' learning experience?
 - ◆ Do students report that CMS use improves communication with the instructor?
 - ◆ Do students report that CMS use improves collaboration and communication with their classmates?
 - ◆ Do students report that CMS use improves the promptness, helpfulness, and value of the feedback they receive from their instructors?
 - ◆ Do students report that CMS use enhances their ability to manage information and their time?
 - ◆ Do students report that course management systems help them learn?

Student CMS Use

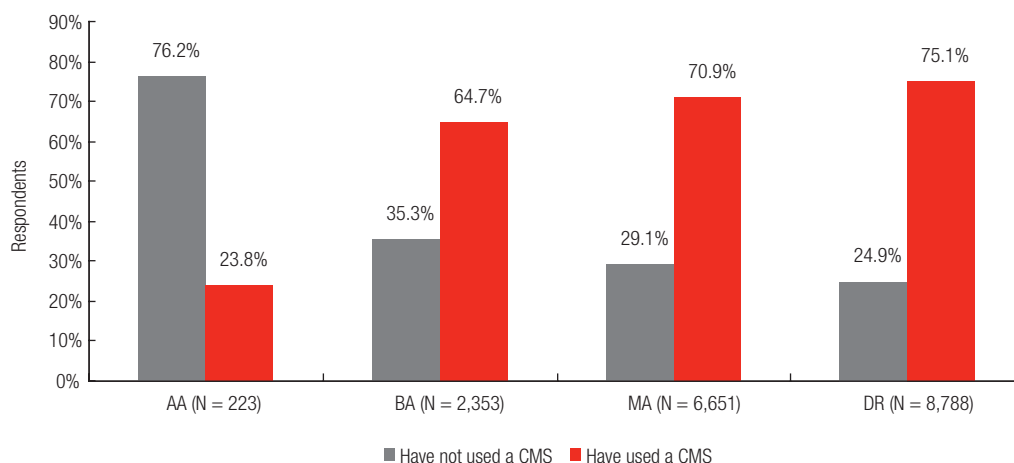
Seventy-two percent of the student respondents to our survey have taken a course that used a CMS. This differs from our findings in the 2004 survey, where 83 percent had used a CMS. Note, however, that the institutions included in the 2004 survey had all used course management systems for some years and the use at each of the 13 institutions exceeded 59 percent of all students. This is not the case in 2005.

In this year's study, some institutions have only recently adopted course management systems. We see a significant difference of use among the 63 institutions, ranging from a low user rate of 12.2 percent to a high of 95.8 percent. We think the number of users is high and growing.

Not surprisingly, seniors (76.1 percent) are more likely to have taken a course that used a CMS than freshmen (65.8 percent). The longer students attend an institution that has implemented a CMS, the more likely it is they have encountered a course using the system. And because a CMS is normally an institution-wide application, it is no surprise that there are no significant differences of student use by age, gender, major, grade point average, part-time or full-time status, or campus residency.

We did find differences by Carnegie class (see Figure 5-1). More students (75.1 percent) at doctoral institutions have taken a course that used a CMS than students at AA institutions (23.8 percent). Note, however, that the number of AA students in this study is too small for generalization, so these numbers must be read cautiously. It is nonetheless likely, in our judgment, that usage differences by Carnegie class are significant, and these possible differences deserve greater study. The differences in CMS use between respondents at doctoral and BA institutions must also be read with caution due to a smaller number of respondents from BA institutions. This caution applies to private institutions generally. Further, any differences we might ascribe to institution mission (Carnegie classification) might be partially explained by the presence or absence of business and engineering programs in institutions of differing missions. Business and engineering students in our sample are more likely than other students to have taken a course using a CMS. We find the majority of these students in our study at doctoral institutions.

