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Accessible Technologies

Ensuring that no child with a disability is left behind

For hundreds of thousands of students across the United States, technology has opened educational doors that were previously inaccessible. But for students who are visually impaired, hard of hearing, or who have other physical or learning disabilities, technology might actually create more barriers than it removes.

Consider the example of a blind student who must read information in Portable Document Format for an online class. Because PDF files are not compatible with screen readers, the student will have trouble accessing the information. Or, if a school web site or classroom instructor shows a video clip in which the audio component is not captioned, students who are hearing impaired in this case will miss out.

"Technology is a huge barrier for students with disabilities," said Sarah Rule, director of the National Center on Disability and Access to Education (NCDAAE), at a

recent conference on accessible technologies. "Are we providing captioning for our deaf students who participate in live-video instruction? In a real-time virtual classroom, how do students with little or no use of their hands activate a microphone to participate in multi-site conversations? With increases in the use of online education, do people stop to think about how a blind student could take an online quiz or read class notes?"

In most schools across the country, the answer to these questions is a resounding "no." Although 95 percent of postsecondary institutions use the web to offer distance-education programs, only 18 percent of institutions make the content accessible to students with disabilities, according to a recent study by the National Center for Education Statistics.

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This Special Report was developed by the editors of eSchool News in cooperation with the Consortium for School Networking (CoSN) as part of the CoSN initiative on Accessible and Assistive Technologies.

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What is 'accessible technology'?

Accessible electronic and information technology is technology that can be used by people with a wide range of abilities and disabilities. It is either directly accessible—that is, it can be used without the need for assistive technology (AT) devices—or it is compatible with standard AT devices.

Accessible software applications might include features designed specifically for users with disabilities. However, they always give users more than one way of accomplishing a task. They use established standards for displaying menus and prompts, which can be interpreted by AT devices. They allow users to use the mouse, the keyboard, or a combination of the two. They rely on more than just color to convey information. Installation instructions, user guides, and other documentation materials are available in alternative formats, such as large print, Braille, and electronic text.

Accessible multimedia products, which may be distributed on videotapes, CD-ROMs, DVDs, or the World Wide Web, include synchronized text captions for spoken information and other audio content and provide synchronized audio descriptions for visual content. They offer more than one way to input commands or respond to prompts. For instance, if a character's voice on a CD tells a child to click on an animal to learn more about it, hearing-impaired children cannot hear the instructions, and blind children cannot click on the animal because they cannot see what is on the screen. Providing captions in addition to spoken instructions gives children who can read but have hearing impairments the chance to participate. Providing keyboard commands for all functions of the software allows blind children to participate. Captioning, descriptive narration, audio navigation (talking menus), and alternative ways of navigating can make a big difference in the ability of students with disabilities to use these technologies independently.

Accessible web sites are designed so that all visitors can navigate the site, access content, and participate in interactive web activities. They provide a text equivalent (typically a description) for all non-text elements, such as audio, video, graphics, animation, graphical buttons, and image maps. This allows those who cannot see the screen to access the information with a screen reader that can read the description of the image.

(Source: AccessIT Knowledge Base, National Center on Accessible Information Technology in Education, University of Washington)

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At the K-12 level, this situation slowly is changing. Thanks in part to the No Child Left Behind Act (NCLB), K-12 school systems now are charged with ensuring that mentally and physically disabled students reach the same achievement benchmarks as their peers.

The law's effects could be felt at the college level, too, because it has provided new motivation for technology vendors—including makers of commercially available software for online instruction and assessment—to create universally accessible solutions for all students.

Another impetus for change is Section 508 of the Rehabilitation Act Amendments of 1998, which now requires federal government agencies to make all their information, computers, and networks fully accessible to persons with disabilities.

All federal agency web sites, for example, must have a text equivalent—a description that can be vocalized—representing every picture, graphic, or icon. Multimedia presentations also must be synchronized with audio presentations. In other words, if you can't see it, you must be able to hear it—and vice versa.

The law applies only to federal government agencies and not state or local entities, but some public schools and universities have adopted the Section 508 regulations voluntarily. Advocates for the disabled say it's only a matter of time before the rules apply at the state and local level, too. Already, Maryland has adopted similar legislation on behalf of its disabled citizens, and other states might not be far behind.

