

Blackboard Use During Its First Term of Deployment at  
Aurora University: Fall 2000

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April 2001

## Blackboard Use at Aurora University

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# 1 Introduction

In the spring of 2000 Aurora University's Department of Information Services (IS) began considering the adoption of a course information management system. The use of faculty-developed web resources had reached a plateau of approximately 12 courses each term. In order to further the adoption of instructional technology a study was made of commercial platforms that would allow us to expand our base set of web-enabled instructors to include faculty beyond the circle of early adopters. Comparing the available platforms it became apparent that the leading contenders offered nearly identical feature sets. After restricting the field to two, WebCT and Blackboard, we contacted instructional technology specialists at institutions using the systems, spoke to instructors who had used them to teach, and asked Aurora University faculty who already used the web for instruction to look at the two systems. Blackboard was selected because of significant usability advantages that we felt would allow us to bring a greater number of courses online with a larger number of faculty at a variety of proficiency levels.

Blackboard is a course information management system. The Blackboard system takes a number of Internet services that we had previously deployed separately and places them together on a single site with a single interface accessed through a web browser. Students and faculty need only learn to use a single set of on-screen controls in order to use discussion boards, electronic mail lists, access course materials and announcements, or upload and share files.

Faculty development began in May 2000. One course was taught using the system in a limited manner during the summer term as a live test. The system was fully deployed in the fall term and was actively used in 19 courses enrolling 490 students. This report will provide an overview of the faculty, students and courses that used the Blackboard system during its initial deployment. While preparing this report additional information was collected on student technology use, student attitudes toward the use of technology for instruction, and the emerging role that Blackboard and other technologies are playing in the University's academic programs.

## 2 Executive Summary

Our investigation into the use of Blackboard during the Fall 2000 academic term is based on 11 faculty and 151 student respondents, as well as a faculty focus group. This report to the campus community includes the following:

- Blackboard was actively used in 19 courses enrolling 490 students during the Fall 2000 term. This includes 370 undergraduate students and 120 graduate students. During the Winter 2001 term Blackboard was actively used in 38 courses.
- The Blackboard server logged 938,418 hits during the Fall term, representing 12,003 visitor sessions. Throughout the term there were an average of 125 visitor sessions each day.
- Data was collected from students about both Blackboard and general computer use. We received valid responses from 151 students, yielding a return rate of 30.8%. Of these, 104 also provided written responses to free-response questions.
- Home access to PC among students is high: 69.5% report owning a PC, and 87.8% report having access to a PC at their residence.
- Availability of the computer labs for all students remains important. Among students with access to PCs at home, 41.7% indicated that they used the University labs as their primary access point for completion of online course work.
- The University is a significant service provider for students using technology-based resources. Overall, 60% of all respondents reported relying on University services as their primary means of accessing the online instructional materials. This includes 43.3% of respondents indicating that University computer labs were their primary point of access, with an additional 37.8% of the respondents accessing primarily from home doing so using the free University dialup services.
- Specific to Blackboard, 90.1% said that the system was user friendly, but only 58.9% said that it made it easier to interact with fellow students.
- Two significant differences appeared between our graduate and undergraduate student users. Undergraduates indicated that course information and content tools were important to their learning and performance in the class more often than graduate students. Graduate students indicated that interactive features such as discussion and chat were important to their learning and performance more frequently than undergraduate students.
- Another significant difference between graduate and undergraduate students was the time spent using Blackboard each week. Graduate students reported 3.2 hours each week, undergraduate students reported 1.8 hours weekly.
- There is evidence that the students do not come to the system with an intuitive understanding of the added dimensions of online collaboration and

asynchronous interaction. Students gave poor ratings to email tools supporting group work, web-based group collaboration tools, and the real-time virtual classroom. Activities utilizing the online discussion boards were rated significantly higher for structured, instructor-led assignments than student-led activities.

- The students' most frequent written comment was regarding the time demands of doing online work, particularly when they felt that they were being asked to do work through Blackboard that had no discernable instructional advantage over traditional methods of delivery.
- A majority of students (74.5%) print their online readings and electronic reserve materials.
- The 11 participants in the faculty provided information on 13 courses taught in the Fall. Additional information was provided in a faculty focus group that met over the University's Winter break.
- Faculty can be trained to begin course development in approximately three hours. Once trained, faculty spent an average of 12.1 hours developing their courses before the beginning of the term.
- Instructors using Blackboard spent an average of 2.38 hours each week per course developing and updating their online content. This does not include time spent in the system interacting with the students, but only "prep time." Instructors teaching multiple courses see a corresponding increase in their weekly time commitment.
- Trained faculty seem confident in their technical proficiency with the Blackboard system and are interested in additional training opportunities focusing on effective practices and curricular integration.

Additional findings are detailed in the remainder of the report. Conclusions drawn and implications for future use are detailed in section 7 of this report.

### 3 Fall 2000 Blackboard Use

This analysis of Blackboard use in the Fall 2000 term will identify both how Blackboard was used and how effectively we applied Blackboard to the University's particular instructional needs. This report is not an attempt to replicate studies of learning outcomes that measure the effect of Blackboard use against courses or sections not using the system. We hope that this information will provide a sound basis on which to base decisions regarding Blackboard's future adoption, student needs, and faculty support and development.

The Blackboard system was adopted in order to meet several outcomes that are related to specific institutional goals. These considerations include:

- The desire to use the Internet as a means of organizing course information for the convenience of students.
- The desire to use Internet technologies to increase student-faculty interaction in the spirit of our commitment to faculty accessibility and individualized instruction.
- The desire to use Internet technologies to promote student interaction and collaborative work, particularly in upper level and graduate courses where the reduced frequency of class meetings, and outside student commitments, obstruct students from having frequent interactions outside of class.

