

Blind Student Success Central to New Grant-Funded Project

A team of UA researchers is figuring out ways to adapt computer software to help blind students studying math while also encouraging them to pursue studies in the STEM fields.

By La Monica Everett-Haynes, University Communications
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Middle and high school students who are blind tend to have lower math achievement scores and tend to participate at a lower rate in science, technology, engineering and math-related fields when compared with their sighted counterparts.

Indicators suggest that part of the fault for this goes to the lack of access to appropriate math instruction, particularly Web-based and tutorial resources.

To address this problem, Carole Beal and her colleagues at The University of Arizona have initiated a new project – "Supporting STEM Access for K-12 Students who are Blind through Adaptive Math Tutoring Technology," or STEMAccess – with grant funding from the National Science Foundation.



Jane Erin

Beal, a professor of cognitive science in the UA College of Social and Behavioral Sciences, is principal investigator on the nearly \$300,000 grant. The NSF transferred the grant from the University of Southern California to the UA after Beal was hired by the University last year.

During her prior research, Beal found that blind and sighted students tended to perform on a relatively equal plane until the math got more complex.

"Their working memory can become overwhelmed, but we can break material into manageable chunks," Beal said. "We want to make sure they can work at the same rate as the sighted students."

Because blind students can only listen to the problems, they have to hold larger amounts of data in their mind – and that is where the problems begin.

"The bigger challenge is the fact that the graphics and media productions are now so diverse and so varied that the Braille reader really loses out when it comes to visual media," said Erin, who is co-principal investigator on the grant. "If the child is blind, these are things that can't easily be captured," Erin added.

Although Beal and her colleagues are currently focused on blind students, they have submitted a proposal seeking economic stimulus recovery funding to initiate a project to figure out ways to improve support for students with low vision.

As part of the current project, Beal and her colleagues will evaluate the cognitive process blind students go through when solving math problems, especially related to word-problem solving.

The team will also try to determine what works best in motivating blind students to pursue studies in the STEM fields. Some research has indicated that this may be the case because blind students have less mathematics motivation. The UA research team said little is known about what motivates students who are blind – so another intention within the program is to understand that.

Beal is currently working with UA College of Education faculty members Jane Erin and Penny Rosenblum. Erin, a special education, rehabilitation and school psychology professor, specializes in instructional practices and media for students who are blind or have other visual impairments. Rosenblum is an adjunct associate professor in the same department who is an expert in learning in students who are visually impaired.

Together, they are developing a Web-based math tutorial for students who are blind. Thomas Hicks, a UA research programmer, has implemented the program prototype, which was introduced this month to several students attending the Arizona State Schools for the Deaf and the Blind.

Beal said the students will work with the prototype using a screen-reading program to test the

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Extra Info |

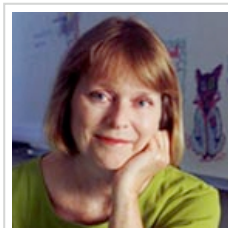
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compatibility and efficiency of the UA-created program.

Using the prototype, students visit a Web site through the use of a screen-reading program and log into a program that runs them through a series of modules. As the students move through the modules, the program informs them of their answers while providing guidance and hints if the answers are not correct.

"The idea is that more and more students are using the Web for learning activities and we don't want to leave students who can't see the screen behind," Beal said.

The ultimate goal is to test the prototype and use it to develop a model that can then be used widely with blind students. "We're about six months away from doing that," Beal said.

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