Figure 5-1.
Students Who
Have Used a CMS,
by Carnegie Class



Student Experience with a CMS

Most students we surveyed have had positive experiences with course management systems. We asked the students who have taken a course using a CMS to describe their overall experience (see Figure 5-2). Of the students who have used a CMS, 75.2 percent report a positive or very positive experience, 19.8 percent are neutral, and only 5.0 percent are negative or very negative. Only 99 of the 18,039 students who responded to the study said they were very negative about a CMS. These figures are virtually the same as in the 2004 study.

We looked for factors that contribute to a positive CMS experience and found three of moderate significance. Students who agree or strongly agree that courses using IT allow them to take greater control of their course activities (planning, apportioning time, noting success and failure) report the most positive experience with a CMS. The next strongest relationship is the perceived general skill of the instructor in using IT for instruction, followed by instructors' use of IT to provide prompt feedback to students. Interestingly, student skill in using course management systems is not much of a factor. With respect to faculty skills, one student notes, "The problem with programs such as

course management systems is that their usefulness depends on the instructor. If they know how to properly and successfully use it, then it will be helpful. If they are not particularly computer literate, it becomes an obstacle and a hindrance."

We asked whether students who preferred to take courses with little or no technology have an equally negative attitude toward course management systems (see Figure 5-3). They do not. Almost 50 percent of students who prefer no IT in courses report a positive or very positive experience with a CMS. Concomitantly, we found that students who have a very positive or positive experience using a CMS overwhelmingly report a preference for extensive or exclusive use of IT in courses.

We note that there are insignificant experiential differences by gender, age, major, part-time or full-time status, and on-campus or off-campus residency. Students at doctoral institutions evaluated course management systems slightly more positively than did students at other institutions, but we attribute that to the fact that these systems are more in use at doctoral institutions. Our data show that the more hours students spend using course management systems, the higher they rate their experiences with them. One under-

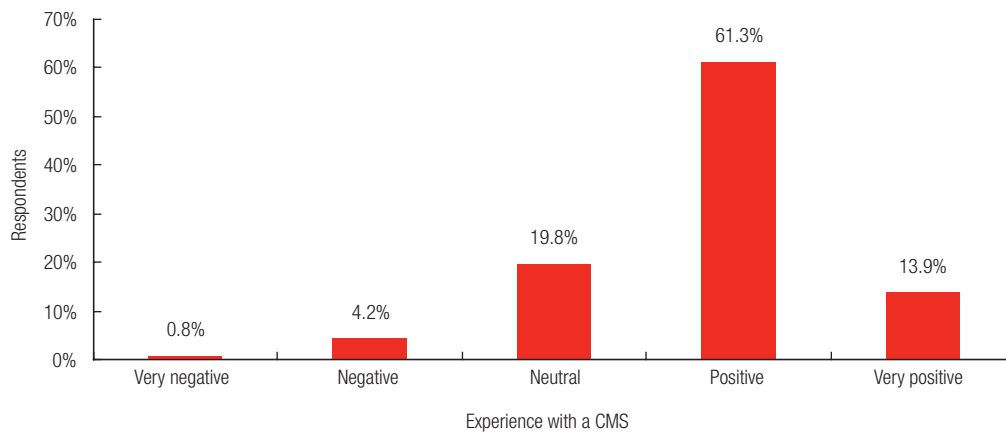


Figure 5-2.
Students' Overall Experience Using a CMS (N = 12,177)