It was our experience that the faculty who constituted the initial adopters were interested in at least one of these three outcomes. At this time the University does not offer any courses that are taught entirely online. While the Blackboard platform is well suited, in fact designed, for such use, there are no academic units on campus considering such course development.

#### 3.1 Instructors

In order to effectively support the faculty using blackboard, and to insure that students have a good experience, faculty are required to participate in approved training before courses are created for them on the system. Training can be accomplished in one of three ways: through workshops taught by IS, through workshops taught by approved faculty members who are themselves proficient, or through a self-study CD-ROM produced by Blackboard for instructors.

An initial group of thirteen faculty members were trained during a week-long workshop in the summer of 2000. This exhaustive training session focused not only on their becoming familiar with the system, but also provided time for the faculty to begin the development of content for courses that they would be teaching in the fall and winter terms. This workshop also allowed an opportunity for support staff to see how the faculty intended to use the system in their classrooms, and allowed for the identification of support

<i>Department</i>	<i>Faculty Trained</i>
<i>SBPS</i>	8
<i>Education</i>	8
<i>Extension</i>	5
<i>UCAS</i>	4
<i>Social Work</i>	3
<i>Nursing</i>	1
<i>Rec Admin</i>	1
<i>Does not include 20 instructors and teaching assistants for IDS 110.</i>	

Table 1: Faculty Trained, Fall 2000

issues that were likely to arise. Faculty were given a small stipend for their participation in the initial training pilot.

This online course development process allowed for the development of an effective accelerated workshop format. Future groups can be introduced to the system with as few as three hours of training. Subsequent workshops were taught for the School of Education as well as the faculty and teaching assistants for the First Year Experience course. An expert faculty member provided training for faculty in the School of Business. Five faculty members completed the self-study CD-ROM.

### 3.2 Courses

The Blackboard system uses the term “course” to name a section of the web site that it assigned to an instructor and that is populated with students. In some instances faculty members may take multiple sections of a University course and have all of the students participate in a single Blackboard course. In other instances students in a single University course used multiple Blackboard courses that corresponded to sections. When necessary we will clarify ambiguities that may exist when referring to Blackboard courses, as defined above, and courses as they refer to classes taught at the University.

During the Fall term 40 courses were created on the Blackboard system. The First Year Experience class (IDS 110) had additional online courses created for each of its ten sections, and four instructors used single Blackboard courses to merge multiple course sections, so a total of 54 University course-sections were created on the server for Fall classes.

Because instructors had varying degrees of comfort using the system, and because the amount of preparation time varied, not all courses that were created in the Fall term were actively used for instructional purposes. The information provided by instructors shows that 19 courses actively used Blackboard during the term, consisting of 32 University course-sections.

In addition to the above courses, the school of Education created two Blackboard courses for cohort groups. They intend to use Blackboard throughout the duration of the students’ programs for both program support and the promotion of a sense of community among the students.

	<i>Undergraduate</i>		<i>Graduate</i>	
	<i>Created</i>	<i>Active</i>	<i>Created</i>	<i>Active</i>
<i>UCAS</i>	10	8		
<i>SBPS</i>	9	2	3	2
<i>Education</i>	5	2	8	4
<i>Rec Admin</i>	2	1		
<i>Social Work</i>	2			
<i>Extension</i>	1			
<b>Totals</b>	<b>29</b>	<b>13</b>	<b>11</b>	<b>6</b>

Table 2: Courses, created and active, Fall 2000.

### 3.3 Students

During the Fall 2000 term Blackboard reported 792 unique students enrolled in the 40 online courses that were created. Roster data from the 19 active courses shows

that 490 students were enrolled. This number represents 370 undergraduate and 120 graduate students. In most cases students received Blackboard orientation from their instructor, using class time in the lab to cover the particular aspects of the system that students would be using in the course. Information Services staff trained students in two graduate courses. The 149 freshmen in IDS 110 were trained as part of their orientation the week before the beginning of term. Because the use of Blackboard requires only familiarity with the use of a web browser, now a near universal skill, it was decided to use this less formal approach to student training. Both IS and participating faculty agreed that it would be more beneficial for the instructors to model the particular manner in which Blackboard tools were to be applied to their courses, often completing their first online assignment as a group.

### **3.4 Technical and Cost Data**

Aurora University purchased and installed Blackboard CourseInfo 4 in May 2000, for an annual licensing and support fee of \$5000. This platform was used for initial faculty training in June. In July the system was upgraded to Blackboard 5. The server (lux.aurora.edu) was initially purchased for general instructional web development, approximately \$500 was spent upgrading the system when it was decided to dedicate it to Blackboard use. The purchase of additional software was not required as lux uses Open Source software for the operating system, web server, and SQL relational database management server necessary to operate Blackboard.

During the Fall 2000 term the server was online continually. It was taken down once, at an announced time, for one hour for a memory upgrade. The system logged 938,418 "hits" representing approximately 12,003 "visitor sessions" during the term. A visitor session represents the activity (all hits) for one visitor to the web site. A unique visitor is determined by the IP address or cookie. A visitor session is terminated when a visitor is inactive for more than 30 minutes. Through the end of the term lux averaged 125 visitor sessions per day. There is no way to differentiate between visitor sessions representing students and visitor sessions representing faculty.

The Blackboard server was operated by the instructional technology director. Faculty members who have been trained request that courses be created for them on the system through a form available on the instructional technology web server (astra.aurora.edu). The empty course is created immediately to provide as much time as possible for content development. The MIS department system administrator wrote custom scripts for use with Datatel, one week prior to the beginning of the term the course rosters were extracted from Datatel and used to populate the Blackboard courses.

