

The University of Tennessee at Chattanooga Student Technology Fee Funding Request

Proposal

Beginning 2005-2006

Title: An Exploration of Motion through Hand-held Technology in Mathematics Education

Unit Submitting Proposal: Teacher Preparation Academy/Deborah McAllister

Briefly summarize the proposed project.

Through the use of hand-held technology, students will collect and analyze real-world data as they integrate curriculum topics in mathematics and the natural sciences. Mathematics education students will increase their knowledge of how to meet K-12 curriculum standards in mathematics, especially the goals and expectations for the standards of data analysis and probability, connections, and representation.

Identify the project goals and objectives. Briefly describe your goals and objectives. Include in the description how the outcomes of the project will improve teaching and learning. Indicate also the anticipated reach of your project. In other words, how many and what type of students will benefit from the successful execution of the proposed funding? How will they benefit?

Goal: Students will better understand the collection and representation of real-world data as related to teaching and learning mathematics in the K-12 classroom.

Objectives:

1. To become proficient in the use of hand-held technology.
2. To integrate mathematics and science in selected activities.

Pasco has designed and marketed new hardware and software that is more user-friendly than the cumbersome data collection means of using the TI graphing calculator with the calculator-based laboratory (CBL) unit.

The hand-held technology will be used in the following courses: Education 451 Strategies and Materials for Teaching Secondary and Middle Grades Mathematics (25-30 students per year, planning to teach mathematics in grades 7-12 or 5-8; fall semester), Education 314 Teaching Mathematics in the Elementary School (120 students per year, planning to teach elementary school grades PreK to 3 or special education grades K-12; fall and spring semesters), and Education 575 Educational Technology (20-25 students per year, students planning to teach at the elementary or secondary level or current K-12 teachers; spring semester).

High school mathematics teachers often use problems based in science to demonstrate mathematical relationships. Middle grades mathematics teachers may teach in a school that pairs a mathematics-science teacher with a language arts-social studies teacher, with each expected to integrate the content for the two areas of responsibility. Elementary and special education teachers will be able to demonstrate principles

and relationships for students.

Describe the method with which you will achieve your goals. Briefly describe your methodology. Include a calendar of target project dates. That is, when will the major steps in the project begin and end?

The Pasco Xplorer GLX captures, analyzes, annotates, and stores (and prints) data without being connected to a computer. It acts as a lab wherever one is needed. It can also connect to a computer to utilize the DataStudio software. The Xplorer contains a built-in graphing calculator and a rechargeable battery.

The types of data that can be collected include both linear and nonlinear relationships within physical science, life science, and Earth and environmental science. The emphasis of the activities to be done will be the concept of motion. Within course activities, students will do the following:

- Collect and analyze data in real time.
- Make efficient use of class time by simplifying experiment setup.
- Focus on the mathematics and science principles being taught.
- Maximize the time available to explore "what if" questions.
- Effectively integrate technology into the mathematics classroom.
- Be assisted in meeting mathematics curriculum standards.

The project will begin on 09/01/05. Material purchased will be used on a continuous basis, so the project will not have a finite end, aside from the final report to the Technology Committee.

How will you evaluate the success of the project? Describe your evaluation criteria clearly. How will you determine whether the project is successful?

The material purchased will be used for in-class activities, not for a project that is graded. Students will work in groups of four to six students. Throughout the semester, each student will have the opportunity to act as the group's leader (coordination of activity), the group's recorder (operating equipment), the group's reporter (reporting to the class), and the group's materials person (assembling equipment). Students enrolled in Educ 451 are proficient in the use of a graphing calculator. The Xplorer system will be a natural extension of that technology. The secondary mathematics students must complete two semesters of calculus-based physics, and have some proficiency in mathematical applications in natural science. Students enrolled in Educ 314 use a calculator in their mathematics courses. Students in Educ 575 will gain experience with another technology, in addition to the computer.

Previous grant(s): If you received a Student Technology Fee grant last year, have you submitted your final report?

NA.

Proposed location: Describe the proposed location of the equipment, software, etc.

The equipment will not require much space, and will be locked in a cabinet in my office when not in use.

Requested Budget: Clearly identify one-time costs, such as equipment, shipping, and installation. Clearly identify recurring costs, such as maintenance and support, and the source of the funds to cover the recurring costs.

All costs are one-time only. I am willing to accept a smaller award than the amount requested.

Summary of projected costs

Salaries (if any)	\$0
Equipment (hardware and software)	\$9,659
DataStudio (software) - \$99	
6 Pasco Physics bundles (1 Xplorer, 14 sensors, 25 labs) - $\$1,179 * 6 = \$7,074$	
Additional probeware and equipment – total of \$2,004	
Pascars dynamics system - \$220	
Ballistic cart accessory - \$299	
Doppler rocket - \$49	
String wave activity kit - \$379	
Acceleration kit - \$599	
Hover puck - \$45	
USB link - \$59 (already have laptop computer)	
Vernier adaptors - $\$59 * 6 = \354 (to use Vernier probeware that we already have)	
Additional lab manuals – total of \$200	
General Science - \$50	
Biology - \$50	
Chemistry - \$50	
Earth and Environmental - \$50	
Shipping (3%) - \$282	
Complete the following items as appropriate	
Installation	\$0
Construction/renovation costs	\$0
Annual maintenance/support costs	\$0
Training	\$0
Recurring costs per year	\$0
Total project one-time costs	\$9,659
Estimated recurring costs per year	\$0

Identify the area(s) responsible for operating and maintaining the equipment.

TPA – Deborah McAllister.

Approval by Dean or Vice Chancellor: _____

Individual responsible to complete proposal if funded: Deborah McAllister

Priority established by Dean or Vice Chancellor: _____

Deans and Vice Chancellors should return completed forms (along with 25 copies) to Provost John Friedl, Chair of the University Technology Committee, prior to **December 13, 2004**.