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## **Influencing the Preparation of Teachers**

For the past two years CSU has participated in a Federal grant from the Department of Education. The purpose of the grant was to create curriculum materials that utilize technology for the teacher preparation courses. The goal is two-fold; one, to facilitate the learning of the concepts in our courses, and two, to acquaint prospective teachers with ways they might use technology in their own classrooms.

At CSU all of the curriculum materials created were in the form of computer labs. The majority of the labs make use of various modules in the Shodor Foundation's *Interactivate*. More about *Interactivate* later. The other labs make use of *Geometers' Sketchpad*. The labs cover such topics as sequences, linear functions, probability (using an electronic spinner to compare theoretical and experimental probabilities), measurement of surface areas and volumes, Venn diagrams, transformations of the plane (exploring commutativity of certain transformations, and finding suitable transformations one figure onto another), tessellations of the plane (leading to consideration of the four-coloring problem), modular arithmetic, compositions of transformations of the plane, and the construction of the nine-point circle.

The courses in which we use these labs are the three-course sequence of Math for elementary school Teachers, (which are taken by all education majors in elementary or middle school teachers) and in our College geometry course (taken by all Math/Secondary Education majors). I grade them and include the scores in the course grade. Beth Clark who has assisted in preparing the labs uses them as enrichment with out incorporating them into the course average.

The Shodor Foundation makes *Interactivate* available free on the web. Just go to Shodor.org, scroll down and click on *Project Interactivate*. A CD with *Interactivate* is bundled with Billstein's text for elementary teachers. The *Interactivate* modules are divided into four groups; number & operation concepts, geometry and measurement concepts, function and algebra concepts, and probability and data analysis concepts. The modules are very user friendly and each one focus on basically one concept. In addition, each module has many support features, including explanations of what the module does, how to use it, and how it relates to the curriculum. There are also resources for the teacher, such as suggestions for class discussions, and lesson plans. *Interactivate* is a fantastic resource. I have found it to be very useful in deepening understanding of concepts in my classes. And my students express delight in the broad scope of *Interactivate* and the richness of the support materials for both students and teachers.

Many of you are probably familiar with Geometers Sketchpad, put out by Key Curriculum Press. It is easy to learn the basics and the commands are executed instantly. One of the nicest features is its ability to instantly update figures as you change one part of the figure. For example if you have constructed the in-circle of a triangle, the circle is correctly redrawn as you move one of the vertices around. Geometers Sketchpad has the power and features that allow you to do sophisticated mathematics.

I feel that the use of our labs have made a positive impact on the preparation of teachers. The technology allows for more elaborate investigations into the concepts. This is especially true in the College Geometry course. It would be very tedious to plot images under transformations by hand. By freeing students from this sort of work it is possible to ask them to explore interrelationships between various transformations.

In the Math 203 course (the first course for elementary teachers) students tend to have difficulty with Venn diagrams and modular arithmetic. The labs on these topics have deepened their understanding of these concepts. The various other labs have also aided in learning concepts and have given the students models for how technology might be used in their classrooms. Clearly, such use is the primary goal of the grant curriculum materials.

I have brought with me a limited number of copies of the lab on modular arithmetic; so let me know if you'd like to have one.