## 4 Faculty Survey Results

Faculty using Blackboard were asked to participate in an online questionnaire about their use of the system, the survey was divided into four sections. Sections on training issues and the use of Blackboard were intended to provide information on how faculty would be best supported by IS and to reveal which features the faculty thought to be most beneficial. A third section consisted of open-ended questions, including a question asking the faculty to compare their Blackboard experience with experiences that they may have had using other technologies as a component of their instruction. The final section was related to student issues, asking about feedback received from students as well as their perceptions of the students' feelings about using the system. The questions in this section correspond to questions on the student survey.

The faculty were notified several times about the availability of the survey. The instrument was available online during the final two weeks of the fall term. We received 13 completed surveys from 11 faculty members out of the 38 faculty members serving as instructors for Fall courses. The 14 faculty members who taught multiple courses using Blackboard were asked to submit a copy of the survey for each course to allow us to report on feature use and time commitment on a by-course basis. One instructor of multiple courses submitted data for 3 courses that they had taught.

### 4.1 Instructors and Preparation

Of the faculty who completed surveys, 9 were trained in workshops and 2 were trained using the CD-ROM. Of the 13 courses for which they provided information, 9 required the use of Blackboard for the completion of graded course work, while 4 promoted the use of the system as an optional resource.

On average, instructors spent 11.0 hours prior to the beginning of the term setting up their online course. Instructors who used Blackboard as a required part of their course prepared an average of 12.1 hours, compared to 8.5 hours spent on pre-instruction development by faculty who were using Blackboard as an optional component.

Faculty also reported a weekly preparation overhead of 2.38 hours for developing and maintaining their Blackboard courses throughout the term. This figure represents

only administrative tasks; it does not include time spent interacting with students or participating in online class activities – the distinction being similar to that between “prep time” and classroom contact time. There were again differences between faculty who required use of the system and those who were using it as an optional component. Faculty who required its use spent an average of 11.4 more minutes each week per class maintaining and developing their resources.

	<i>Use Status</i>	<i>N</i>	<i>Mean</i>
<i>Hours Setup</i>	Optional	4	8.50
	Required	9	12.11
<i>Hours Weekly</i>	Optional	4	2.25
	Required	9	2.44

Table 3: Instructor time commitment.

Faculty were asked about what kinds of training and development opportunities that would like to see offered in the future. They were asked to rate future training options on a scale from 1 to 5, with 1 indicating their greatest interest. The results shown in Table 4 suggest that their initial training sufficiently covered the key factors of system use. There was a strong indication of interest in training that looks closely at the classroom application of Blackboard, as opposed to topics related to technical proficiency. Based on this feedback IS has outlined and piloted training and materials for faculty users that focus on effective integration of online learning resources in their courses.

	<i>Mean</i>
<i>Use of Communication Tools</i>	1.55
<i>Effective Instruction</i>	1.91
<i>User Management</i>	2.64
<i>Online Evaluation</i>	3.00
<i>Basic Orientation</i>	3.36

Table 4: Future faculty training interests.

## **4.2 Use of Blackboard**

Reports on the use of various blackboard tools are available for 13 fall courses. The most frequent sections used were those that related directly to course information: course content areas (12), an online course schedule (12), announcements (10), and online course syllabi (11). Most frequently characterized as “integral” to successful participation in the course were schedules (100%), syllabi (91%), or the use of online content (83%). The use of the system to make course announcements was integral in only 70% of the courses, most likely because IS advised instructors against relying on the online announcements as the sole means of communicating important information to the students.

Eight of the courses report having used the online discussion board. Overall, faculty were most likely to use the discussion board for the posting of student assignments, reports, or reviews, but this was not always a required component of course participation. Courses in which discussion boards were required or assigned were more likely to use the system for general discussion.

Eight courses reported using online readings in the Blackboard environment or links to “e-reserve” material provided through the library. The use of Blackboard for online assessment or for the posting of instructor’s lecture notes were each reported in five courses.

## 5 Student Survey Results

The student survey was made available on the web during the final two weeks of the term. The evaluation included questions to collect background information about the student population that was using Blackboard during the Fall 2000 term. Student participation in the survey was not mandatory. Students were asked to voluntarily go to the survey web site through three means:

- A Blackboard system message that students saw when they logged in during the final two weeks of the term.
- An email invitation from Information Services sent to all students enrolled in Blackboard courses in the Fall term of 2000.
- Invitations from instructors to participate were requested both in class and online.

During the two weeks that the instrument was active 173 students submitted survey data giving us a response rate of 35.3% for the 490 students enrolled in active classes. Of the surveys submitted 22 were rejected because they provided incomplete information, leaving 151 valid surveys, a final response rate of 30.8% of students enrolled in active classes. The identities of the students participating were not recorded.

### 5.1 Student Background Information

Several of the questions on the student instrument were designed to help us to understand what resources students had access to and how they went about using the system. This information is useful not only as it relates to Blackboard, but also as a general means of understanding our students' technology needs.

A surprising number of students reported that they had difficulties getting access to an Internet-connected computer with which to access Blackboard. Twelve respondents (7.9%) indicated that "finding an Internet connected computer that you could use to access Blackboard" was a problem. In the past there have been concerns among faculty that the requirement of an online component in a course may significantly disadvantage some students. Some faculty have not proceeded with the adoption of Internet technology so as to avoid the development of a "digital divide" within their classes.

