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Learning in the Digital Age

Assistive Technologies for Reading Text-reader programs, word-prediction software, and other aids empower youth with learning disabilities.

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Schools in today's digital age are filled with students who every day retrieve archived information with a mouse click or stream video footage of events occurring around the world right into their classroom computers. In these same schools, millions of students cannot benefit as fully as possible from their education programs because of learning disabilities. Besides providing exciting new ways to communicate, digital technologies can be a lifeline to this latter group.

About 10 percent of students in U.S. public schools—more than 6 million students nationwide—receive special education services *(25th Annual Report to Congress . . , 2005)*. Approximately half of these students are classified as having a learning disability, a term defined by the National Joint Committee on Learning Disabilities as

> a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. (1991)

The percentage of students with learning disabilities spending the majority of their school day in inclusive classrooms rather than in pullout programs has increased steadily over the last 10 years. Approximately 44 percent of students with learning disabilities spend 80 percent or more of their school day in inclusive classrooms *(25th Annual Report to Congress . . ., 2005)*.

As more of these students are being educated in inclusive classrooms, where they are expected to perform grade-level work but not always given specialized support, teachers are searching for ways to educate students with disabilities more effectively. Yet too many teachers are unaware of the potential of assistive technologies to empower students struggling to work independently at their grade level.

Assistive Technology Defined

The term assistive technology (AT) is used broadly in education. Federal law defines assistive technology devices as

> any item, piece of equipment, or product system . . . used to increase, maintain, or improve functional capabilities of individuals with disabilities. *(Individuals with Disabilities Education Act, 1990)*

Assistive technology devices and services—from such high-tech innovations as computer screen-readers for people with

visual impairments to lower-tech products, such as head pointers or pencil grips—have aided learning for many students with physical impairments. Positioning devices have enabled students with physical disabilities to join their classmates at tables; auditory trainers have helped those with hearing impairments comprehend instruction in the regular classroom; and portable text-reading devices have enabled learners with sight problems to access information from libraries.

Although assistive technology has made a dramatic difference for many students with severe physical impairments, research suggests that its potential remains untapped for the larger group of students receiving special services because of learning disabilities. The National Assistive Technology Research Institute (NATRI) at the University of Kentucky examined the use of assistive technology in 10 U.S. states in 2005 and found that assistive technologies are much more likely to be used by students in low-incidence special education categories (such as autism, hearing impairment, or visual impairment) than by students with learning disabilities. Further, assistive technology is more often used in special education classrooms than in regular classrooms. Regular education teachers appear to rely on specialists for information about assistive technology, reporting that they know little about available assistive technologies or how such tools can be used (NATRI, 2005). It is essential that classroom teachers, not just special educators, learn to guide and support students in using applications that can boost their academic success.

Assistive Technologies for Literacy

Literacy is one area in which well-applied assistive technologies can act as a lifeline to students with learning disabilities. As many as 8 of 10 students with learning disabilities have reading problems so significant that they cannot read and understand grade-level material (Lerner, 2003). Learning disabilities often interfere with students' ability to grasp principles of phonetics, decode text, or comprehend what they read. In our work with schools, we have seen assistive technology break down barriers to full literacy in two ways: as a *reading support*, meaning that computer-based applications help students with learning disabilities successfully access grade-level text as they read, and as a *reading intervention*, meaning that the technology helps students strengthen and improve their overall reading skills.

Supportive assistive technology approaches should work symbiotically with learning interventions. In an ideal situation, students can use an assistive technology intervention to continually improve their reading skills while at the same time taking advantage of a reading support to provide the scaffolding necessary to read text at their grade level.

Providing Reading Supports

In 2000, the Kentucky Department of Education embarked on a technology-based initiative to help students with disabilities become more independent when reading grade-level text. The program centered on an assistive technology called *text-reader* software that uses synthetic speech to read text aloud while the same text is highlighted on a computer screen. After evaluating various text-reader tools, the Kentucky Department of Education selected a software program called Read & Write Gold.[1] Kentucky negotiated an agreement with Texthelp, makers of Read & Write Gold, to provide a discount for Kentucky schools; 95 percent of Kentucky's public schools now have a site license for this product.

Read & Write Gold software provides text-to-speech output of individual words, sentences, or paragraphs. It allows the student to customize the program and select personal preferences for the text-to-speech output, such as voice gender, speed, and pitch. The voice reading aloud may be heard through computer speakers or through personal headphones.

