

An intervention to provide youth with visual impairments with strategies to access graphical information in math word problems

*IES National Center for Special Education Research
Technology for Special Education, Development & Innovation Goal
Project Summary*

Purpose. We will develop a technology-based intervention to train students with visual impairments (VI) to locate key information on math word problems that involve graphics such as line, bar, and circle graphs, diagrams, figures and geometric shapes, and maps. The intervention will be developed and refined with students with VI and teachers of students with visual impairments (TVIs). Evidence of feasibility of classroom use, and promise to improve students' problem solving on math problems that involve graphical material will be documented. The project builds on a prior NCSER study involving making math word problems about endangered and invasive species accessible to students with VI ("AnimalWatch Vi Suite," R324A120006).

Settings. The research will be conducted in middle and high schools serving students with VI in Arizona, Florida and other states. These include both residential (specialized) schools and public school settings where most students are served by an itinerant TVI.

Participants. Students with varying degrees of visual impairments will participate, as well as TVIs who will implement the intervention in classroom settings.

Intervention to be developed. We will develop an iPad-based program to train students with VI to systematically locate target information in math graphics. Graphics will be accompanied by audio, print and/or braille to provide image description for accessibility plus two levels of strategic guidance about locating target information in the graphic.

Comparison condition. Students in the comparison condition will complete the pre and post test, and will then complete the training.

Primary research method. A usability study and a feasibility study will lead to a pilot study in which students' baseline performance with math graphics problems will be compared to performance after the intervention, and to a delayed-training comparison group.

Primary measures and key outcomes. Students' problem solving will be tracked in terms of ability to locate information in the graphics, time required, and problem solving accuracy. Teachers will rate students' need for instructional support with graphics. Students and teachers will be interviewed regarding the perceived effectiveness of the training.

Data analytic strategy. User feedback will be used to refine the intervention in Years 1 and 2; in Year 3, quantitative metrics of students' math problem solving will be used to assess promise of the intervention, along with teacher and student ratings of the perceived effectiveness of the approach for building proficiency with math graphics.