A closer look at the data provides hope that this may not be the case. While we attempted to carefully word the question so that it would be read as referring to a general problem with access to the Internet, it may have been interpreted as being about technical problems accessing the resources. Among the persons who responded affirmatively to the question about access problems, all but one indicated that they had access to computer at their place of residence. While this does not rule

<i>Students Reporting Access Problem</i>		
<i>Home Access Type:</i>	<i>Number</i>	<i>Percentage</i>
Own PC	7	0.046
Friend/Family PC	3	0.02
No PC	1	0.006
No access problem	140	0.927

Table 5: Home PC availability of students with access problems.

out the possibility that they may have access to outdated computers not capable of accessing the Internet, or that there may be financial or other reasons that they cannot access the Internet from these PCs, the reported 7.9% may not necessarily indicate that there is a large underclass of technology users among our students. The expanded promotion of the free dialup services may help to reach students who are PC owners but who do not currently have Internet access available on the PC.

When asked about PCs in their place of residence, 87.8% of the respondents indicated that they had access to a computer in the place that they lived, including 69.5% of respondents who indicated that they had their own computer. This means that home computer access among our students, considerably better than the national household availability rate of 51.0%, and is slightly better than the 82.9% of homes with PCs reported by high school students across Illinois. (US Department of Commerce, 2000; Peddle and Trott, 2001)

<i>Home PC</i>		
<i>Own</i>	91	69.5%
<i>Friend or Family</i>	24	18.3%
<i>None</i>	16	12.2%

Table 6: Availability of PC at residence.

Because the Blackboard system operates on the public Internet, it can be reached from any network-connected computer. This is advantageous as it allows maximum flexibility for students in choosing the time and location to do their work. When asked about the location from which they did a majority of their online work, an almost equal number of students reported working from either home or the Aurora University computer labs. This was surprising given the widespread availability of PCs that the students had indicated at their residences. Among students who reported having access to a computer at home, 41.7% reported that they used the campus labs as their primary point of access for their online work. This suggests that the availability of open labs continues to play an important role in student planning and management of coursework, despite the availability of home resources.

<i>Primary Access Point:</i>	<i>N</i>	<i>%</i>
<i>Home</i>	66	44.0
<i>AU Labs</i>	65	43.3
<i>Work</i>	16	10.7
<i>Public or Library PC</i>	3	2.0

Table 7: Primary access points.

Another Aurora University resource that appears to be important to students is the free dialup service. Of the respondents who worked primarily from home, 37.8% did so using the free dialup service. Overall 28.5% of respondents reported using the free dialup service. Combining the students who used the Aurora University dialup facilities from home with the students who used University labs, a total of 60% of the students enrolled in Blackboard courses relied on the University for their means of accessing the online instructional resources.

## 5.2 Student User Experience

Students taking the survey were asked two types of questions about their user experience. The first set of questions probed respondent feelings and perceptions of the use of Blackboard as they experienced it throughout the term. The second set of questions related to the specific tools and features of the Blackboard system in an attempt to identify portions of the system that they felt were particularly effective or beneficial.

### 5.2.1 Student Perceptions

The questions related to student perceptions of the use of Blackboard were coded with a 4-point Likert scale, with students choosing between strongly disagree, disagree, agree, and strongly agree with strong disagreement coded as a “1” and strong agreement coded as “4”.

Student Level		Bb was user friendly.	Bb made it easier to communicate with the instructor.	Bb made it easier to fulfill assignments and required work.	Bb made it easier to interact with fellow students.	Bb made it easier to manage course documents and information.	Bb helped you feel connected to the classroom and community.	Bb’s group tools were useful for the collaborative group activities.
Undergraduate N = 112	Mean	3.30	3.02	3.18	2.53	3.18	2.79	2.83
Graduate N = 39	Mean	3.21	3.10	3.05	3.00	2.85	2.85	2.64
Total N = 151	Mean	3.28	3.04	3.15	2.65	3.09	2.81	2.78
	Percentage who agree/strongly agree:	90.1	77.5	79.5	58.9	77.5	68.2	65.6

Table 8: Student perceptions of Blackboard.

Overall reaction to Blackboard was positive with 90.1% of respondents either agreeing or strongly agreeing that the system is “user friendly.” There was almost no difference between graduate students and undergraduates in their agreement with this statement, reporting 89.7% and 90.2% respectively.

What is interesting about these items is that two differences between our graduate and undergraduate students begin to emerge. The first is a significant difference ( $p \leq .014$ ) appeared in the degree to which the system facilitated interaction with fellow students, the graduate students reporting that it more beneficial. This is not surprising given that the use of Blackboard to promote increased student interaction is an expressed goal among both the business and education faculty using the system with graduate students. The faculty teaching graduate courses in the School of Business hope to

		Sum of Squares	df	Mean Square	F	Sig.
Student Interaction * Grad Level	Between Groups	6.478	1	6.478	6.112	.014
	Within Groups	157.920	149	1.060		
	Total	164.397	150			
Manage Information * Grad Level	Between Groups	3.196	1	3.196	3.920	.036
	Within Groups	121.505	149	.815		
	Total	124.702	150			

Table 9: Interaction and information management, by student level.

shorten classroom instruction time by conducting online discussion between class meetings. The school of education is similarly promoting Blackboard in their graduate programs by using it in many classes and providing areas for their cohort groups in which they can interact with members independent of enrollment in a particular course.

Given this emphasis on student-centered interactive features, it is of concern that only 58.9% of respondents felt that the system made it easier for them to interact with their peers. As will be shown in later sections, it appears that asynchronous collaboration is a new skill that require faculty attention and additional student experience to master.

