

Using Toolbook II to Create Graphing Calculator Instruction

A significant problem for many beginning community college students in an algebra reform course that requires the use of graphing calculators is the additional cognitive burden placed on the student when trying to learn the mathematics as well as the technology. There has been emerging research (Adams, 1994,1995) to suggest that the segment of the population that is symbolically challenged and anxious often finds use of the graphing calculator difficult. It is simply too hard for some of these people to learn two things at one time. So, while the technology is intended to aid all students, for these students the technology presents an additional burden for already marginal mathematics students.

To deal with this problem at Adirondack Community College a remedial, non-credit course was developed to allow self-selected students to take a technology intensive course along with their regular mathematics course that supports and specifically instructs the students in the use of technological tools. The course entitled, MAT 095 Technological Tools in the Mathematics Classroom was first run during the Fall 1996 (2 sections) and has continued each semester. Reactions from students have been very positive in regards to the confidence and the graphing calculator ability they have following their course. They return to their regular mathematics courses and often give pointers to their classmates and occasionally their instructors. With the cognitive burden of the calculator removed, they are now able to concentrate on the mathematics of the course.

The presentation of this course for the past year has involved extensive handouts with

careful instruction in each of the areas used in Adirondack's mathematics courses. While the method was successful, an alternative idea was conceived in which the student and instructor could be more interactive and more visual than simply using an overhead projection panel. A Toolbook (using Toolbook II) was created initially as a teaching mechanism to be piloted during the Fall 1997 semester. This multimedia attempt allows the student to have some of the instruction that was afforded previously now on a large screen projected within the classroom, and allows through captured screen images stored as bitmaps, screens that can be manipulated size wise for more effective classroom instruction. A simple menu-driven program that works visually through the basics of arithmetic and continues through tables of values, graphing, statistics, and programming is included within the software package. In addition, there are sections about, and maps of, the TI-82/83 calculators with pop-up labels.

For note-taking convenience, students are provided with printouts of the individual screens. Initial reactions are quite positive. Future plans include extending the Toolbook from a level of instructor to a self-paced student version that can be used by anxious students as well as any other mathematics student at the college. As well, the intention is to allow instructors at that point to have students work on more of the calculator-specific instruction outside of class, leaving more class time to focus on the mathematical concepts within their individual courses.

Bibliography

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