Developing and Implementing a Laptop Program

William F. Moss
Laurie H. Sherrod
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Introduction

In the fall of 1998, 105 Clemson engineering and science freshmen brought a prescribed Dell Latitude CPi laptop and software load to campus and matriculated in a minimum of three special courses taught in newly renovated classrooms. These classrooms provided a technology lectern for the instructor and power and network connections at the student tables. In the years 1999-2001, the pilot continued adding more students each year - culminating with more than 1000 freshmen with laptops in 2001. The College of Engineering and Science Pilot Laptop Program was an experimental study of the use of mobile computing in support of an active learning model of instruction. The goals of this program included improvement in teaching and learning, retention rate, written and oral communication skills, team building skills, curriculum integration, and quantity and quality of applicants. Our challenge was to assess the value of this environment to meeting these goals.

At the conclusion of the pilot program, the university decided to mandate laptops beginning in 2002. The first year of the mandate required freshmen/sophomores in the College of Engineering and Science and freshmen in the College of Business and Public Affairs to own laptops. The second year will add the College of Arts, Architecture, and Humanities and the College of Agriculture freshmen. The third year will complete the freshmen class. So by 2007 all undergraduates will have laptops. When the mandate began, the program management moved to the computing department.

Pedagogy First

There are at least a dozen reasons why a laptop program is a worthwhile experiment. In this day and age the call for the use of technology in education is coming from diverse groups. Teachers at all levels are saying consider pedagogy first. At many schools innovators are hammered with statements like "the research is not yet in" or the "longitudinal studies have not been completed." Yes, these statements are correct. Laptop programs are part of a set of experiments being conducted worldwide to determine the effect of technology on teaching and learning. They are bold experiments often conducted in the face of a good deal of opposition to changes in the traditional modes of instruction.

The big news of the electronic age is the enhancement of communication. As a consequence, employers are now telling us that they are looking first at the communication skills of potential employees, written and oral, and they are also looking at team building skills. Five years ago, they were telling us that content knowledge was number one. While still in the top five, content knowledge has moved down the list. When fully integrated into the curriculum, a laptop can greatly enhance all types of communication. At Clemson we say that our pilot laptop program was an experimental study of the use of mobile computing in support of an active learning model of instruction. By active learning, we mean anything other than the traditional 50 minute talking head combined with practice in stenography. We are experimenting with cooperative learning and we regard our classrooms as studios rather than lecture halls. Student-student, student-instructor, and student-expert communication is a big part of what we are doing.

Before implementing a pilot laptop program, talk to your faculty about the enhancements to pedagogy that are possible. Get them excited about experimenting with new modes of teaching and learning.

Prerequisites for a Successful Pilot

A **champion** at the dean's level or above can rally faculty and staff support and can appoint a laptop committee to develop a plan and write a proposal for funding.

The **laptop committee** must develop a broad vision of the needs of the program and write a proposal for funding which includes the following items.

- Set of laptop courses to be offered.
- Student cohort size and composition.
- Instructor cohort size and composition.
- Smart classrooms providing for projection of the instructor's laptop and network connections for the instructor and students.
- Network connections in dormitories.
- Improved network capacity and reliability.
- A course management system and server.
- A program manager.
- Laptops for faculty.
- Scholarship laptops for needy students.
- Faculty development workshops.
- Faculty summer support.
- Staff hours to cover the helpdesk and repair center.
- Spare laptops for the helpdesk and repair center.

- Summer orientation for laptop students and parents.
- Student technology assistants.
- Processing of student applications.
- Advertisement.
- Time table for rollout.

A laptop **program manager** is the focal point for the project. This individual typically will perform the following tasks.

- Vendor interviews and testing of evaluation units.
- Preparation of a service agreement with the laptop vendor.
- Licensing of software.
- Preparation and testing of software load.
- Scheduling of laptop classes.
- Presentation of student and parent orientation.
- Presentation of student how-to workshops.
- Management of student technology assistants.
- Training helpdesk workers.
- Management of program web site.
- Coordination with laptop vendor, network services, housing, the helpdesk, and the laptop repair center.
- Communications with and advice to students and parents

A bullet proof laptop provided by a **vendor** who will provide a **service agreement** is a necessity. This service agreement should include a schedule for the following.

- Delivery of evaluation units.
- Decision on program laptop for the next academic year.
- Software load development
- Delivery of the software load to the vendor if it will be installed at the factory.
- Vendor training of repair center staff.
- Faculty orders.
- Laptop student orders - processes and troubleshooting.

In addition, the service agreement can include

- Warranty and insurance.
- Spare laptops for the helpdesk and repair center.
- Scholarship laptops for needy students.
- Actions to be taken if it is not possible to meet delivery dates.

Minimally the **campus network** must extend into the classrooms and dorm rooms used by laptop students, and into the offices of laptop faculty. Students and faculty must be able to reliability connect to the network in different locations without reconfiguring their machines. With the approval of the IEEE 802.11 wireless standard in the fall of 1999, the possibility of using wireless networking has greatly expanded.