The other statistically significant ( $p \leq .036$ ) difference between graduate and undergraduate students was their sense of the system making it easier for them to manage course documents and information. This item saw the responses moving in the opposite direction, with undergraduates finding it to be valuable for the management of course information while the graduate students found it significantly less so. This may reflect a difference in instructor focus, as low-level undergraduate courses and the First Year Experience (IDS 110) classes planned to emphasize the use of Blackboard to organize information and provide access to course content.

While it is difficult to discern whether these findings are a reflection of differences in student learning preferences or if significantly different instructional methods were used, the different ways that graduate and undergraduate students used the system seems to be reflected in the number of hours that students spent in Blackboard each week. The reason for this significant difference ( $p \leq .01$ ), shown in Table 10, is difficult to determine with our data and could be explained by differences in instructional methods used or by the students exhibiting different behavior.

	N	Mean
<b>Undergraduate</b>	112	1.8529
<b>Graduate</b>	34	3.1897
<b>Total</b>	146	2.1642

Table 10: Hours spent working online, by student level.

The final piece of data collected described how the students were fulfilling online reading assignments. While online readings (and electronic reserves) have been used on campus for over a year, Blackboard has increased the frequency of their use as instructors have greater flexibility of posting online readings and better management tools. A majority of the students (74.5%) report that they print online readings "always," 31.8%, or "usually," 42.7%. There were no significant differences between on-screen and on-paper readers when the students rated the utility of online readings as a resource.

<b>Online Readings</b> N=110	
<b>Usually Printed</b>	42.73%
<b>Always Printed</b>	31.82%
<b>Usually Read Online</b>	15.45%
<b>Always Read Online</b>	10.00%

Table 11: Online Reading Habits

## 5.2.2 Student Use of Tools

The second major section of the survey asked students to use a 6-point Likert scale to "characterize how useful each of these course features were in their contribution to your participation and learning in the class." The scale ranged from "not at all" (1) to "extremely useful" (6). Students were also allowed a seventh option for each

item to indicate that the tool was not used in their class. Data was collected for 25 Blackboard tools/areas.

The first details that emerged from Blackboard use data were statistics that show differences between graduate and undergraduate users. Undergraduates valued the course content areas more highly than the graduate students. These were the areas in which instructors would provide course information such as syllabi, lecture notes, online readings, or links to relevant web sites. There was also a significant difference between the two levels of students in rating the use of the Virtual Classroom for a virtual office hour with the instructor, though only a small number of students appear to have attempted to use it. The Virtual Classroom is a synchronous tool, allowing two or more people to interact in real-time sharing text chat, a whiteboard, and allowing to simultaneously view online resources and These distinctions again seem to be related to the combination of different learning styles and instructional methods employed at the graduate and undergraduate levels.

Level		Content Areas	Virtual Office Hour
Undergraduate	Mean	5.00	3.63
	N	104	19
Graduate	Mean	4.15	1.75
	N	27	4
Total	Mean	4.82	3.30
	N	131	23
	Sig.	.012	.036

Table 12: Significant differences in tool use, by student level.

The feature rated as most valuable by students was the online discussion board. Blackboard’s discussion boards are asynchronous communications areas that use a threaded discussion format. Faculty can set up “forums” for various topics in the course, then faculty or students can post a note to the forum. Members of the class read the note and post responses that are then displayed to other users as being part of the same “thread.” During training faculty were introduced to three ways of using the discussion board as part of their courses. Discussion boards could be used for “general discussion,” meaning that the forums were related to course topics, class readings, or questions that arose in the course of instruction. The second suggested use was using the discussion boards for student assignments. The assigned uses of discussion boards included responding to questions posed online by faculty; posting of student-written assignments, reports, or reviews; or requirements that students engage and comment on the posted work of fellow students. The third suggested use of the discussion boards was for student-led discussion, which may include elements of the other two uses selected and led by a student or student group.

	General Discussion	Posting Assignments	Student Discussion
N	80	103	51
Mean	4.19	4.60	3.80

Table 13: Use of discussion boards.

Interestingly, the student-reported value of each of these activities is related to the degree of instructor-provided structure. The use of the discussion boards for assignments typically involved the instructors providing questions or other starting points for student participation. Unless successful instructor-led activities had already been modeled in the course, student-led discussion projects may have been

more difficult to effectively implement, as the students may not have had the experiences necessary to construct effective activities. The significant ( $p \leq .01$ ) difference between instructor-specified assignments and student-led activities reflects research findings that show effective online discussion to rely on instructor modeling and the provision of effective scaffolding activities for students. (Ahern, 1999; Becker and Dwyer, 1998; Funaro, 1999; Graham, Scarborough, and Goodwin, 1999; Hiltz, 1998; Wenger, Holloway, and Garson, 1999)

Among the highest rated features of the system were the email utilities. Because email is the Internet tool that a majority of students are likely to be familiar with prior to using Blackboard it follows that people would feel positive about using it in class.

Students were asked about the three modes of email integration that Blackboard supports: messages sent to the entire class, messages sent to a working group to which the student belongs, or messages sent to individual

	Email Entire Class	Email Work Group	Email Individuals
<b>N</b>	81	57	79
<b>Mean</b>	4.01	3.40	4.20

Table 14: Use of email tools.

students. Surprisingly, students who reported using Blackboard for email communications within a working group rated the value of the feature significantly lower than mail to the entire class or mail to individuals. This suggests again that we need to help our students develop online collaboration skills.

The mail interface in Blackboard is not full-featured. Students cannot read their mail on the system, it only allows for messages to be sent. It does not keep copies of mail either, so students using it to send messages do not have a record that they sent a message should there be a dispute over attempted delivery. So while there are clearly advantages to using a client-side email program or a full-featured web mail service, students reported use of the system for the sending of individual emails to be more valuable than the workgroup features that cannot be found anywhere else. One explanation is that Blackboard serves as a useful directory service. Blackboard allows students to set their preferred email address at which to receive mail, and approximately two-thirds of students use personal mail accounts not provided by the University. As a directory service it is a useful way of finding the address of another student. Information Services should consider this in looking to expand web-based email services and expand directory services.

