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Additional briefs include:

Goals

Steps to Increase Accessibility

Promotion of Curricula and Teaching Strategies That Integrate Technology

Professional Development

Technology Type and Costs

Coordination with Other Resources

Integration of Technology with Curricula and Instruction

Innovative Delivery Strategies

Parental Involvement

Collaboration with Adult Literacy Service Providers

Accountability Measures

Supporting Resources

Collection of Key Questions to Consider

Strategies for Improving Academic Achievement and Teacher Effectiveness

Local technology applications and plans should include a description of how the applicant will use Ed Tech funds to improve the academic achievement, including technology literacy, of all students and to improve the capacity of all teachers to integrate technology effectively into curriculum and instruction.

Overview

Technology will have the greatest impact on student learning when integrated into the curriculum to achieve clear, measurable educational objectives (Hawkins, Panush, & Spielvogel, 1996). In order for meaningful, sustainable school improvement to occur, school reform initiatives that involve technology need to coordinate five issues—leadership, core vision, professional development, time, and assessment (Honey, 2001). It is clear that technology tools and resources must become an integral part of both the teaching and learning process if they are to have an impact on student achievement.

Before planning for technology, therefore, it is crucial to develop a clear set of goals, expectations, and criteria for improvements in student learning. Additionally, it is important to establish and support an ongoing staff development program tied to criteria for improvements in student learning. Then, specific curricula, practices, skills, attitudes, and policies that can be enhanced through the use of technology can be identified.

Key Questions to Consider

- How can technology be used to support the improved academic achievement, including technology literacy, of *all* students?
- What strategies will you use to improve teachers' capacity to integrate technology effectively into curriculum and instruction?

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"If technology isn't used properly or isn't fully integrated into the project at hand, it will gather dust and offer nothing in the way of student academic improvement."
(McKeon, 2001)

Strategies for Addressing Local Technology Applications and Plans

Technology Supporting Improved Academic Achievement
A shift has taken place in recent years from teaching students how to use technology to focusing on using technology to support content. Technology can no longer be looked at in isolation but rather as part of a carefully planned program of school change as it relates to student achievement. Technology can broaden the range of students' choices as they learn. Students routinely use technology tools to find information, collect, organize and interpret data, and present results. In addition, technology offers teachers options for adapting instruction to special student needs. The following strategies suggest ways technology can be used to support improved academic achievement:

1. Use technology in support of student learning in key content areas by linking to existing district or school initiatives. For example, process writing goals can be supported with portable smart keyboards and webbing tools (e.g., Inspiration). Build technology into the math curriculum in areas such as data organization and interpretation (databases and spreadsheets) or exploration of mathematical concepts (see http://standards.nctm.org/document/eexamples/). Support early literacy initiatives with technologies that incorporate reading, writing, speaking, and listening (e.g., Wiggleworks).

2. Teachers can work within specific content areas to integrate technology rather than making technology a separate subject area. Consider: What do students need to learn, and how can technology promote those learning goals? When revising curriculum in a specific subject area, the committee that is charged with this task could also be specifically charged with looking into the selection of technology tools and resources to support learning in this area. It is best if curriculum and technology leaders work together to create planning documents to ensure that district learning goals are in both the curriculum and technology plans. Working together, they can create curriculum plans that include technology skills and resources where appropriate and beneficial to student learning, identify student and

teacher technology skills needed to use technologies for learning, and plan where these skills can be integrated into professional development (for teachers) and curriculum (for students).

3. District leaders can use technology tools to collect, organize, analyze, disaggregate, and report on student achievement data. Student achievement data is complex, but it offers a tremendous opportunity to identify strengths and weaknesses in curriculum and instruction when properly analyzed and synthesized. Data organization and manipulation tools such as spreadsheets, relational databases, and automated student information systems can assist in this task. Administrators can involve teachers in the process of looking at student performance data to inform curriculum and instruction decisions and practices. Teachers' use of portable technology tools (e.g., PDAs, hand-held computing devices) can assist them in classroom assessment.

