

## BPC-DP: Improving Minority Student Participation in Computing through Culturally Situated Design Tools

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Our prior research established a network of university faculty, teachers, and community partners to develop and evaluate “Culturally Situated Design Tools” (CSDT). Funded by the NSF, Dept of Education, and HUD, these web-based applets are based on ethnomathematics: the mathematical knowledge embedded in cultural designs such as cornrow hairstyles, Native American beadwork, Latino percussion rhythms, etc. ([www.csdt.rpi.edu](http://www.csdt.rpi.edu)). CSDTs allow students to use these underlying mathematical principles to simulate the original cultural designs, create new designs of their own invention, and engage in specific math inquiries. Based in K-12 schools with majorities of African-American, Latino, and Native American students, preliminary evaluations indicate statistically significant increase in both math achievement and attitudes toward technology-based careers.

This BPC project has allowed us to develop a new user “programmable” interface in which students create designs by a drag-and-drop system for “codelets”, thus shifting the learning emphasis from mathematics to computer programming. It has utilized the CSDTs in the Student Leadership Corps (SLC) of the BPC-sponsored STARS alliance, providing new training and resources to students with outreach projects in grade 7-12 and out-of-school education. Our evaluation will examine the impact of CSDTs on both SLC students and their outreach constituency, and allow us to compare this impact to the old interface. In addition, students in the SLC will have the opportunity to develop CSDTs of their own creation, following a design protocol that ensures respectful use of cultural materials by a participatory process, and a coding library that allows fast integration into the pCSDT system.

**9<sup>th</sup> grade Anishinaabe students at Northern Michigan University’s Native American summer camp explored parabolic arcs in traditional structures (wigwams, canoes, etc.), and used a CSDT applet to create their own. For more see <http://csdt.rpi.edu/na/arcs/index.html>.**

