



**State Educational Technology Directors Association
Leadership Summit's Toolkit 2006**

Technology's Role in Math Curriculum

Background, Process & Outcomes

Background

As education stakeholders address the importance of math for ensuring a competent workforce and for America's competitiveness in a global economy, educational technology has an opportunity to make a significant contribution to improving student achievement and expanding higher level thinking skills in math. Although state technology directors frequently develop programs that involve technology and math, states and districts are not yet maximizing the potential of collaborating across programs and working together. SETDA worked with Texas Instruments to explore the potential of integrating technology into math curriculum and instruction and to identify funding streams within programs across SEAs and LEAs.

Process and Outcomes

Through whole group guidance and focused discussions and research of subgroups, the Math Tool Team identified various tools that would be helpful for all SETDA members and the broader education community. The components included:

- Creating a Vision
- Leveraging Funding for Technology
- Promising Practices and Research

The Team specifically addressed ideas that may be accepted, but due to lack of time and resources, may not be fully explored and/or utilized. For example, the Team documented the vision for technology's role in math curriculum and researched the specific references to technology throughout NCLB. The resulting tools in these two areas are currently available.

After much discussion, the Team also developed criteria to assess promising practices and a survey to collect programs integrating math and technology. The Team is in the process of collecting additional examples and reviewing them using the promising practices criteria. The Team also compiled research from academia, corporations, organizations, states, and school districts relating to math and technology. The resulting criteria, promising practices, and research will be released in October 2006.

The rich discussions and motivation to delve into the issue of the role of technology in math curriculum and instruction provided a rich learning experience for those involved. The resulting Toolkit attempts to share the lessons, examples, and potential ideas with all education stakeholders in a succinct and meaningful way.



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The Toolkit

1. Vision Statement
2. NCLB: Technology at a Glance - Leveraging Funding Streams Matrix
3. Criteria to Assess Promising Practices (will be released in October 2006)
4. Promising Practices (will be released in October 2006)
5. Research and Resources (will be released in October 2006)

Vision Statement

Vision

To empower educators in transforming mathematics teaching and maximizing learning through the use of educational technology to ensure America's competitiveness in the 21st century.

Belief Statements

6. Students should have a strong understanding of mathematical knowledge and skills, and the ability to apply these knowledge and skills, in relevant problem solving situations so they can thrive and become competitive leaders in the global economy.
7. Educators should have a deep understanding of mathematical concepts and their applications to relevant problem solving situations, and should continue to gain insight and understanding of methods to encourage their students to learn, use and be intrigued by mathematics.
8. The use of technology can support the teaching and learning of mathematics by bringing a multitude of learning experiences to captivate student interest and build mathematics understanding, proficiency, application and confidence.
 - a. Mathematics is most powerfully learned through discovery and exploration and technology provides these opportunities.
 - b. Mathematical understanding is increased when students and teachers use and apply technology to investigate mathematical concepts; including visualization, modeling, representation, simulation and communication. *
9. All educators and students should have access to the resources and technology to support teaching and learning of mathematics at school and home.
10. Students learn mathematics in different ways, and we need to provide technology, resources, varied instructional strategies and skills that allow them to excel, deepen their understanding and maximize their potential.

*Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances student's learning.
- National Council of Teachers of Mathematics*



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11. Students build mathematical knowledge and understanding of mathematical concepts through problem solving. *
12. Educational technology strengthens the connection of mathematical topics in different contexts.
13. Technology proficiency will prepare our students and teachers for living, learning and meeting the complex challenges of the global economy in the 21st Century.

Essential Conditions

1. Because technology is a catalyst in transforming mathematics teaching and learning when it is available to all teachers and students, adequate and sustained funding must be available specifically for educational technology and its support.
2. Mathematical concepts, technology integration and pedagogical strategies are a part of teacher educator programs.
3. Professional development to improve conceptual understanding of mathematics and supporting the infusion of technology in mathematics teaching and learning is a high priority.
4. Follow-up opportunities and continued support is available to ensure success in transforming mathematics teaching using technology.
5. High-quality, aligned, interactive, electronic mathematics content is available to all students and teachers.
6. There is a strong on-going partnership between mathematics content and technology integration experts.

Guiding Questions

- What does research tell us about the ways technology can be utilized to enhance teaching and learning in mathematics?
 1. What are the critical mathematics concepts that technology can help in deepening student understanding (i.e. visualization, modeling and simulation)?
 2. How can technology in mathematics help educators differentiate instruction?
 3. What real-world contexts will students encounter?
- How can technology be used in mathematics to provide students the opportunity to work and compete with 21st century tools in a 21st century context with 21st century content measured by 21st century assessments?
 1. How can technology be utilized to encourage thoughtful, effective, global communication around mathematical concepts?



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2. What mathematical real-world tools can assist students in producing relevant, high-quality products?
 3. How can teachers make connections with community members to identify real mathematical problems?
- What successful practices and resources are available that provides a model for transforming mathematics instruction in the classroom?

*Adapted from the National Council of Teachers of Mathematics (NCTM) statements of belief.

Leveraging Funding Streams Matrix

The *Leveraging Funding Streams Matrix* provides information on possible funding sources and programs for collaboration for educational technology. The funding sources include specific Titles and programs within the No Child Left Behind Act of 2001 (NCLB) and the Individuals with Disabilities Education Act (IDEA). For each funding source with relevant opportunities, the matrix includes details on the following (as applicable):

- Purpose
- Allocation of Funding
- Guidelines for Funding
- Allowable Uses of Funding
- Restrictions on Uses of Funding

The matrix also provides a link to legislation, the 2006 funding amount, the U.S. Department of Education contact, and any related national organizations.

Although the matrix is available in its entirety under “Technology's Role in Math Curriculum” > “Leveraging Funding Streams Matrix,” you can also access specific parts:

- NCLB Title I
- NCLB Title II
- NCLB Title III
- NCLB Title IV
- NCLB Title V
- IDEA

General resources for funding amounts and legislation are available at:



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- EDGAR (Federal Regulation Guidance Booklet):
<http://www.ed.gov/policy/fund/reg/edgarReg/edgar.html>
- Federal Funding Allocations: <http://www.ed.gov/about/overview/budget/budget06/06action.xls> or
<http://www.ed.gov/about/overview/budget/budget06/summary/edlite-section2a.html>

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