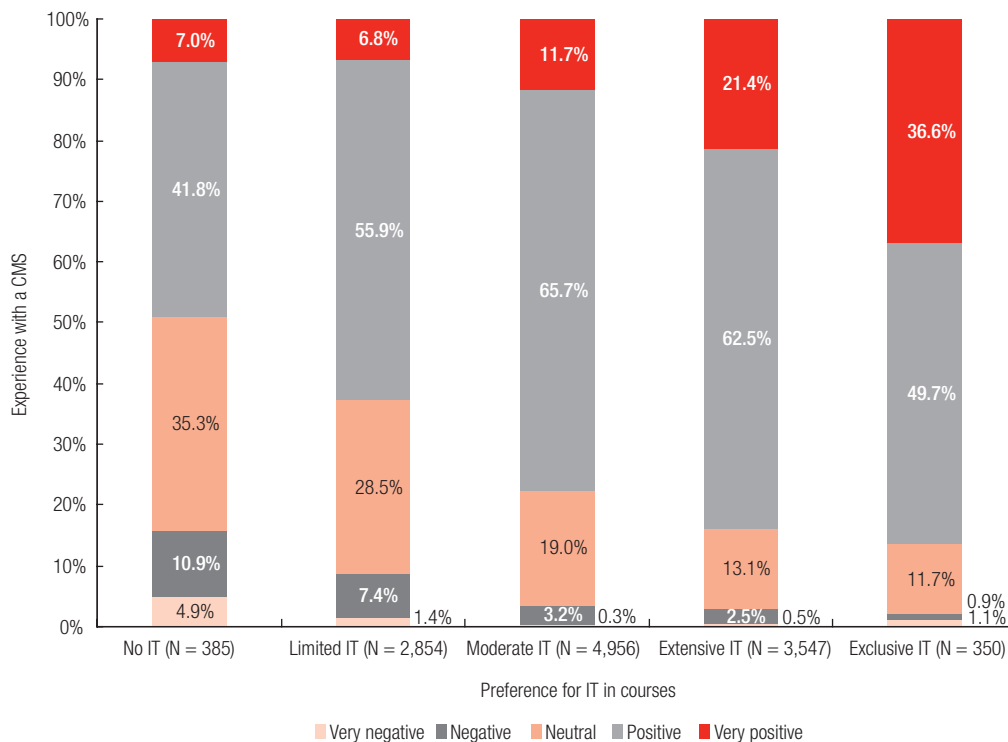


Figure 5-3.
Experience with Course Management Systems, by Student Preference for IT in Courses

graduate reports, "I really wished that more professors used course management systems to organize their classes. It is a wonderful tool that keeps both students and professors honest and organized." Another states, "The CMS works great when professors list class notes for printing so that more material can be covered quicker and clearer during class and then reviewed later for studying."

Some students were negative: "The CMS has some bugs to be worked out. I basically

feel it is used primarily for grade feedback and assignment submission. I am not sure it improves my learning; it is more of a convenience." For some, course management systems offer the potential of abuse. "I know enough about computer security to know that it is disturbingly easy to compromise confidential information of students and faculty using a CMS. User names and passwords are frequently sent over unencrypted and insecure network connections (in the clear

over http). In addition, these tools are often expensive and inflexible, and full of errors.”

