

# **UNC TLT Collaborative Spring 2001 Campus Funding Allocations**

- 1. Campus:** NC State University
- 2. Campus office that is to receive the funding allocation:** Zoology Department
- 3. Accounting information:** OUC 11210, fas 201372. Department of Zoology CB 7617  
North Carolina State University, Raleigh, NC 27615-7617, ATTN: Jan Fites
- 4. Project Category or Categories:**

TLT Wireless/handheld computing

Other Campuses receiving allocations in this category:

ECU, NCAT, NCCU, NCSU, UNC-C, UNC-W, WCU, WSSU

## **5. Project Description:**

The purpose of our pilot study was 1) to test the use of wireless computer technology as a way of facilitating active and collaborative learning during lecture-based teaching and 2) to compare the merits of two types of handheld computers. The initial year of our pilot study involved a two-semester junior-senior level course in developmental anatomy and histology and a senior level course in evolution. Two types of handhelds were utilized: the Jornada 820, a mini-laptop with color screen and keyboard, and the Handspring Visor, a "personal digital assistant" with grayscale screen and a stylus to enter data. In the Fall courses, students were allowed to take the handhelds home, whereas in the Spring computers were used only in the classroom. Apple Airports, which allowed the handhelds to wirelessly access the web, were placed in the classrooms as well as in the library. Storage cards in the Jornadas and a cradle that "hotsynched" the Visors with a dedicated PC allowed students to exchange data with one another and/or the instructor.

In Fall 2000, seniors in Evolution used the Jornadas to access lecture notes from the course website during lecture and to search the web wirelessly both during and outside of class. This access to the internet allowed students to download specified portions of primary literature for analysis during class and to work in pairs both in and outside of class to locate materials for future presentations on assigned topics. In Spring 2001, the Jornadas were used to initiate classroom exercises in Developmental Anatomy and Histology. These included short quizzes taken during class via the internet using "WebAssign" (a homework submission and grading tool developed at NCSU), short essays written by student pairs and submitted to the instructor's e-mail via web forms, and labeling of anatomy/histology images by student pairs using Pocket Artist. Summaries of quiz results and selected essays were presented to the class from the web using the classroom projection system and used to initiate class discussion, correct misconceptions and/or lead into related lecture topics. Images labeled during class were subsequently presented by each student pair to the entire class by connecting Jornadas to the projector.

Utilization of the Visors in the 2000-01 academic year was restricted due to delay in shipping of the ethernet modules required for internet access. Half of the students in Developmental Anatomy, Fall 2000, were given a Visor for use during the semester. Each Visor was provided with a module that contained the entire course website, including outlines with links to text and images used during lecture. The document reader included "bookmark" and "find" functions that allowed students to access relevant material quickly and easily. Another image viewing application allowed students to load high quality images from lecture and to annotate them either during lecture or when studying outside of class. When reviewing material or preparing for an exam, student study groups were able to beam images or notes to one another via the infrared ports. The Visors were also used for brief exercises during class, including labeling of images via TealPaint and filling in tables of data, but lack of internet access and "instant feedback" capability rendered these exercises less useful than those possible with the Jornada.

This pilot study has demonstrated the effectiveness of handheld computers in lecture-based teaching when internet access is available. We have learned much regarding the strengths and limitations of the two types of handhelds and will be better able to devise appropriate learning experiences using this technology in the next academic year. Although the Jornadas work quite well in the classroom, they are expensive and more difficult to maintain than the Visors. We believe that most of the exercises that worked well with Jornadas can be duplicated using Visors, if wireless internet access is provided. Xircom has indicated that the required ethernet modules will ship during the 2nd quarter of 2001. Thus to continue our study, we are trying to identify funds for 20 modules and an additional 20 Visors. This will provide all 40-45 students in Developmental Anatomy with a Visor for their use during the Fall semester. The modules will be distributed to half of the students during class, allowing internet access for each student pair. The use of handhelds will be extended to a larger course, Bio 125, in Spring 2002. A total of 45 Visors will allow these students to work in groups of four during class with internet access provided for one member of each group.

## **6. Collaboration with other UNC Campuses:**

We are eager to disseminate our current and future results using wireless handhelds to the academic community. We are preparing a website which will summarize the results and student reaction to handhelds during 2000-01 and will include video clips of classroom exercises using Jornadas. We are presenting a workshop titled "Using handheld wireless computers to increase interactivity and collaborative learning in large classes" at the national ABE meeting in Chicago, June 20, which we would be glad to share with UNC campuses upon request. We welcome future interactions with other UNC faculty using wireless computing, and look forward to the UNC TLT conference in May as one such collaboration opportunity.

## **7. Deliverables in addition to those specified for all 2001 UNC TLT funding allocations:** As specified.