Additional evidence of problems understanding how to effectively collaborate is suggested by the poor ratings given to the group tools. Blackboard's group functions allow the instructor to designate students as part of a work group, giving the group a private discussion board, mail functions, virtual classroom, and an area that provides for the browser-based exchange of files. This was only used by a small number of students, but faculty report that they are increasingly more apt to use these functions to promote collaborative group-based projects. It is interesting to note that the same functions that are part of the group toolbox received generally good scores when rated independently by the students. This suggests that the students lack a clear understanding of how to efficiently use groupware tools to promote efficient collaboration. This interpretation is consistent with other research that has indicated a need to assist students in transitioning from face-to-face collaboration into

	Group Use	Group Web Page
<b>N</b>	28	23
<b>Mean</b>	3.36	3.26

Table 15: Use of group tools.

technology mediated relationships with their peers. It also assists in our understanding of the findings about student use of email and discussion board functions reported elsewhere in this report.

Another poorly rated feature of the system was the Virtual Classroom. It is apparent that only a small number of students attempted to use the tool, and only one faculty member reported using it as a non-integral

course component. In faculty training sessions, as well as in the faculty focus group, there is nonetheless considerable interest in the possibility of using this real-time element as part of instruction. The low ratings from the students may reflect our experiences in experimenting with the tool during training –

that it is more difficult to learn the controls for real time chat, and that it is also more susceptible to technical problems because it is a Java applet and, therefore, dependant on the user's computer for proper operation. It is also possible that student did not like the possible time constraints involved in using this tool. This is the only feature of Blackboard that requires participants to be online at a specified time in order to participate.

	VC Office Hour	VC Class Meeting	VC Group Meeting
<b>N</b>	23	21	20
<b>Mean</b>	3.30	3.52	3.45

Table 16: Use of Virtual Classroom.

## **6 Additional User Feedback**

In addition to the numeric data collected, students and faculty were given opportunities to provide free-response feedback in the final section of their questionnaires. Participating faculty did not provide any additional information. We received written responses from 104 students. During the University's winter break we also conducted a faculty focus group to discuss expectations, experiences, and ideas about future use.

### **6.1 Faculty Focus Group**

During winter break three faculty members who taught with Blackboard in the Fall term participated in a focus group. The comments and experiences related by the faculty members have contributed to all areas of this report and were helpful in interpreting student data, particularly with respect to collaborative work.

### **6.2 Student Comments**

The student survey instrument included opportunities to enter open-ended questions about the students' Blackboard experiences; 104 of the respondents wrote responses to these prompts. Student responses fell into seven broad categories.

#### **Positive Comments**

The most frequent types of responses were general positive comments about using the Blackboard system in class. Comments of this type include students liking Blackboard, loving Blackboard, claims that it was easy to use, and comments that they found it to be a useful learning tool. Approximately 29% of respondents made general positive comments.

#### **Time Demands**

The second most frequent comment (12%) was related to the time demands of using Blackboard in a course. Students specifically mentioned having to do tasks online that would have been more easily done in class. In many instances they had to go online to get assignments and indicated a preference to receive the assignment in class. Related comments came from students who were surprised by the amount of time that the online assignments took, indicating that the instructor should take this into consideration in the future. The general tone of these comments indicated that the students did not appreciate doing online work that did not have a clear advantage over traditional methods of delivery.

#### **Communication**

Approximately 10% of the respondents mentioned, both positively and negatively, the communication capabilities of the system. Some students voiced a general fear that Aurora University would use Blackboard to automate instruction leading to less personal interaction; an equal number indicated the development of a better student-faculty relationship because of the additional communication opportunities.

## Negative Comments

Approximately 8% of respondents made general negative comments about using Blackboard. The most common comment was that the system was confusing to use. Some students simply noted that they did not like, or even hated, the system.

## The Digital Drop Box

The only specific feature of Blackboard that generated student comments was the Digital Drop Box used for the electronic submission of work. The Digital Drop Box enables students to upload files (word processor documents, spreadsheets, &c.) to the server using their web browser. Students then submit the files to the instructor's drop box for use or review. Some students (2.6%) found this feature confusing, and did not feel that their work was reliably submitted to the instructor. Investigation of this problem found that the Blackboard user interface encouraged students to upload files without actually submitting them to the instructor. Instructors have been notified about this problem, and have been encouraged to let their students know about the confusing interface.

## Instructor Abilities

A few students (2.6%) commented that they felt their instructors needed more training. It appears that in a couple of classes students were being asked to perform tasks that the instructors themselves did not know how to do, which resulted in students becoming confused and frustrated trying to perform the assigned activities. We have made efforts to remind faculty that they need to be familiar with all of the Blackboard features that they assign to the students, and have offered to assist any faculty members who have questions about using specific Blackboard components.

## 6.3 Technical Comments from Students

Thirty-six students (24%) reported technical difficulties using the Blackboard system. Respondents were given the opportunity to describe technical problems that they encountered and they noted 49 specific problems using the system.