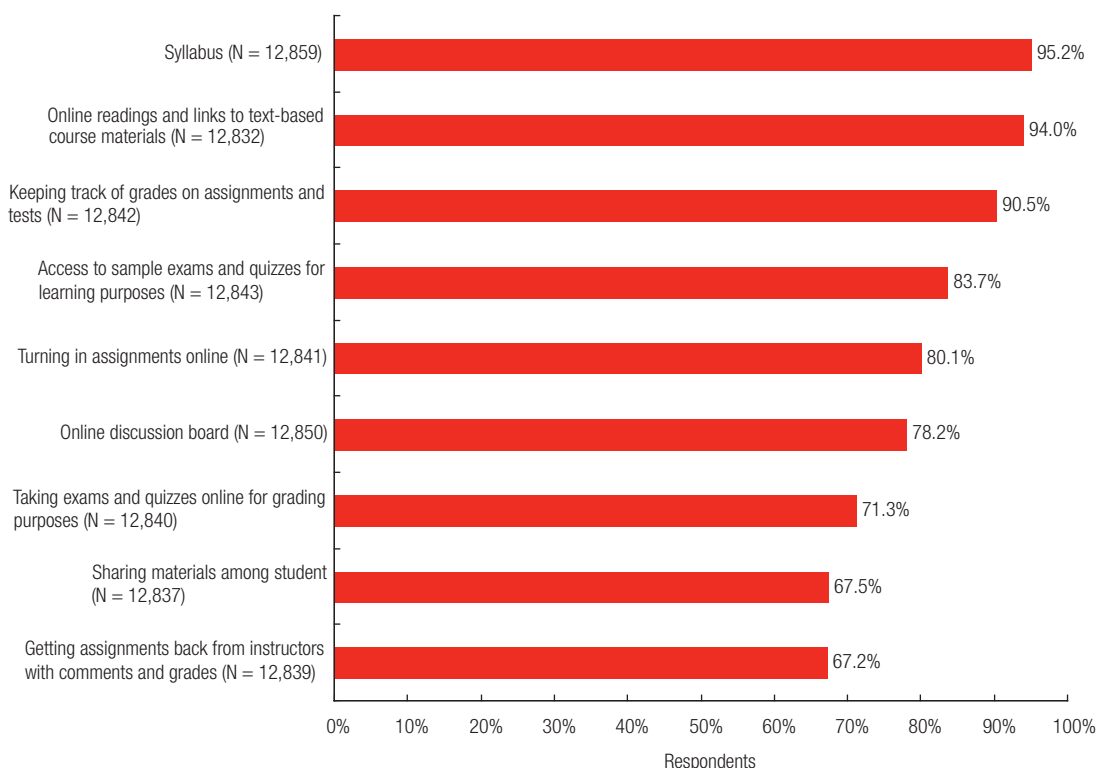
Student Use of CMS Features

Course management systems offer many features in support of learning and course administration. We asked the students who had used a CMS which features they had used (see Figure 5-4). We found that administrative features are used most, with syllabus (95.2 percent) and online reading (94.0 percent) receiving the highest percentages. Less used are the CMS features that enable sharing materials among students (67.5 percent) and getting assignments back from faculty (67.2 percent).³

Student feedback on course management systems is fairly consistent: They seem to like many of the features but wish faculty members used them more extensively and frequently. One student commented, “Each semester it is hit or miss as to which classes will use a CMS and which classes will not. I

think all professors should use the system to some degree, for example, to upload syllabus, assignments, and readings.” A Bridgewater State College student notes, “In one of my classes, the professor puts the reading assignments on the CMS. The other day, a couple of other students and I tallied up all the pages for our reading assignment. Over 200 pages would have been handed out in paper. But, since it’s in electronic form, we just read it online. Ecologically it is good to read it on the screen because it saves trees.” Another states, “I saved about \$120 because when the professor posted the readings on the CMS, I did not have to buy the book. I printed out pages as I needed them.” Still another advises, “I wish more instructors would use the CMS because it keeps students aware of what is going on. For example, when assignments are due, what grade they have, and the course outline/syllabus.” And finally, another notes, “I like the use of the CMS for communication and listing assignments.”

Figure 5-4.
CMS Features
Used by Students



Perceived Benefits of Course Management Systems

In addition to querying students on their use of various CMS features, we asked them whether they found various CMS features or functions valuable (see Table 5-1). Respondents value keeping track of grades on assignments and tests most (2.57), closely followed by accessing sample exams (2.50), where a mean score of 2.0 = valuable. We found that 60.5 percent of students find keeping track of grades very valuable and 54.1 percent find access to sample exams very valuable. Both contribute to students' ability to monitor and improve their course performance.

The next valued set of features is administrative in nature—convenience items such as syllabus (2.36), turning in assignments online (2.27), getting assignments back from instructors (2.27), access to online readings (2.25), and taking exams online (2.18).

Interactive communication items—sharing materials among students (2.09) and online discussion board (1.86)—are less valued. With the exception of the online discussion board,

all students consider the features valuable or very valuable. Note that 33.4 percent of the students who use a CMS evaluate online discussions as not valuable. Not surprisingly, students who feel the features to be most valuable rate their experience with a CMS the most positively. And students who rate their instructors' skill using technology highest find the features most valuable.