To spur efforts to make school technology more accessible for all users, NCDAE and the Consortium for School Networking (CoSN) recently launched separate initiatives to make education stakeholders aware of the issue. For more information about these initiatives, as well as other important advice to help you develop accessible technology approaches in your own schools, read on.

Communication is key

The lack of communication and coordinated planning among school technology leaders, special-needs administrators, and classroom teachers in most school systems today is a serious impediment to providing a high-quality education for all students, including those with disabilities, warned a panel of experts who met at CoSN's annual conference in Arlington, Va., last spring.

Though schools are now beginning to harness the power of technology to identify children with special circumstances and better meet their learning needs, a number of barriers to students with disabilities remain. Chief among them, agreed participants in a special forum at the conference, is a lack of understanding on the part of school technology directors about what kind of accessible- and assistive-technology (AT) options exist and how these should fit in with a school district's overall technology plan.

To help solve the problem, CoSN has launched a new initiative called "Building Bridges: Accessible Technology for All Students." The first two components of the initiative, a report and a challenge-grant program, were unveiled at the conference.

The report, which appears as a monograph in CoSN's 2004 Compendium of resources, provides advice from special-needs educators about how technology can be used to reach children with special needs; charts a course for improved communication between school technology coordinators and special-needs educators; discusses the use of AT devices in the classroom; and explains the theory of universal design, the concept of designing and delivering mainstream products and services that are usable by people with the widest possible range of functional capabilities.

The report also takes a look at current legislation supporting the use of AT in schools and will help educators follow the trends and policies influencing legislative action on Capitol Hill, particularly the reauthorization of the Individuals with Disabilities Education Act (IDEA), the multibillion-dollar federal program that aims to increase opportunities for children with special needs.

The idea, according to school technology leaders and vendors who attended the CoSN forum, is to move away from the "separate but equal" approach that is typical of special education today and toward a scenario where technologies and approaches designed to benefit special-needs children are ingrained in the fabric of traditional learning environments—and fit into a school system's overall technology plan.

Too often, special-education teachers or administrators are the only individuals within a school who are capable of suggesting appropriate accessible or AT solutions for students, forum participants said. "Only the specialists even know what's available," said one panel member, a technology director for the Baltimore County Public Schools in Maryland. Outside of that, teachers and technology planners "have very limited exposure to assistive technologies."

The problem is especially acute in many smaller school districts, educators say, where a lack of resources makes it nearly impossible for instructors to keep abreast of best practices and new technologies proven to help improve achievement for special-needs students.

Tech directors in general complained they aren't exposed to accessible and AT products. They said they learn about these products only when special-ed teachers or AT directors bring such products to their attention.

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In some school systems, the lack of coordination among tech leaders, curriculum directors, and special-needs teachers is so severe that administrators aren't even sure what kinds of assistive technologies are in use, simply because the technology was purchased by a parent or special-needs coordinator and then never included in the district's broader inventory processes.

That's because special education traditionally has been grouped under a separate umbrella than regular instruction. Thanks to NCLB, however, all of that is changing, said Bob Moore, CoSN chairman and executive director of information technology services for the Blue Valley School District in Kansas. "We need to move everybody if we are going to make [Adequate Yearly Progress]," he said.

But it isn't just schools that must improve their efforts; vendors, too, must recognize a need for change, educators contend.

Several technology leaders who participated in the CoSN forum agreed that integrating AT devices would be easier if vendors and service providers worked to make their solutions more intuitive, so that schools could purchase them without investing additional time and money in training and professional development.



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Technology and a caring educator can level the field for kids like this one.

Compatibility is another issue, they said. "Every time our [operating] system is updated, it seems our special-needs software stops working," commented one panelist. Other participants were equally troubled by compatibility issues, citing problems with competing operating systems, among others.

Panelists also said they need solutions that instill elementary-level skills but do so using age-appropriate content. Many older special-ed students need elementary remediation but are turned off by the childish content used in most products, they said.

With the myriad of disabilities that exist, from the most glaring of physical limitations to the least visible of learning disabilities, educators said what they need most of all are solutions that are versatile enough to meet the diverse demands of their students.

