Pearce Center Presentation
Pilot Laptop Program
College of Engineering and Science

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Introduction. In the fall of 1998, 105 engineering and science freshman brought a prescribed laptop computer and software to campus and matriculated in a minimum of three special courses taught in newly renovated classrooms. These classrooms provide a technology lectern for the instructor and power and network connections at the student tables. The pilot laptop program is an experimental study of the use of anytime, anywhere computing in support of a student-centered, active learning model of instruction. The goals of this program include improvement in teaching and learning, retention rate, written and oral communication skills, team building skills, curriculum integration, and quantity and quality of applicants. Please visit our laptop web site at http://www.ces.clemson.edu/laptop.

Studio Classroom. A studio classroom provides technology for the instructor and computers for the students. Individual or group computer exercises become another active learning activity that can be used to break the traditional lecture into mini-lectures. This is not a new idea. Some schools such as RPI have built special studio classrooms using desktop computers and introduced courses such as studio calculus and studio physics. With the advent of desktop equivalent laptop computers and inexpensive networking (including wireless), studio classrooms are within the reach of most universities. Our college currently has fifteen laptop studio classrooms and two desktop studio classrooms, in addition to traditional computing labs. We must assess the value of the studio classroom for teaching and learning and determine what types of classrooms to build in the future. In this regard Bernadette Longo makes the following comments about laptop freshman English in the fall 98 semester. "I found that I was teaching more in a workshop mode because of the resources we had with the networked laptops. Instead of having students guess about what they should be doing out of class and then bringing their products to me for evaluation, I found that I could intervene in their work process real-time because we had many of the necessary resources right there in the classroom. I think this kind of coaching while students are doing the work is more helpful for their understanding of the writing tasks I was asking them to learn. If they had questions, they could get them answered right there, and other students probably had the same questions. When I saw questions cluster during the class sessions, I knew what I needed to cover more thoroughly for the whole class. So we both had real-time feedback on the learning."

Lab in a book bag. Groups of three or four laptop students often work together on group projects outside of class. These students are not limited to labs or dorm rooms for computer and network access and have great flexibility in choosing a location for group work. Students report that e-mail and bulletin board tools have become increasingly useful. Laptop freshman English students gave each other lots of (required and graded) feedback on their writing via the bulletin board. Through this process, students learned to be productive collaborators and to revise their writing based on peer and teacher feedback. Our assessment is that students learned much more about the writing process because of this facilitated feedback. Students are staying "connected" throughout the day as they move around the campus. The old model of logging on once a day often does not suffice. Also, the traditional lab layout of rows of tables does not facilitate group discussion.

Professional Practice. A recent survey conducted by the University of Oklahoma, College of Engineering indicates that over 100 engineering programs in the United States will mandate student computer ownership within the next two years and it appears that most will choose laptops. Two justifications are often cited for student ownership. The first is that students are already bringing computers to campus in large numbers. The second is that mandating student ownership allows the cost of the computer to be figured into financial aid. About 73% of Clemson engineering freshmen brought computers to campus for the fall of 98 (88% out of state, 55% minority, 81% other). About 10% of these freshmen brought laptops, not counting the students participating in the laptop program. If mobile computing becomes a significant part of engineering practice, then immersing undergraduates in this environment is justified.

Course Management System. The laptop program adopted the course management system WebCT. We wanted our faculty to have access to the complete set of currently available tools which include private e-mail, bulletin board, chat, white board, individual and group student presentation area, surveys, quizzes, grade maintenance, progress tracking, glossary and index, and content searches. WebCT was made available across the university and as a consequence approximately 6000 Clemson students used WebCT in the fall of 98. A student survey indicated that students thought the positives far out-weighed the negatives. The most consistent positive response was "I love being able to see my grades anytime." The most consistent negative response was "Why don't all courses at Clemson use WebCT." The use of on-line quizzes was a hot topic. Many students loved the immediate feedback. A few students did not like the impersonal nature of electronic communication, but many more said that WebCT made them feel that their instructor was available all the time. Laptop faculty members were given a course in WebCT and one month of summer support for course development. Technically advanced laptop students were hired and trained to provide technology assistance to faculty members, primarily in the area of WebCT course construction.

Assessment. Through surveys and interviews, we plan to compare the laptop students and a control group over the life of the project. A November survey was conducted to establish computing experiences prior to entering Clemson. This survey showed that our engineering majors have more experience than our science majors with e-mail, word processing, spreadsheets, and team activities. We will begin to assess the value of laptop computing to teaching and learning in the spring of 99.