EVALUATING THE MOBILE COMPUTING PILOT PROGRAM: A COLLEGE-WIDE INITIATIVE

Summary of Results from 2001-2005
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Executive Summary

During 2001-2005, the goal of the Mobile Computing Pilot Program (commonly referred to as the Laptop Program) was to determine how the use of laptop computers and wireless connectivity can enhance the undergraduate academic experience in engineering. This program was conducted out of the Student Owned Computing program of the College of Engineering. The assessment of the impact of the wireless technology was focused on several specific objectives. These objectives included evaluating the impact of the technology on student learning in the area of problem-solving, the impact of teaching with technology on faculty pedagogy and workload, and assessing student, faculty and technical staff’s satisfaction with the Student Owned Computing program. One of the main targets of the program was to have both the faculty and students using the laptops during some or all of the class periods of the selected courses.

The pilot program started with a small group of courses, and asked for a small number of volunteers from the honors students. As the implementation issues of providing the technology were solved, more and more courses, faculty and students became involved in the program. The third and fourth phases of the program did not focus on honor students, but was open to all incoming engineering students. Fall 2003 program had 200 student volunteers and fall 2004 had 300 student volunteers. The program identified laptop pilot courses; the program started with six courses and increased to more than 16 courses offered any one semester. It should be noted that both the faculty and students were volunteers for this program. As we assessed the impact on learning, we developed “comparisons” groups of students based on SAT scores, however, the volunteer and enthusiasm of both faculty and students need to be considered in any interpretation of the assessment results.

Conclusions:

Beginning in Fall 2006, the college of engineering expects all incoming undergraduate students to have a laptop computer that meets college specifications. Based on increased number of students who bring laptops to the university, the successful development of infrastructure to support technology in classrooms, and the positive assessment showing improved student learning and student satisfaction, the College of Engineering decided to recommend that all incoming undergraduate engineering students bring a laptop computer to the university beginning fall 2006.

The students needed to be empowered to solve their own problems with the technology. Therefore, beginning in fall of 2004, the students were taught about their computers in a modified course: E115. The laptop sections of E115 taught students about the technical aspects of maintaining their computer, how to interface with the campus computing infrastructure, and allowed them to choose their own operating platform (Windows, Mac, Linux). The assessment results showed that during the first year of implementation of this course, the number of logged help calls for the laptop program decreased by more than half. This modified course was a very important addition to the program.

One of the most important factors that impacted student learning and satisfaction was how the technology was used during classtime. The Pilot Program increased emphasis on
pedagogy during fall 2003-spring 2005. Efforts were made to work with faculty to improve their courses with technology through seminars, summer training sessions, faculty forums, and direct consultation. Throughout the four years of the pilot program, the faculty modified their teaching using a variety of pedagogies, modifying what they did and what students did in class. For example, many faculty integrated the lecture with hands-on experience instead of conducting lectures in large classrooms with smaller labs conducted by TAs. Many faculty added the Internet and problem-solving as part of their pedagogy. They added more complex, real world or technically challenging problems to class time activities. Many faculty incorporated the software appropriate for their course into the classroom activities (i.e., MAPLE, Excel, MATLAB). Those that used teamwork or cooperative learning, continued to use those pedagogies, but also used the technology as “partner” to the teams.

Direct assessment of student learning showed that those in the laptop sections of courses increased in problem-solving abilities in a number of ways. The students increased in their ability to visualize the material, their ability for preciseness of geometry and dimensioning of modeling; and in their ability to write software programs to solve tasks. It seems clear that what students are learning in the laptop sections may be different from traditional courses in several ways including depth of material, types of material learned and ability to better visualize information. During 2003-2005, direct assessment of the impact of technology on student learning needed to wait until more engineering faculty had appropriately modified their courses to integrate the technology. More direct evidence of student learning is currently being conducted.

Survey results showed that most of the students said that laptops made learning more enjoyable and stimulating. The laptops gave them freedom to work any place, any time; in-class use of instructional technology stimulated learning; classes were positively affected by integrating laptops; experience increased comfort in using their laptops and laptops improved communication with classmates and faculty.

Survey results from faculty showed that most agreed that the laptops in class enhanced student learning. More than half of the faculty agreed that students were more involved in learning in their laptop courses. The faculty indicated that the pace, depth, and variety of the material was increased because of the addition of the technology usage. At times, the pace may be slowed by technical difficulties or by students spending more time on complex problems.

Students, faculty, and staff were satisfied with the quality of the technical support, the Pilot Program implementation, and use of the wireless technology in an academic setting.