During the term the majority of the technical support calls received by IS staff were related to student passwords. Helpdesk and lab staff were effective at directing students with password difficulties to the proper staff members, and most issues were resolved in a short amount of time. Some students reported problems with their accounts not being created on the system at the beginning of the term. Students who enrolled in Fall courses in the week prior to the beginning of the term, and who had not been enrolled at the University in either of the two previous terms, were not automatically entered into the system. Accounts were created for these students when they or their instructors notified the

<i>Problem</i>	<i>Responses</i>
<i>System Down or Inaccessible</i>	14
<i>Account / Password</i>	9
<i>Server Speed</i>	5
<i>Network Access (Home/Office)</i>	5
<i>Session Timeout</i>	3
<i>AU Dialup Server</i>	3
<i>More Training Needed</i>	3

Table 17: Student Technical Problems

department. Instructors are now encouraged to look carefully at their class rosters at the beginning of the term to make sure that all of the students are properly enrolled in their Blackboard course.

Two of the problems identified by students dealt with technical difficulties related to access from home. Five students reported network access problems, specifically mentioning problems connecting from home. While these types of problems are beyond the ability of IS to provide technical support, there were an additional three students who mentioned known access problems specific to the AU dialup server: one mentioned busy signals, while the other two mentioned dropped connections.

Several students mentioned the speed of the server. While this may be a problem that is conflated with the speed of student dialup connectivity, it did appear that the server was using memory in a manner that may have affected performance during periods of heavy use. Changes were made to the system during the first week of term to remedy this problem. The system otherwise operates at ~5% of capacity. Problems of reported slowness are more likely related to intermittent network events or the condition of the user's connection from an off-campus location.

Some students related, both through the survey and to support staff, the frustration that they experienced when their sessions would "timeout." When a user is idle for an extended period of time Blackboard assumes that they have left the machine and, for security purposes, requires that they log back in. This can be problematic in instances where the student has been reading and composing a lengthy message only to find that when they try to submit it to the system they are asked to re-authenticate and their work is lost. Students who are going to be composing assignments in the system should be warned about the session timeout limit, or should be encouraged to compose lengthy replies in a word processor that may be copied and pasted into the browser for posting.

At this time we are unable to explain the meaning of the fourteen reports of the system being down. Throughout the Fall term the Blackboard system running on the lux server was online, available, and functioning properly. The system was taken down once for an announced service after 11:00 PM for less than one hour in order to apply software patches. During the Fall term the University did experience intermittent network outages. It is possible that these network outages, combined with difficulties attributable to the students' home computers, may have given students the impression that the server was having difficulties.

## 7 Paths For Future Blackboard Use

The information contributed by our students and faculty was of high quality and has informed current and future uses of the system.

### 7.1 Supporting Students

- Because a large number of students rely on the labs to do their online work, we should consider providing Blackboard training for all lab assistants. Lab assistants successfully provided a basic level of support when provided with troubleshooting guidelines for students having difficulty logging in, they could prove to be a valuable resource for providing assistance with other functions (such as the Digital Drop Box) as well. This would be especially important during evening hours or late in the term when students may have time-sensitive assignments during hours that the regular IS staff is not on campus.
- The University needs to insure the provision of access to students. While the number of courses using Blackboard increases, there will be a need to expand the students' understanding of home access options to relieve pressure on the campus labs. We should aim to utilize the high level of home computer access that our students report by encouraging them to work online via the University dialup services or through their own ISP.

### 7.2 Faculty Training and Support

- It is important to note that time commitment reported for additional weekly preparation is by-course. We now see instructors using Blackboard with multiple courses, so their time commitment for administrative work related to online instruction is increasing arithmetically.
- Information Services should provide additional introductory training sessions for faculty who have not yet used the system but who wish to learn.
- Information Services should offer a one-hour "refresher" course for faculty who are currently using the system to discuss issues that arose during this study and to address their specific training needs.
- Information Services should offer a one hour workshop on "effective practices" for faculty who are currently using the system and provide written or online support materials. This was successfully piloted in the winter term with a small number of faculty and could be easily expanded through an open workshop or workshops planned for users in individual departments.
- Suggestions should be provided for faculty on the effective use of the discussion features of Blackboard, particularly with respect to teaching at the graduate level. Research suggests that activities using online discussion boards should be clearly modeled by instructor participation in early use to provide a framework and examples for student participation.
- Faculty need to be aware that students may not know how to effectively collaborate using online tools, even though they may be effective at group work using face-to-face methods. Faculty should monitor group progress

involving online collaboration, and should provide additional guidance until students seem comfortable and proficient interacting in this new environment.

### **7.3 Instructional and Technical Issues**

- Faculty should be aware of student anxieties about the “automation” and depersonalization of learning; they should use the communications facilities of the system to increase student-instructor contact as well as communication among the students themselves.
- Faculty should encourage student feedback and quickly work with Information Services to provide appropriate student or faculty training for emergent problems.
- Information Services should stay in contact with faculty regarding novel applications of the system. We should also make sure that faculty know of non-Blackboard options that may be more appropriate for their instructional goals.
- Information Services should continue working with departmental technology committees on identifying appropriate uses of Blackboard in courses or at the program level.
- Instructors need to think carefully about using the Virtual Classroom features. While it can serve as a powerful synchronous teaching and collaboration tool, it requires more training than other elements of the system. Because it is a Java application it is more susceptible to problems with the client computers. Instructors should consider using it as an optional activity so that they have firsthand experience using the tool before planning to use it for critical instructional purposes.
- Information Services should monitor system use and insure that the server is operating efficiently under increased course loads.

