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# Creative Solutions to Tech Integration Challenges in Math Instruction

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Center for Implementing Technology in Education (CITEd)

The [Individuals with Disabilities Education Improvement Act](#) (IDEA, 2004) and the [No Child Left Behind Act](#) (NCLB, 2002) outline the role that technology could play in the education of students, especially those with disabilities. Both initiatives emphasize assistive and instructional technologies to provide access to the general curriculum and improve instruction. They also emphasize the importance of professionals capable and qualified to deliver high quality instruction.

However, this heightened emphasis on assistive and instructional technologies has presented challenges for many schools and districts.

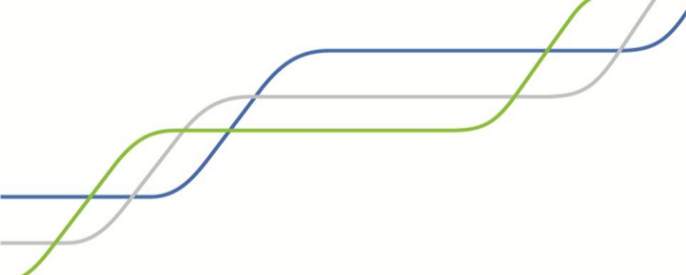
To learn more about the challenges facing districts and schools, the Center for Implementing Technology in Education (CITEd) conducted seven focus groups in 2005 in urban and suburban locations. The focus groups were held with general and special education teachers, administrators, assistive technology service providers, and mathematics education experts.

The dialogues focused on the difficulties that students with disabilities encounter in learning mathematics, instructional strategies teachers use to address these challenges, and how teachers integrate technology in their mathematics instruction.

The CITEd team found common challenges facing schools and districts with respect to providing technology-enhanced mathematics instructions, including funding, time constraints and the need to provide professional development that embeds technology in content area training.

Here, the creative solutions employed by schools and districts to address these challenges are explored, including:

- Offering a variety of professional development and technical assistance options for teachers and staff;

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- Forming collaborative relationships with a variety of venues to overcome funding and time constraints; and
  - Utilizing and customizing innovative technology tools.

## A variety of professional development options

For teachers and administrators, many opportunities come in the form of professional development (PD) and technical assistance (TA). In response to both IDEA and NCLB, schools and districts are placing greater emphasis on upgrading the skills of their staff. The CITEd focus groups discussed activities to enhance the way technology is being used for instruction.

Teachers reported continuing to rely on PD offered by professional organizations at conferences and in the community. These experiences, however, outside of the school and classroom, were critiqued as exciting but not necessarily directly applicable to their curriculum or the tools to which they had access.


More direct assistance was found by working with mathematics and instructional technology coaches from the same school or district as co-teachers in classrooms, as co-planners, and as professional developers offering in-service training.

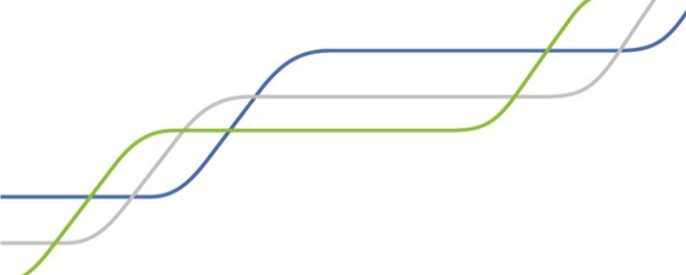
## Forming collaborative relationships

School and district administrators and service providers also discussed the various creative collaborative relationships they have initiated that help them address their own organizations' funding and time constraints.

Teachers reported that their schools have partnered with the commercial vendors for professional development (PD) and technical assistance (TA) related to the products that have been purchased.

These ongoing relationships are fulfilled with support ranging from vendor trainers coming to the schools regularly, to providing access to Internet sites with vibrant online communities of colleagues sharing integration ideas and lesson plans. This type of technical assistance was seen as supporting teachers' understanding and integration of technology into the curriculum.





Other partnerships included nearby university programs which focused on supporting students with disabilities, their families and their teachers. This type of ongoing partnership brought benefits to all parties and strengthened the community connections.