In education, "everyone is special," according to one panelist. That means the solutions schools invest in need to be flexible enough to provide potential benefits for all, not just those who are labeled as in need of special attention.

Realizing the challenges most educators face in making technology and learning accessible to all students, CoSN announced that it has received challenge grants from two technology companies: IntelliTools Inc. and Sprint Corp.

The grants are intended to create new resources for school administrators and to help make educational technology accessible for students with disabilities. CoSN will use the awards to build tools to integrate AT devices and services into the traditional curriculum.

According to CoSN, the grants will be used to identify and spread awareness of best practices for increasing access to the curriculum for students with disabilities through the adoption and integration of AT devices and accessible software. The program will provide tools and training to improve the ways school systems iden-

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Evaluating whether IT products and services are accessible

To determine whether a software application is universally accessible, you should evaluate the application according to a set of guidelines or standards that defines accessibility.

The only legal standard is Section 1194.21, "Software applications and operating systems," of The Electronic and Information Technology Accessibility Standards

(<http://www.access-board.gov/sec508/508standards.htm>). These standards were developed by the U.S. Architectural Transportation Barriers Compliance Board (Access Board) as required by Section 508 of the Rehabilitation Act Amendments of 1998. There are 12 standards, and the Access Board provides a detailed explanation of each in its Guide to the Standards (<http://www.access-board.gov/sec508/guide/1194.21.htm>).

Following publication of the Access Board standards, the Information Technology Industry Council (ITIC) teamed up with the U.S. General Services Administration (GSA) to create a Section 508 compliance checklist called the Voluntary Product Accessibility Template, or VPAT (<http://www.itic.org/policy/508/vpat.html>). Many software companies have completed VPATs and have made them available on their company web sites. GSA also has created a central database called Buy Accessible (<http://www.section508.gov>), where many vendors have posted their VPATs. The database serves to help purchasers make informed decisions about the accessibility of products. To date, there is no comprehensive third-party evaluation of software, however, so purchasers must rely on vendor self-representation in the VPATs, coupled with their own understanding of product features and accessibility issues.

IBM separately maintains the IBM Software Accessibility Checklist (<http://www-3.ibm.com/able/accesssoftware.html>). This checklist includes 20 checkpoints in seven categories, and each of the checkpoints links to specific techniques documents for software developers.

A few postsecondary schools have developed their own checklists, guidelines, and policies for ensuring that accessibility is considered when purchasing software. Examples include MIT (<http://web.mit.edu/atic/www/sw/purchaseapp.html>), Oregon State University (<http://tap.orst.edu/Policy/soft.html>), and the University of Minnesota (<http://cap.umn.edu/ait/Software/index.html>).

Finally, the Mid-Atlantic Regional Technology in Education Consortium (MAR*TEC) has created a database called the Accessibility Survey for Educational Software (<http://129.32.108.4/swcatalog/deswcatsearch.asp>), which allows educators to see if their software meets the standards defined in Section 508. More than 200 curriculum software titles are represented in the database, along with a description of how accessible each one is.

(Source: National Center on Accessible Information Technology in Education and eSchool News staff reports.)

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tify, acquire, and implement AT products and accessible technologies in their classrooms, officials said.

“As technology becomes ubiquitous in education, and the demands on students and schools increase, there is a pressing need for educational technology and special-education leaders to work cooperatively and to understand what each can contribute to the education of all students in the district,” said CoSN’s Moore.

Accessibility vs. usability

Bringing down the barriers to students with disabilities also was the objective addressed by a select group of special-education experts and industry executives who convened earlier this year at the National Summit on Disability and Distance Education in Washington, D.C. Their goal was to form an agenda that would help make the promise of virtual instruction a reality for the nation’s special-needs learners.

Throughout the two-day conference, sponsored last spring by NCDAAE, stakeholders from industry and education discussed how online course materials—and the assistive technologies that often are required to access them—could be improved to accommodate all students, regardless of disability.

Experts suggested a three-pronged approach to the problem, including (1) broad shifts in public policy; (2) stronger, more ambitious professional development for distance educators and course designers; and (3) design changes to educational technology that would permit all students—including those with disabilities—to benefit from its use.