In one focus group at the University of Wisconsin–Madison, a few students got into a debate about whether online discussions in their courses are good or bad. One student explains, “In one of my classes we had to participate in an online discussion by the end of the day. It turns out it wasn't a discussion at all. We all started posting entries just before midnight so that we'd posted something. We didn't discuss anything. We just dumped comments to the discussion board at the last minute.” Another student disagrees: “In my course that used an online discussion board, we got into a serious discussion about the course content. It carried over to the next class period, too.”

Table 5-1. Perceived Value of CMS Features

Feature	N	Mean	Std. Deviation
Keeping track of grades on assignments and tests	11,627	2.57	0.565
Access to sample exams and quizzes for learning purposes	10,748	2.50	0.578
Syllabus	12,236	2.36	0.582
Turning in assignments online	10,291	2.27	0.666
Getting assignments back from instructors with comments and grades	8,624	2.27	0.674
Online readings and links to text-based course materials	12,065	2.25	0.615
Taking exams and quizzes online for grading purposes	9,149	2.18	0.709
Sharing materials among students	8,664	2.09	0.648
Online discussion board	10,052	1.86	0.716

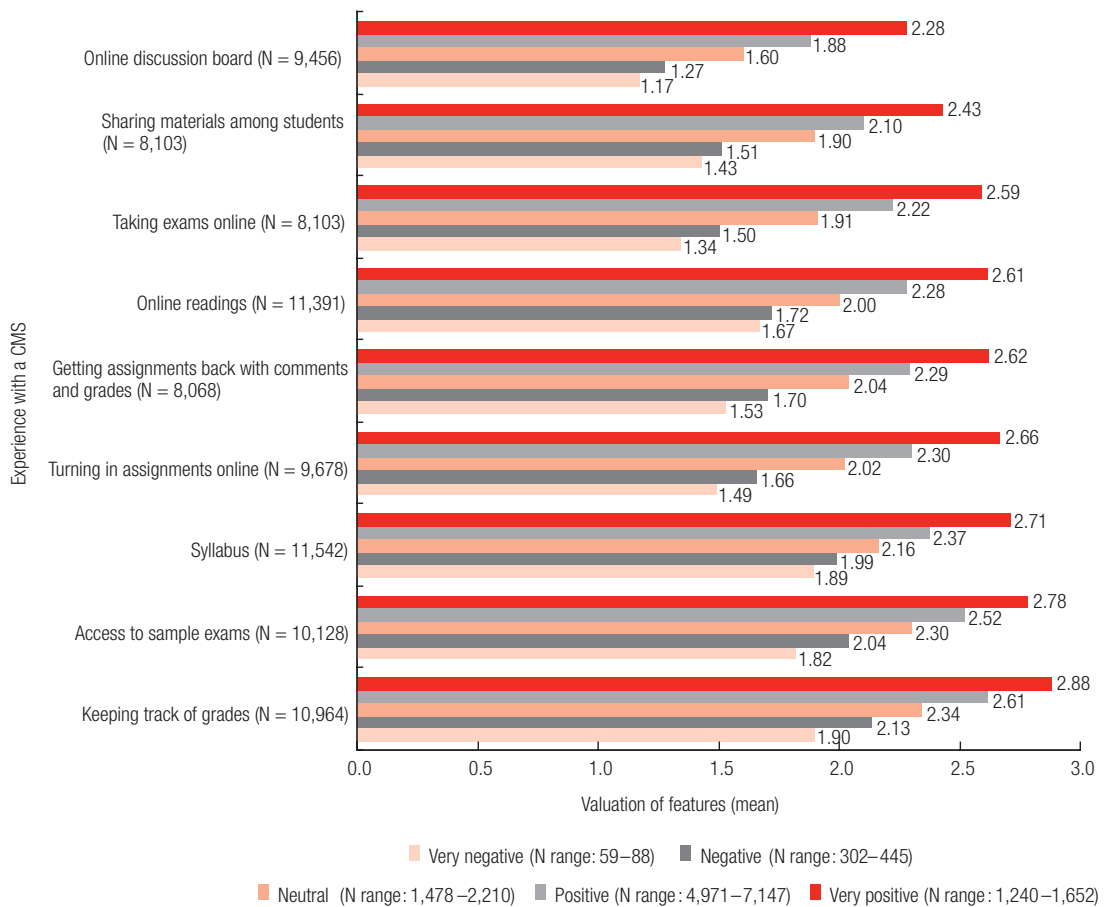
Scale: 1 = not valuable, 2 = valuable, 3 = very valuable

