UT College of Natural Sciences
Information Technology Vision Plan

2006-2007

Introduction

The College of Natural Sciences is one of the largest providers of information technology to UT students.

- We put more than 1,000 computers in front of students of all majors.
- We have 5,664 seats in 64 standardized technology auditoriums, classrooms, and seminar rooms; 15 of these auditoriums are also equipped with student response systems.
- We have 30 instructional computer labs for undergraduate and graduate students, including two joint-use labs open to all students at the university.
- We have 75 undergraduate science labs, most of which are equipped with computers used in conjunction with experiments. Twelve of these science labs are standardized technology science labs.
- We are the college whose buildings have the most square footage, so our wired and wireless network is the most extensive on campus.
- Most of our departments operate their own mail servers, file servers, web servers, backup systems, and printing facilities, which serve students in those departments.

While bigger does not necessarily mean better, we strive for all our information technology to be state-of-the-art and to lead the university in innovation.

The College of Natural Sciences spends more than $3.5 million annually on instructional information technology and its maintenance. Almost two-thirds of this is from a college-level IT fee that pays our support staff. We rely on our ITAC allocation to purchase all our equipment.

More than half of our ITAC allocation is required simply to keep our heads above water. The math is simple: If we replace one-fourth of our 1,000 computers each year, that alone requires more than $375,000. We can spend $50,000 a year just replacing bulbs in LCD projectors in our classrooms.

The remainder of our ITAC allocation is for expansion and innovation: new technology classrooms, more technology in science labs, expanded wireless coverage, the next generation student response system, automated recording of lectures for student review, etc.

This report has intentionally been kept brief. We invite everyone to tour our facilities, see our progress, and hear about our plans for the future.

Our Vision

Our management and expenditure of student fee money and our requests for future funding are guided by the four principles described below. While these principles may seem obvious, it is not clear they are applied everywhere on campus.

1. Protecting Each Investment of Student Fee Money

Caring for equipment and facilities can easily be as expensive as their initial cost. Too often there is a tendency to build new facilities without concrete plans or funding for their upkeep. The College of Natural Sciences does not make that mistake with student fee funded facilities.

Every computer in our $1,500,000 inventory has been purchased with a four year warranty from Dell or Apple that ensures the computer will remain in good working order for its lifetime, regardless of future funding levels. The $2,000,000 of A/V technology in our classrooms is inspected and cleaned every day by a staff of 25 student assistants to ensure that every classroom is as perfect as the day it was built. The College of Natural Sciences has even taken over responsibilities neglected by the university. We are replacing rotting carpets and broken furniture in classrooms, and when necessary we even outsource the cleaning of our classrooms.

Each year an increasing percentage of our budget goes toward maintenance and life cycle funding: keeping equipment in good working order as long as is practical and then replacing it with new equipment. We believe this is the only responsible strategy.

2. Innovating for the Future

Seven years ago the College of Natural Sciences led the university by creating the first standardized technology classroom. We continue to use student fee money to innovate.

This past year the College of Natural Sciences deployed the first permanently-installed, fully-automated system for recording classroom lectures and serving them up to students for review and study. This system - which was installed in WEL 2.224, our largest auditorium - will be duplicated in other technology classrooms in the coming year.

The standardized technology classroom has given rise to the “standardized technology science lab”. This project brings the same technologies found our in our technology classrooms to undergraduate science labs in areas such as Biology. Using camera-equipped microscopes, what one student sees under a microscope can be immediately shared with the entire class by projecting it on the screen.

The College of Natural Sciences was the first to use student response systems (CPS from eInstruction) to improve student/faculty interaction in large classes. These systems allow faculty to ask questions in class and immediately see student answers. Faculty are able to adjust their lectures to address student needs, and students are more likely to attend lectures. This year we will be converting to a new

student response system that uses radio frequency technology and hope to support student response systems in every general purpose classroom in our college.

The College of Natural Sciences is home to the Interactive Homework Service, a web-based system that provides homework and practice problems to students in Physics, Mathematics, Chemistry, and Biological Sciences. The system grades the students' answers and provides instructive feedback.