To make distance-education programs fully accessible to all students, schools and their corporate partners first must address what speakers called a fundamental rift between accessibility and usability. Just because a solution adheres to a set of predetermined accessibility standards doesn’t necessarily mean the technology will make learning any easier on the student, participants said.

“The difference between accessible and usable—or easy and comfortable to use—is sometimes worlds apart,” said Norm Coombs, professor emeritus from the Rochester Institute of Technology and chief executive officer of EASI (Equal Access to Software and Information), a provider of online technology training for persons with disabilities that has reached more than 4,000 people in three dozen countries since its inception in 1993.

Coombs, who is blind, said schools need to provide “direct” accessibility of hardware, software, and course materials, so that when students with disabilities log onto distance-education programs and other online learning resources, they are not required to jump through additional hoops before proceeding.

For example, frames and other elements of online course design can trip up a user’s screen-reading software. If visually impaired students must change or adjust the settings on their software each time they try to access various course materials, they’re already at a disadvantage when compared with their peers.

The answer, summit participants said, lies in the creation of distance-education solutions according to the principles of “universal design,” so materials are universally accessible to—and easily usable by—all students, regardless of their disability.

But that’s easier said than done. Distance-education providers and advocates for disabled learners are faced with several questions: Which set of standards should institutions follow when designing courseware that is universally accessible? How can schools be encouraged to adopt this practice? How can companies be encouraged to develop universally accessible ed-tech products?

Coombs was part of a working group that proposed solutions to these and other questions. Here are the group’s key recommendations:

- Collect all existing accessibility standards in a single location for companies and schools to draw from. This collection of standards should include those spelled out in Section 508 of the Rehabilitation Act Amendments of 1998.
- Design a curriculum for schools to implement that teaches how to make web sites and online courses fully accessible. (Cyndi Rowland, project director for WebAIM, a project of Utah State University’s Center for Persons with Disabilities, reported that her organization already is working on a version of this.)
- Create a model reporting tool that students can use to inform schools of their non-compliance.
- Persuade the accrediting institutions to consider whether a distance-education program is fully accessible before granting accreditation.
- Create an awards or recognition program for universities that adopt best practices in accessibility, and share these best practices among schools nationwide.

Funding also is a challenge, participants noted. Many argue that the time and money it takes to develop universally accessible distance-education solutions have precluded smaller vendors from entering the market. Without competition, these advocates contend, there is little or no motivation for larger providers to invest in improving

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How to develop an accessible technology policy

- Make sure that all stakeholders—including potential students, instructors, and other staff members with disabilities—are represented as policies, procedures, and standards are being developed.
- Review what policies and procedures currently exist for the procurement, use, and development of electronic and information technology, and consider how accessibility issues might be incorporated within existing policies and procedures.
- Consider at what level the policy should reside—for example, at the school, district, or state level—and be sure to involve decision makers at the appropriate levels in policy development.
- Consult with your school’s or district’s legal counsel to determine what legal issues apply in this policy area.
- Review policies and guidelines that have been created by other organizations, including those for distance-learning courses developed by the California Community Colleges (http://www.htctu.fhda.edu/publications/guidelines/distance_ed/disted.htm), the software

access guidelines developed by Oregon State University (<http://www.washington.edu/accessit/articles?169>), and the web accessibility policy developed by the University of Wisconsin (<http://www.washington.edu/accessit/articles?140>). Incorporate good ideas into your own policies and procedures.

- Develop a broad policy statement that commits your school or district to making all programs, services, and resources accessible to students and employees with disabilities.
- List potential access challenges that students and employees with disabilities might face within the programs, services, and resources offered using electronic and information technology at your school or district.
- Consider the Section 508 standards (<http://www.access-board.gov/508.htm>) used by the federal government as a model for your own accessibility standards.
- Assign a person or a department within your school or district to be responsible for updating disability-related program-access policies and guidelines and for assuring compliance.
- Develop a plan to phase in compliance with

program-accessibility guidelines for previously developed courses and resources, with a date by which all electronic products will be compliant.

- Disseminate your accessibility policy, guidelines, and procedures throughout your school or district. Make it clear that the policy has high-level endorsement.
- Provide regular training and support for accessibility issues, policies, and guidelines to educators, students, and other stakeholders.
- Regularly evaluate progress made toward the use of accessible electronic and information technology in your school or district.
- Develop procedures for responding quickly to requests for disability-related accommodations when electronic and information technology that is used in your school or district is not accessible to a student or employee. Applying accessibility policies, procedures, and standards will assure that such requests are kept to a minimum.