For example, the University of Vermont has regional educational consultants available to schools and holds summer camps for students with disabilities. These summer camps at the University provide a support team for students and their families.

Despite such creative partnerships, however, teacher and mathematics experts identified a lack of interdisciplinary approaches to the problems associated with the intersection of mathematics instruction, special education, and technology integration.

Assistive and instructional technology service providers, meanwhile, were addressing their organizations' needs to offer TA and training to teachers and support staff through creative collaborations. These small organizations partnered to offer information and sessions at district-sponsored in-service trainings.


They also reported collaborating with similar organizations in neighboring regions to form communities that could share solutions and promote best practices.

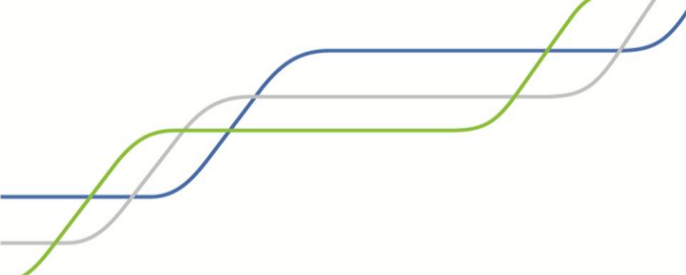
## Utilizing and customizing innovative technology tools

Teachers and administrators discussed using a variety of technology tools to improve student learning opportunities.

The pedagogical potential of these tools was inspiring teachers to find deeper ways to integrate them into the curriculum. At one school, Smart Boards (interactive whiteboards which can capture and store writing digitally) are available to all middle school teachers along with technical assistance from the vendor. With the help of these ongoing learning opportunities, teachers at this school reported using the technology regularly across content areas, and making the use of the tool a high priority for their own planning time.

Teachers across districts had been introduced to innovative tools such as graphing calculators and Geometer's Sketchpad® and had at least some access to these tools. But while teachers saw the potential for student learning, only those teachers who had





had specific training on integrating the features of the tool into their instruction reported being comfortable with trying to do so.

Teachers and administrators were also keen to harness the potential of the Internet to offer support, reinforcement, and connections for students' learning.

Teachers identified reinforcement and practice with concepts and skills taught in class as a high priority for their students who struggled with mathematics content. To them, the vast array of learning opportunities on the Internet held great potential to meet this challenge.

Many of the districts encouraged teachers to construct websites to communicate with parents and extend the reach of the classroom, but the time this effort required was daunting.

## Summary

In sum, the challenges of meeting the expectations of IDEA 2004 and NCLB in regards to technology integration and high instructional standards were seen as formidable.

Positive solutions were found in ongoing training, creative collaborations, and innovative tools to advance the ways that technology can improve mathematics instruction.

The CITED team has provided resources below that can be used in your setting as first steps, but encourages you to address these common challenges by participating in the CITED online community and sharing your creative solutions.


## Resources

### [Professional Development in Technology: Key Principles](#)

This resource provides information on how teachers and administrators can make the most out of technology related professional development.

### [PowerUp WHAT WORKS](#)

PowerUp WHAT WORKS is your free, comprehensive guide to technology-enhanced teaching and learning in English Language Arts and Math to help struggling students meet the Common Core State Standards.





### [ITTE: Education Technology Programs](#)

The National School Board Association offers professional development opportunities on the latest developments in education technology including staff development and technology assessments.

### [Access Center](#)

The Access Center, a national technical assistance (TA) center, provides TA to schools and districts to help provide students with disabilities access to the general curriculum.

### [CAST UDL Toolkits](#)

The CAST UDL Toolkits help educators understand the UDL principles, how to apply them in their classroom, and how to train others in UDL.

### [Web Worksheet Wizard](#)

This tool gives teachers the opportunity to quickly create lessons, worksheets, and class pages and post them on the Internet.

### [E-ssential Guide to Assistive Technology](#) (PDF)

This resource is a collection of articles and worksheets that discuss how and why to use technology to support individuals with learning disabilities.

### [Tech Matrix](#)

The Math and Reading Matrices, developed by CITED and NCTI, are searchable databases that present evidence and products for the use of technologies that support instruction for students with special needs