3. Serving the Entire University

The College of Natural Sciences - like the College of Liberal Arts - offers a huge number of service courses. It is unlikely that an undergraduate will receive a degree from our university without taking some of our courses. Students and faculty from across campus use our 56 general purpose classrooms. And, students from across campus work in our joint-use computer labs.

For these reasons, most of the ITAC funds that we spend benefit the entire university. We have always given top priority to shared facilities. Our first technology auditorium built in 1998 was a general purpose classroom, and seven years later every one of our general purpose classrooms is equipped with standardized technology. Our technology classroom team responds to the needs of all faculty teaching in our classrooms, regardless of the college or school they come from. We employ students of all majors to work in our computer labs and technology classrooms. And, our auditoriums are in high demand for university-wide events.

4. Achieving Synergy with Multiple Fees

Highly specialized student fees are a double-edged sword: they provide for some needs while neglecting others. A student may find state-of-the-art computers in a room that floods every time it rains. Or, a student may attend a lecture that uses modern A/V technology in a room that smells of rotting carpet and uncleaned food and drink spills.

In the College of Natural Sciences, we are combining multiple student fees to solve problems and give students facilities that we can all be proud of. It is becoming less common to spend ITAC funds by themselves or to think of a project as simply "an ITAC project".

A good example is WEL 2.224, one of the five largest general purpose auditoriums at UT. Several years ago, ITAC funds were used to make this a standardized technology classroom. Three years ago, the lighting was replaced with institutional funds. A year ago, the 500 seats and the carpeting in this room were replaced using student fee money, giving students larger writing surfaces and a more pleasant place to learn. More ITAC funds were used this year to equip the room with our automated lecture recording system. And, student fee money at the college level pays for the staff who keep the room in perfect working order. Without multiple sources of funding, we could not have achieved the overall high quality of this learning environment that we were aiming for.

Milestones

The past year has seen the achievement of a number of goals that we have been working toward for multiple years. These achievements would have never been possible without student fees.

1) Every general purpose classroom in the College of Natural Science now has standardized A/V technology. Faculty no longer have to make a special effort to obtain a room with the technology they need, and the scheduling of classrooms by the Registrar's Office has become simpler. This project took seven years to complete partly because Natural Sciences had to invent and refine the concept of the standardized technology classroom and partly because we had 56 general purpose classrooms to modernize.

2) After 40 years, the infamous "overhead projector" has been eliminated from Natural Sciences classrooms. This was made possible only in the last year by a new generation of document cameras that do everything overhead projectors do and more. They are brighter and there is no motion blur as faculty write beneath the camera. The document cameras project 35mm slides as well as both transparent and solid objects.

3) Every square foot (or, more accurately, ever cubic foot) of the College of Natural Sciences has been equipped with high-speed 56Mbps wireless networking. Whether students are working in classrooms, teaching labs, offices, libraries, study areas, hallways, or even sitting outside our buildings on the grass, they can be connected to the internet. This project required three years of effort and funding.

4) The College of Natural Sciences has invented and deployed the first fully-automated system for recording class lectures and placing them on the web for students to review and study after class is over. Other universities tell us that there is no other system like this in the country. The system records everything the instructor shows on the projection screens and also follows and records everything the instructor says and does. Because the system requires no effort on the part of faculty to use it and needs no staff to operate it, it can be scaled up (for the cost of additional equipment and storage) to handle multiple classrooms.

Specific ITAC Funding Requests for 2006 - 2007

Note that about half of our request is for life cycle funding: upgrading and replacing aging information technology in our classrooms and labs, and keeping our network state-of-the-art. The other half of our request is for the creation of new facilities and innovative projects.

New Technology Science Labs and Seminar Rooms: $175,000

We plan to add technology to 15 undergraduate teaching labs and seminar rooms at a cost of about $12,000 each. The College of Natural Sciences will use local funds to pay the staff who assemble, install, and maintain this equipment.