Students and faculty must have faith in technology in order to use it effectively. If their laptops do not have a high percentage of up-time, a laptop program will soon lose its appeal. The goal of the **helpdesk and repair center** is to strive for 100% up-time. In most cases, this means that a user must leave the helpdesk with a functioning machine that contains his data. Minor problems such as a loose keycap can be handled in a matter of minutes. Problems requiring longer repair times will likely (depending on the user's needs) necessitate swapping the user's hard drive into a spare machine and the reverse swap when the repair has been completed.

In addition to access to campus e-mail and web services, laptop students and faculty need **a course management system** to facilitate communication within their courses and between courses in cases of curriculum integration. At Clemson we are using WebCT along with a homegrown system called the CLE.

Faculty development is often taken to mean teaching faculty how to make web pages and how to put course materials into a course management system. This is certainly a first step, but it is likely to be one already taken by laptop faculty. New laptop faculty need workshops which present the successes and failures of other laptop programs, along with suggestions for fully integrating the laptop into the curriculum. In addition, faculty may need guidance in the use of cooperative learning strategies which lend themselves well to a laptop environment. Curriculum development should be the focus of the faculty. Through workshops, colloquium talks, and brown-bag lunches, laptop faculty need to share their successes and failures with each other. There are by now several mature laptop programs, such as the ones at Wake Forest University, Seton Hall University, and Rose-Hulman Institute of Technology. The faculty and staff of these programs represent a source of expertise. In addition, there is a growing number of laptop conferences.

Early on a **program assessment committee** should be appointed. Assessment can take several forms: periodic surveys, critical incident interviews, and a longitudinal study of a laptop group and a control group.

Planning for Expansion

Major hurdles to expanding from a pilot program to a college-wide or university-wide program include acceptance by the faculty of the laptop approach to teaching and learning and willingness of the administration to renovate dorm rooms and classrooms.

Schools with a small, young faculty will not have much trouble convincing them to try something new but larger schools typically have a high percentage of "late adopters" who are hard to convince. Laptop programs need champions in high places. Of course, there is always the bribe. By offering faculty a laptop, faculty development workshops, and technology assistance (hand holding), much of the opposition can be removed.

Schools are continually renovating classrooms and building new ones. The smart classroom has become a standard in the last five years so there should be no argument about that. Providing a port per pillow in dormitories has also become fairly standard in the last five years. What is less clear is whether we should provide network access to students in the classroom and if so, how to do it.

With the approval of the IEEE 802.11 standard for wireless networking in September 1999, three Ethernet drops in the ceiling should be added to the specifications for smart classrooms on all campuses. These drops will allow the placement of up to three wireless Access Points in every smart classroom. The cost is insignificant. Schools that are not already wired should look carefully at the wireless option. Wireless classrooms are configurable classrooms. Seating does not have to be in fixed rows. Classroom furniture can be rearranged to suit the needs of each class.

Campuses such as Clemson have gone far down the wired road. All faculty offices and all dorm rooms have been wired. We have 17 classrooms with wired network access at the student tables and 111 smart classrooms.

In early 2003, we have 118 wireless locations (including a lot of 'spillover' into undocumented locations). Students in 2001, 2002, and 2003 have laptops with built in wireless. As remodeling funding is available, desks are being replaced with tables and chairs in rooms with smart classroom and wireless capability.

Mandate Management

Mandate management usually moves to the computing department.

- Why would a computing department endorse a mandate? A common machine among most or all students provides for much simpler support
- A common software image makes recovery of 'broken' Windows a very quick fix
- Common parts make sharing/replacing of parts a quick and painless procedure
- When all students have a computer, the needs for labs and lab classrooms decreases dramatically
- When all students have printers, the printing costs for the computing department decrease significantly

What are the annual management steps?

- Decide on a vendor, a recommended laptop and minimum specifications
- Notify students and parents
- Plan classes / classrooms
- Host workshops/presentations

Laptop Support

Key elements to laptop support:

- Images - provide a clean software image that students can quickly return to (we use Norton Ghost)
- Partition Hard Drives - put the clean image on the C: drive, direct student data to the D: drive - for backups/easy restorations
- Web page with common solutions
- Help desk with software/diagnostic technicians and hardware technicians
    - Student signs in our database
    - Our diagnostic technician decides if it is hardware or software. If it is software, he handles it.
    - If it is hardware, he sends it to our hardware technician. If it cannot be resolved while the student waits (or if parts need to be ordered) his hard drive is put in a matching loaner and he returns later when it is repaired.

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Mrs. Laurie H. Sherrod – http://www.clemson.edu/~laurie – laurie@clemson.edu
Dr. William F. Moss – http://www.math.clemson.edu/~bmoss/ - bmoss@clemson.edu