Students who report having a very positive experience with a CMS find the features to be more valuable than other students do (see Figure 5-5). Another interesting finding is that regardless of whether students have a very positive or very negative experience with a CMS, they rank the relative value of the features alike. Online discussions are liked the least, for example, regardless of CMS experience. Even students who have a very negative experience with a CMS consider over half of the features to be valuable (mean of 1.5 or higher).

Numerous students comment on how much they like seeing their grades online. A University of Wisconsin–Madison student expresses her desires thus: “I wish more of

my teachers would use the CMS to post assignments and test/quiz scores and grades. This would help a lot of students out and let them know how they’re doing in the class without going through the process of talking to the professor and then (he/she) not having the grades readily available.” One Bridgewater State College student reports, “I like the ‘view grade’ feature of the CMS. You can see how you are doing and compare yourself to others in the class. It gives me some basis to talk to my professor about my performance. In other classes you just see your paper/test and have no idea how well you are doing compared to other students.” In the open-ended comments, another student says, “I wish all my instructors posted grades online.”

Figure 5-5.
Experience with a CMS, by Valuation of Features



These comments corroborate a rich literature that finds a strong correlation between student-faculty communications and student academic performance, persistence, satisfaction, and retention (Pascarella and Terenzini, 1976, 1991).

Of course not all students view course management systems in positive terms. One opines, "I like all aspects of information technology except taking online tests...." Another says, "Also, online tests are not fair to everyone; there are no examiners for online exams." A third student comments, "The CMS is relatively inconvenient for me. It takes more time than I would like to take to use it."

Course Management Systems and IT's Impact in Courses

Students who report a positive experience with a CMS are more likely to agree that the use of IT in courses has a significant positive impact on their engagement, inter-

est in the subject matter, presentation of their work, understanding of complex concepts, and so forth, than are students with a neutral or negative CMS experience (see Figure 5-6). Note that improved communication with the instructor is highly valued regardless of the overall experience with a CMS. This may or may not be attributable to a CMS, however, as faculty can use e-mail independent of a CMS.

Course Management Systems and Learning

Our data show that course management systems contribute to convenience, connection, and control, and of these, students most value convenience. The big question, of course, is whether a CMS contributes to learning. Students say that it does (see Figure 5-7). Nearly 85 percent of students who have a very positive experience with a CMS also agree or strongly agree that the use of IT in