Existing Technology Classrooms: Upgrades and Operation: $200,000

Although college funds are used to pay the staff who maintain and upgrade our technology classrooms, funding is needed to repair and replace aging equipment. We plan to replace a dozen old LCD projectors with new, brighter ones. At a cost of $500 each, replacing the bulb in each of our projectors once a year costs $50,000. We use thousands of batteries each year in our wireless microphones.

Replacement of Aging Computers: $300,000

One quarter of our approximately 1,000 computers in computer labs, science labs, and technology classrooms need replacement each year. We budget $1,400 for each PC and $1,600 for each Apple.

Networking: $250,000

Having focused on wireless networking the last two years, our wired network is in need of modernization. We expect to replace all the switches in WEL, WCH, and PAT over the coming year.

CS Laboratory Relocation: $125,000

The Department of Computer Science is moving its undergraduate computer labs from Painter to ENS North. This is a first step in creating teaching lab surge space for the demolition of ESB in 2008. This funding will pay for installing networking and electrical service into the new ENS North labs and for any painting, flooring, lighting, etc. needed to make the space pleasant for students to work in.

Lecture Recording Systems: $100,000

We plan to expand our existing lecture recording system into four additional auditoriums in Welch Hall: WEL 3.502, 1.308, 1.316, and 2.246. This will give faculty teaching in the five largest auditoriums in Welch the ability to record their lectures for review by students.

UT Homework Service Improvements: $150,000

The Homework Service provides web-based homework and review problems to students in Physics, Chemistry and Biochemistry, Mathematics, and Biological Sciences. It is used by thousands of students each semester. The hardware platform on which this system runs has become old and unreliable. We plan to replace the servers, storage, and backup system with new hardware having a service contract with 4 hour response. This funding will also be used to make improvements to the software and the problem bank.

Servers, Storage, and Backup: $100,000

In addition to the computers in our general purpose labs, we contribute to the cost of departmental servers that host student web pages and files, store class related information, and move email between students and faculty. This funding also provides for the servers for our instructional computer labs.

TOTAL REQUEST: $1,400,000

Summary of 2005 - 2006 Expenditures

It is beyond the scope of this report to detail every student fee funded IT expenditure in the College of Natural Sciences. We have chosen to group and report expenditures according to type.

New General Purpose Technology Classrooms: $325,000

During Summer 2005, we completed our seven-year project of adding technology to every general purpose classroom in the College of Natural Sciences. We created thirteen new technology classrooms at an average cost of $25,000 per room.

New Technology Science Labs: $125,000

During 2005, we constructed twelve technology science labs, which contain much of the same equipment as our technology classrooms but without a large podium. Each room costs about $10,000.

Existing Technology Classrooms, Upgrades and Operation: $200,000

This year we completed the replacement of all document cameras in our general purpose technology classrooms with WolfVision VZ9's, which have a refresh rate of 30 frame per second for blur-free images. At a cost of about $5,000 each, our 56 WolfVisions have a value of $280,000. Additionally, we replaced aging LCD projectors, microphones, etc.

Replacement of Aging Computers: $300,000

One quarter of our approximately 1,000 computers in computer labs, science labs, and technology classrooms were replaced. We spend about $1,400 for each PC and $1,600 for each Apple computer.

Wireless and Wired Networking: $150,000

This academic year we are completing our three-year project to upgrade all our buildings to high-speed 802.11g wireless networking. Students are now able to access the Internet from their laptops whether they are in libraries, classrooms, science labs, hallways, offices, or even sitting in the grass outside out buildings.

Lecture Recording Systems: $75,000

The first permanent, automated system to record classroom lectures became operational in WEL 2.224 (our 500 seat auditorium) in summer 2005. Students are now regularly viewing recorded Chemistry lectures using a web interface.

Everything Else: $225,000

Included in this category are 1) contributions to departmental web, file, and email servers that serve students, 2) upgrades to wired networking in our buildings, and 3) support of faculty projects to expand the use of technology in classes.

TOTAL EXPENDITURES: $1,400,000