Chapter XII

Ethnocomputing with Native American Design

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Abstract

This chapter shows how culturally situated design tools can be developed to support traditional culture and individual creativity in Native American communities. The software allows students to simulate traditional craft designs as well as their own creations. By translating the indigenous mathematical concepts and practices embedded in craftwork into the formal mathematics of the school curriculum, students can see math and technology as a bridge to native culture, rather than a barrier. Evaluation of one of the tools has shown statistically significant improvements in students’ mathematics performance as well as an increased interest in information technology.
Introduction

The term “ethnomathematics” refers to mathematical concepts embedded in indigenous practices. Examples range from purely numeric (e.g., counting systems) to geometric (sculpture and textiles) and even various uses of logical relations (such as indigenous kinship diagrams). In discussing my previous work on fractal structures in African material culture (Eglash, 1999), Matti Tedre of the University of Joensuu in Finland suggested the term “ethnocomputing,” which seems a better fit, given that many of the examples made use of computer simulations in order to “translate” between indigenous practices and western technical concepts. My efforts are primarily focused on using these computer simulations of indigenous designs to aid in mathematics education of secondary students (primarily those whose heritage is based in those traditions). In the fall of 2001 our team at Rensselaer Polytechnic Institute received funding from Housing and Urban Development, the Department of Education and the National Science Foundation that allowed us to include some new efforts in Latino and Native American designs as well. We have titled this suite of simulations “Culturally Situated Design Tools” (CSDTs); they are available as free applets online at http://www.rpi.edu/~eglash/csdt.html. This paper will review the development and evaluation of CSDTs created in collaboration with Native American communities and discuss how our activities attempt to navigate through the potential dangers and rewards of this potent hybrid of information technology, traditional culture and individual creativity.

The Virtual Bead Loom

In the summer of 2000 I was invited by Professor James Barta at the University of Utah to discuss the ethnocomputing approach with the educational community on the Shoshone-Bannock reservation in southern Idaho. Key tribal members included Drusilla Gould, an instructor in American Indian studies at Idaho State University and Ed Galindo, science teacher at the reservation junior-senior high school. Our first attempt, the virtual bead loom, turned out to be one of the most successful tools in our entire repertoire.

There were several aspects of the beadwork that made it seem like an important candidate for one of the CSDTs. First, it offered a bridge between historic tradition and contemporary culture. All too often, components of what constitutes “tradition” have — whether by the colonial experience or neocolonial forces like tourism — become “museumified” into static forms that have little engagement with contemporary community members. But Native American
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