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## Appendix A: The Faculty Bb Survey

### 1. Training Issues

Course ID and section:	
I received Bb Training:	in a workshop from cd-rom
Use of Bb services in this class was	required not required, but strongly promoted optional
Did your students receive any orientation	from it staff from instructor none
If IS were to offer additional faculty training, rate how useful you would find each of the following from 1 to 5 where 1 is most useful and 5 is least useful.	Additional basic orientation Student/roster management (add/drop students) Online evaluation (quizzes and tests) Developing online courses for effective instruction Using Bb's communication tools

### 2. Student Issues

How many (provide a number) of your students reported problems finding a connected computer that they could use to access Bb?	
How many (provide a number) of your students reported technical problems accessing Bb (other than password problems)?	
Based on student feedback, please estimate the percentage of your students who would agree with the following statements:	
Bb was user friendly:	
Bb made it easier to communicate with the instructor:	

Bb made it easier to interact with fellow students:	
Bb made it easier to manage course documents and information:	
Bb helped them feel connected to the classroom community:	
Bb's group tools were useful for collaborative/group activities: (if groups were used)	

### 3. Using Blackboard

Approximately how many hours did you spend before the beginning of your course developing materials for use in Bb?	
Approximately how many hours per week did you spend administering/maintaining your Bb course (do not include time spent using the system features)?	
<p>Please describe your use of the following Blackboard features according to the following four-point scale:</p> <p style="text-align: center;">1: Did not use.</p> <p style="text-align: center;">2: Optional, or not integral to the course.</p> <p style="text-align: center;">3: Recommended, or integral to the course.</p> <p style="text-align: center;">4: Required or assigned.</p>	
Announcements	
Staff Information	
E-Mail: Entire Class	
E-Mail: Work Groups	
E-Mail: Individual Students	
Content Areas (course documents, assignments, course information)	

Posted online syllabus	
Posted online course schedule	
Posted online reading materials	
Posted online class notes	
Discussion Board: general discussion	
Discussion Board: posting of student assignments, reports, or reviews	
Discussion Board: student-led discussion	
Virtual Classroom: virtual office hour	
Virtual Classroom: virtual class meeting	
Virtual Classroom: small group meetings	
Use of Groups?	
Group web pages	
External Links	
Tools: digital drop box	
Tools: course calendar	
Tools: To Do list	
Assessment: (graded quiz, self-review, survey)	
Online grade book	
Resources: subject specific information from Blackboards online resource site	

#### ***4. Alternate Technologies***


<p>If you have previously developed your own course <b>web site</b>, what are the <b>strengths</b> of Bb compared to having done your own work?</p>	
<p>If you have previously developed your own course <b>web site</b>, what are Bb's <b>weaknesses</b> compared to having created your own site.</p>	
<p>If you have previously used a <b>mail list</b>, how does Bb compare with respect to a channel for communication with your class and the facilitation of electronic discussion?</p>	
<p>If you have previously used <b>WebBoard</b>, how does Bb compare with respect to a channel for communication with your class and the facilitation of electronic discussion?</p>	

## Appendix B: The Student Bb Survey

### 1. Training

Course ID and section: (e.g. IDS 110-4)	
Use of Bb services in this class was	required not required, but strongly promoted optional
Did you receive any orientation?	from Information Services staff from instructor from a fellow student none

### 2. Student Issues

Did you have any problems finding an Internet-connected computer that you could use to access Bb?	Yes No
Do you own or have access to a computer where you live?	Own a PC Have access to PC (friend or family) No home access
What was your primary means of accessing Blackboard this term?	AU Labs Home/Dormitory Dialup Connected PC at work Other university Public access point or library
Do you use Aurora University's free dialup service to access the Internet from your home or dorm room?	Yes No
Did you experience any technical problems accessing Bb (other than password problems)?	Yes No <i>If yes, please describe:</i>
Based on your experiences this term, would you agree or disagree with the following statements:	
Bb was user friendly:	<input type="text"/>  (Agree Strongly; Agree Somewhat; Disagree Somewhat; Disagree Strongly)
Bb made it easier to communicate with the instructor:	
Bb made it easier to fulfill course assignments	

and required work:	
Bb made it easier to interact with fellow students:	
Bb made it easier to manage course documents and information:	
Bb helped them feel connected to the classroom community:	
Bb's group tools were useful for collaborative/group activities: (if groups were used)	

### 3. Using Blackboard

Approximately how many hours per week did you spend working for your course in Blackboard?	
--	--

If your course included online readings (or electronic reserves), did you usually read the materials online or print them out?	
--	--

Please characterize how useful each of these course features were in their contribution to your participation and learning in the class. **This section uses a six point scale where 1 means not useful at all and 6 means extremely useful.** Use 0 if that Blackboard feature was not used in your class.

Announcements	<input type="text"/>
Staff Information	
E-Mail: Entire Class	
E-Mail: Work Groups	
E-Mail: Individual Students	
Content Areas (course documents.	
Posted online syllabus	
Posted online course schedule	

Posted online course schedule	
Posted online reading materials	
Posted online class notes	
Discussion Board: general discussion	
Discussion Board: posting of student assignments, reports, or reviews	
Discussion Board: student-led discussion	
Virtual Classroom: virtual office hour	
Virtual Classroom: virtual class meeting	
Virtual Classroom: small group meetings	
Use of Groups?	
Group web pages	
External Links	
Tools: digital drop box	
Tools: course calendar	
Tools: To Do list	
Assessment: (graded quiz, self-review, survey)	
Online grade book	
Resources: subject specific information from Blackboard's online resource site	

#### 4. Alternate Technologies

If you have previously used other Internet tools (WebBoard, mail lists, professor authored web	
--	--

<p>pages), how does Blackboard compare as both an instructional tool and a communications channel. Please make sure to let us know what tools you are comparing Bb to.</p>	
<p>Do you have any comments about Blackboard in general, or about the ease-of-use of the interface?</p> <p>If you are filling this survey out for a second course, did the use of Bb in multiple courses affect your perception of the system?</p>	