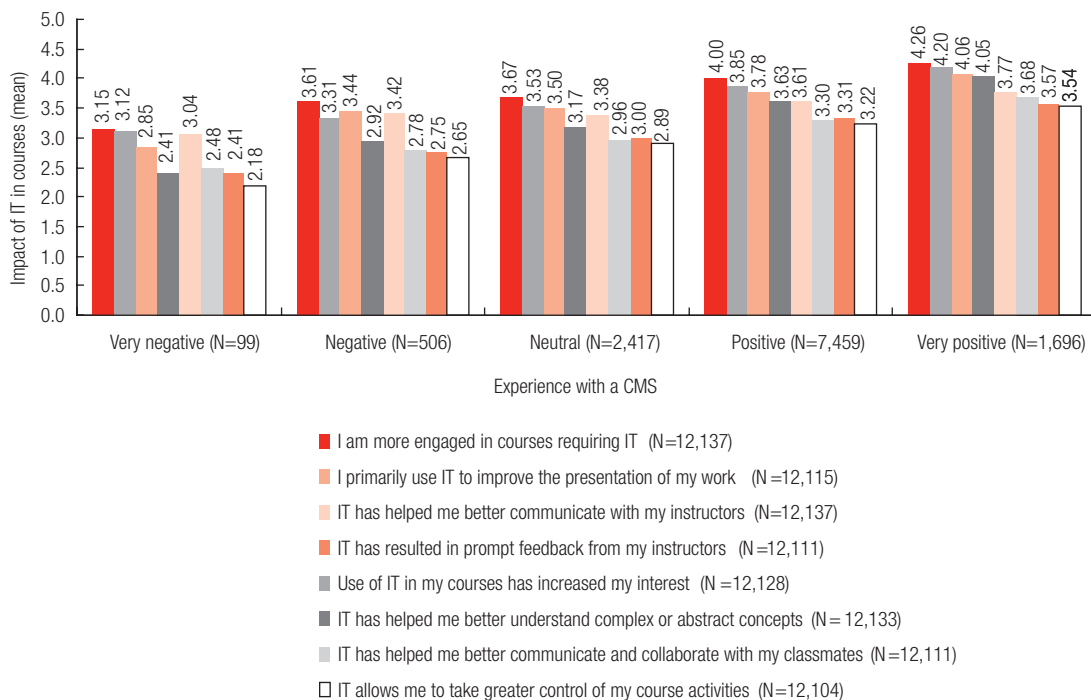
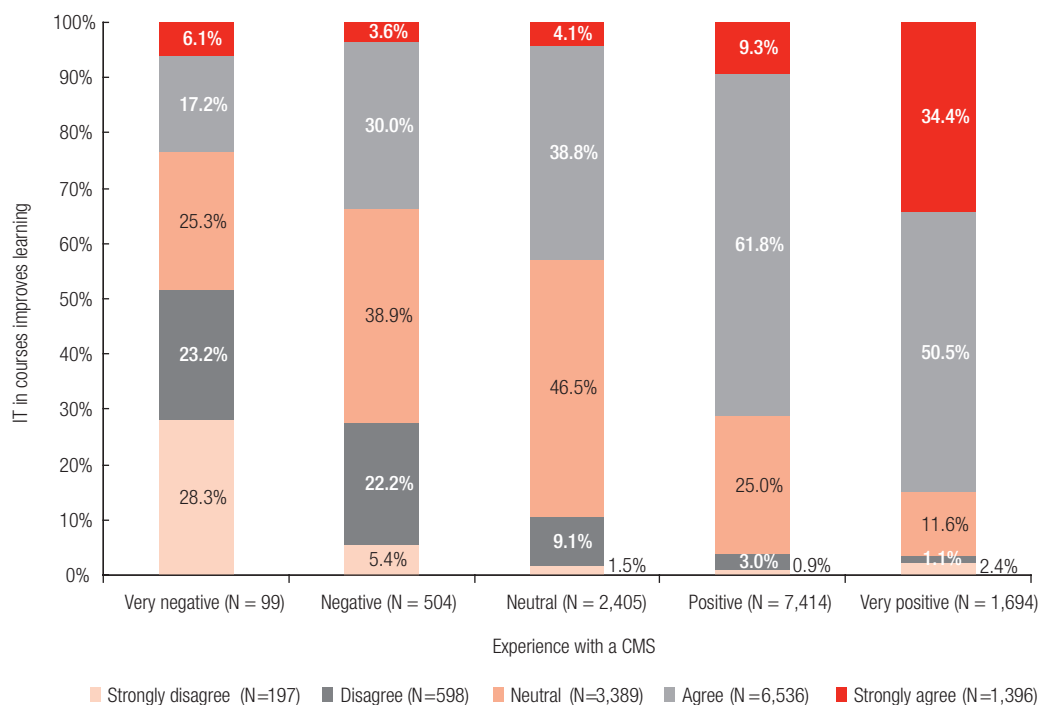


Figure 5-6. Impact of IT in Courses, by CMS Experience

Scale: 1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree

Figure 5-7.
Impact of IT on Learning, by Experience with a CMS



courses improves their learning. Conversely, if the CMS experience is negative, the student is more likely to indicate that the use of IT in courses does not improve learning. More than 50 percent of students who reported a very negative experience with a CMS also disagree or strongly disagree that IT in courses improves learning. While this student feedback does not constitute formal evidence of IT’s impact on learning, it is certainly heartening and worthy of note.