As the name implies, Read & Write Gold also provides computerized support for writing, another area of difficulty for many students with learning disabilities. Perhaps the most powerful writing feature is word prediction. As a student is composing on the computer, the computer attempts to predict, on the basis of the context or the first few letters typed by the student, the word that the student is reaching for, and provides several choices. Such support often dramatically speeds up the student's composition process. Because students with learning disabilities frequently skip words or misread written text even in their own compositions, the text-reader feature of Read & Write Gold can be especially useful. At any point during the writing process, the student can direct the computer to read back portions of the text. When students with learning disabilities can hear what they have written, their composing and editing labors are lessened.

To a large extent, the success of the Kentucky project has hinged on making computer-readable school texts available to

Kentucky's students. Recent legislation amends the state's textbook adoption law to provide preferential procurement status to textbook publishers that supply digital versions of their textbooks (Casebier, 2002).

Text-reader software creates a more level academic playing field for students who do not decode or comprehend well enough to read grade-level text independently. The assistive technology used in this project has freed thousands of Kentucky students with learning disabilities from the stigma and failure that they may have faced their entire school careers (Hasselbring & Goin, 2004). For many, it is a breakthrough to be able to read a grade-level passage without depending on a teacher or another reader. Students in Kentucky schools who receive special testing accommodations use Read & Write Gold when taking the state assessment. Teachers have found that students with disabilities are more likely to reread text passages several times for clarity when using Read & Write Gold than when listening to the text being read aloud by a teacher.

Improving Skills with Reading Interventions

What happens when a student with a learning disability faces reading challenges outside the school environment or when text-to-speech software is not available or practical? To address this problem, a number of schools have turned to technologies that help improve reading skills. Computerized reading training applications—such as the Read, Write & Type! Learning System (developed by Talking Fingers, Inc.) and Read Naturally (developed by the Fluency Company)—have proved extremely effective for many students. In one study, a technology-based reading intervention program called READ 180[2] resulted in significant gains in reading fluency and comprehension for special education students in the Des Moines Independent Community School District. Perhaps the most significant finding was that 18 percent of the students in the study no longer required special education services for reading after one year of intervention (Palmer, 2003).

READ 180, published by Scholastic, Inc., is one of the few assistive technology programs for reading intervention designed for older students, specifically those in grades 4-12. The program provides individualized instruction on the basis of each student's ability level and specific needs.

One of the greatest problems that poor readers face is a deficit in background knowledge in many subject areas. We have all read text that made no sense to us even though we could read all of the words. Typically in these cases, we don't have the knowledge needed to comprehend the text. READ 180 remedies this problem: Before reading a text passage, the learner watches a short anchor video that provides the background knowledge needed to make sense of the text. The anchor videos are clustered around three areas: people and culture, science and math, and history and geography. After viewing the video, the student is shown a text passage about the video that is on his or her pre-tested reading level. READ 180 includes support much like that found in text-reader software; when needed, the student can prompt the computer to provide help in decoding words, phrases, or the entire passage.

After the student works through the reading passage, the software provides instruction on words that the student had trouble reading quickly and accurately; the text-reader software enables the student to decode, pronounce, spell, and define words, as well as break them into parts and translate them into one of five different languages.

Following the vocabulary work, the computer presents the student with comprehension questions about the passage. Finally, a recap shows the student how many words he or she has read correctly. The student continues to read the passage with instruction and support until he or she can do so with speed and accuracy. Then a new video is introduced, and the instructional cycle begins again.

Techno-Byte

> In 2004, virtually all public schools in the United States had Internet access, up from 35 percent in 1994.
>
> —Children's Partnership, 2005

Beyond Instructional Delivery Systems

As assistive technologies have advanced over the years, they have delivered instruction in new ways. But simply improving

access and delivery will not necessarily improve instruction. On the contrary, improved learning for all students depends on the quality of instruction—not on the medium with which it is delivered. As media researcher Richard Clark notes, instructional technologies are

> mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition. (1983, p. 445)

As teachers, we must become more aware of the role that technology plays in learning. Our main focus as educators who care about youth with learning disabilities must be on providing excellent instruction. Although assistive technologies make it possible for students with disabilities to profit from good instruction, technology is not magic; it is simply a tool of education. As with any tool, when used skillfully, it can help achieve spectacular results.

Endnotes

[1]For more information on Read & Write Gold, contact Texthelp Ltd. at 617-896-9704; www.texthelp.com.
Other text-reader programs include Solo, available from Don Johnston, Inc.; Wynn, developed by Freedom Scientific; and Kurzweil 3000, available from Kurzweil Educational Systems.

[2]For more information on READ 180, contact Scholastic, Inc. at 212-343-6100; www.scholastic.com.

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