4. Technology can be used to support different learning styles and meet the needs of all learners in the district. For example, technology supports a district-wide focus on differentiated learning with universal design for learning concepts: multiple means of expression (multimedia presentation tools), multiple means of engagement (simulations, online manipulatives, content-based software), and multiple means of representation (digital images, digital sound, animation, text-to-speech resources). Curriculum materials should be varied and diverse and should include digital and online resources in addition to traditional text resources. Technology can also facilitate developmentally appropriate learning experiences by providing information in a variety of ways (visual, auditory) and at a variety of levels.

Increased Teacher Capacity

Technology can and should play an important role in curriculum planning, development, delivery, assessment, and administration. Technology must be "institutionalized in schools"—integrated into the culture and classroom practice of a school (Nelson, Post, & Bickel, 2001). Professional development is essential to ensure that teachers are able to choose the most appropriate technologies and instructional strategies to meet district curriculum goals and student learning needs. The primary reason teachers do not use technology is a lack of experience with the technology itself (Wenglinsky, 1998). Teachers need to be supported in their efforts to use technology.

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When properly trained and supported, teachers can effectively use technology to find content-based resources, deliver instruction, and support and enhance curriculum.

1. The Enhancing Education Through Technology Act of 2001 requires that "not less than 25 percent of funds [will be used] to provide sustained and intensive, high-quality professional development" (Section 5216a). A district can support content-based professional development with curricula and teaching strategies that integrate technology, particularly in areas identified by the district as areas of concern or focus. For example, professional development focused on "writing across the curriculum" can be supported with technology tools such as graphical organizers (Inspiration) and portable writing devices. This strategy necessitates cooperation and common planning and goal setting between curriculum directors, support personnel, technology directors, and staff. Districts might consider providing a variety of flexible and on-going professional development formats and options (online, after school, summer, staff meetings, release days).

2. It is important to allocate appropriate hardware, software, and support resources to encourage the capacity-building process. Consider providing on-site technical and instructional support for the integration of technology. A possible strategy involves using technology integration specialists to support teachers. Training, materials, and modeling should show how technology can be used to support curriculum, making the push for technology and the push for standards complementary rather than competing mandates on teachers. Consider creating professional development centers (real or virtual) in schools or districts where teachers can meet to learn, practice, and share new ideas and strategies.

3. Experience has shown the importance of creating school conditions that support and encourage teachers as they work to develop basic technology skills and integration strategies. Consider providing in-school time for professional development, collegial sharing, curriculum planning, and teacher experimentation. Teachers will need easy access to reliable, Internet-connected teacher workstations/ presentation stations in their classroom. Possible strategies include making laptops available to teachers for at-home use,

ensuring that district software may be used by teachers at home for curriculum planning, and allowing teachers to access school/district servers and networks from outside of school.

4. It is important that district/school goals and expectations support teachers in their integration efforts. Aligning teacher evaluation systems and hiring practices with the system technology goals and vision will support technology integration into the curriculum.

Extended Resources

National Educational Technology Standards for Students
http://cnets.iste.org/index2.html
An excellent resource for establishing technology competencies for students can be found in this publication.

National Educational Technology Standards for Teachers
http://cnets.iste.org/index3.html
This resource provides a set of expectations for teacher technology skills.

The Profiler
http://profiler.hprtec.org/
This online survey tool may be useful to assess technology strengths and weaknesses.

The Learning with Technology Profile Tool
http://www.ncrtec.org/capacity/profile/profile.htm
This program presents indicators of engaged learning and indicators of technology that educators can use to identify their own strengths and weaknesses.

NCREL (North Central Regional Educational Lab)
http://www.ncrel.org/sdrs/areas/te0cont.htm
"Critical Issue" papers that focus on technology in education.

Universal Design for Learning (UDL)
http://www.cast.org/udl/
The CAST website provides tools, examples, and research to support the use of technology to meet the needs of all learners.

Enhancing Education Through Technology Act of 2001. Title II, Part D of Elementary and Secondary Education Act, 2001.

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Technology Briefs for NCLB Planners can be obtained by visiting http://www.neirtec.org.

Technology Briefs for No Child Left Behind Planners was developed by the Northeast and the Islands Regional Technology Consortium (NEIRTEC) project, a collaboration of Education Development Center, Inc. (EDC), TERC, Education Alliance at Brown University and Learning Innovations at WestEd, funded by the U.S. Department of Education.

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