When we do a regression analysis, the first factor contributing to whether IT improves learning is perceived faculty skill in using IT, followed by the respondent’s experience using a CMS. We also know that faculty IT skill contributes to a student’s positive experience using a CMS, and so it is not surprising that this is the most important factor. And it is likely that a positive experience using a CMS is something of a surrogate for faculty skill. Nevertheless, our analysis shows that a positive experience using a CMS has a perceived

impact on learning. This is also seen in Figure 5-6, which describes the student experience with a CMS and students’ self-reported understanding of complex and abstract concepts in their courses. These encouraging findings call for more research that addresses learning using additional methods other than those used in this study.

We conclude from the quantitative data, student comments on our survey, and our qualitative interviews that a CMS very likely facilitates activities that contribute to learning: reinforcement, self-assessment, practice, improved communication with the instructor and classmates, easier and ready access to learning materials, and so forth. We also conclude that the effectiveness of these tools for student learning depends to a great extent on the skill of the faculty who use this tool. When used poorly, a CMS can have the opposite effect, as some students conclude that it negatively contributes to their learning. Fortunately, most students view the CMS

positively and also give their instructors good grades on their IT skills. As faculty members continue to use these systems and improve their skills, we should expect future ECAR surveys to show an upward trend of CMS' impact on learning.

Students make numerous comments on how course management systems contribute to their learning. A Colgate University sophomore notes, "Technology should play a supplemental role in the classroom. The discussion on the CMS can be a rich discussion. That way you can use resources to their fullest extent by the sharing of ideas. It helps more people out of the unparticipating shell. A CMS discussion also fuels class discussion." Another Colgate student says, "One professor put the outline of every lecture on the CMS. It was easy to follow where he was going. I could see what he was leading to."

Students also offer advice. "Overall I love the concept of the CMS. Putting study guides there is a big help. It would be nice if all of my classes were on the CMS. Universities should seriously consider requiring all assignments and quizzes to be given online and to make lectures optional. That way students can find their own learning groove and settle into a pattern that works the best for them." Another respondent notes, "Everyone should use online course management systems—make it mandatory for all instructors because until all courses are accessible it will never really take off as the next big thing."

Conclusion

In sum, ECAR data show that students find course management systems improve their course management. Students rate the ability to keep track of grades on assignments and tests most highly of all CMS features. Students value CMS features that foster convenience and that facilitate their management of course activities. They also acknowledge learning benefits from CMS use when these systems are incorporated well into instruction.

Endnotes

1. To see a comprehensive list of course management systems (and to evaluate their features), see the Western Cooperative for Educational Telecommunications (WCET) EduTools at <<http://www.edutools.info/course/compare/byproduct/index.jsp>>.
2. Readers are advised to use insights drawn from the 2003 study cautiously. The rate of CMS adoption and diffusion has been rapid, and it is likely that if the 2003 faculty use of CMS study were repeated today, faculty perceptions, adoption, and uses of course management systems would be more strongly positive, deeper, and varied.
3. The "use" responses in Figure 5-4 are cumulative figures that reflect the percentage of students who have once or more than once used the CMS feature specified. Exposure to a CMS feature depends upon what each faculty member decides to use, and the combination of features chosen will vary by faculty member. By taking courses from multiple faculty members, the students are likely to have been exposed to most CMS features. The *Faculty Use of Course Management Systems* study confirmed our findings that more faculty members used the content presentation tools such as Syllabus and fewer used the interactive tools such as the grade book and quizzing (Morgan, 2003).