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Mathematics
Grades 9-12

The integration of technology into secondary mathematics often begins and ends with the graphing calculator. This is problematic on a number of levels from eroding arithmetic skills to education lobbying by hardware manufacturers, but most deleterious is that the calculator functions (often literally) as a "black box" which produces answers to problems while hiding the process. The aim of my RET project is to keep the benefit of advanced computational and visualization tools but mitigate the "black box" effect by giving them a role in the creation of such tools.

The idea is to integrate a

mathematics software environment into the curriculum in the hopes that once commonalities among several problems are recognized, students can be assigned to write functions or subroutines that scale the techniques to handle more complex problems.



**Campus Wide Computation Initiative -
A New Model for Computing Education**
Dr. Valerie Barr Union College

The goal of this project is to develop a model for a campus wide computation initiative.

The model is based on the framework of a curriculum in computational methods that includes a core of courses that addresses common applications of computation across disciplines, followed by additional discipline specific courses within other departments that focus on computation activities in those fields.



Successes

The greatest successes came from students and usually accompanied a cry of "That's so cool!" Many students in my Introduction to Statistics course utilized Sage in their final projects, though did not go far beyond computing CDF (cumulative distribution function) values not covered in tables at the back of their textbook. A few really ran with it, however, as did one pair who ran multiple simulations to compare computer and human performance as random number generators.

Challenges

Challenges are myriad, however. The downside of open software, particularly when developed by mathematicians, is terse documentation (when there is any documentation at all). With very few resources at our disposal (the computer lab is but a hodgepodge of spare parts) and little chance of booming budgets on the horizon, access is the chief difficulty. A significant percentage of students have no Internet access at home and many who do lack the savvy

necessary to install a major software package.

Reflection

Overall, the RET experience has led me to think in new ways about how students learn if for no other reason than it has forced me to examine my own learning in an area I am far from expert. Though much can be improved in its implementation, as the program matures, I anticipate our students will have another rich area to approach mathematics.