(Source: AccessIT Knowledge Base, National Center on Accessible Information Technology in Education, University of Washington)

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Additional resources

At the Assistive Technology Industry Association web site (<http://www.atia.org>), educators can find information about companies that manufacture and supply assistive technologies, as well as the organization's annual trade show.

The School Technology Buyer's Guide at eSchool News Online (<http://www.eschoolnews.com/buyersguide>) contains information about at least 45 companies that supply assistive technologies to schools. Click on Accessories and Upgrades, then Assistive & Special Needs.

The National Center on Accessible Information Technology in Education (<http://www.washington.edu/accessit/index.php>) at the University of Washington promotes the use of electronic and information technology for students and employees with disabilities in educational institutions at all academic levels. The group's web site features the AccessIT Knowledge Base (<http://www.washington.edu/accessit/kb.php>), a searchable, growing database of questions and answers regarding accessible technology.

The international DO-IT (Disabilities, Opportunities, Internetworking, and Technology) Center at the University of Washington (<http://www.washington.edu/doi>) serves to increase the success of people with disabilities in college and careers; promotes the use of accessible technology and universal design; distributes publications and videotapes to freely use and reproduce for presentations and exhibits; co-sponsors the National Center on Accessible Information Technology in Education; and sponsors AccessDL, the National Center on Accessible Distance Learning (<http://www.washington.edu/doi/Resources/accessdl.html>).

Another co-sponsor of the National Center on Accessible Information Technology in Education, the University of Washington's Center for Technology and Disability Studies (<http://uw-ctds.washington.edu>) provides resources on accessible and assistive technologies, including technical assistance and training.

The Center for Universal Design at North Carolina State University (http://www.design.ncsu.edu/cud/univ_design/ud.htm) has established a set of universal design principles to apply toward the design of products, environments, and communication and other electronic systems.

The Web Accessibility Initiative (<http://www.w3.org/WAI>), a project of the World Wide Web Consortium, pursues internet accessibility through technology, guidelines, tools, education, outreach, and research and development. The group has published a set of guidelines and a checklist for making web sites fully accessible to persons with disabilities.

The Center for Applied Special Technology (CAST) Universal Design for Learning web site (<http://www.cast.org/udl>) offers resources, research, and examples to assist in the design of learning materials and activities that are accessible for all learners.

The National Center for Accessible Media (<http://ncam.wgbh.org>), a project of public television station WGBH of Boston, is a research and development facility dedicated to the issues of media and information technology for people with disabilities.

The Trace Research & Development Center (<http://trace.wisc.edu/world>) works on ways to make standard information technologies and telecommunications systems more accessible and usable by people with disabilities.

The Information Technology Technical Assistance and Training Center (<http://www.ittatc.org/index.cfm>) promotes the development of accessible electronic and information technology by providing technical assistance, training, and information.

Online discussion lists

Adapt-I focuses on adaptive technology and libraries. To subscribe, send a message with a blank subject line to listserv@american.edu. In the body of the message type "subscribe adapt-I [first name] [last name]."

Adtech-ps focuses on adaptive technology and technology accessibility in postsecondary education. Subscribe at the adtech-ps Info Page (<http://lists.oregonstate.edu/mailman/listinfo/adtech-ps>).

AToutcomes supports the development and use of reliable, valid, and sensitive outcome measures in assistive technology. To subscribe, send a message with a blank subject line to majordomo@snow.utoronto.ca. In the body of the message type "subscribe atoutcomes [eMail address]."

Axslib-I focuses on issues surrounding access to libraries by people with disabilities. To subscribe, send a message with a blank subject line to listserv@maelstrom.stjohns.edu. In the body of the message type "subscribe axslib [first name] [last name]."

Crt-focus is for discussion of assistive technology for people with disabilities. To subscribe, send a message with a blank subject line to listserv@smash.gatech.edu. In the body of the message type "subscribe crt-focus [first name] [last name]."

EASI (Equal Access to Software and Information) discusses technology access for people with disabilities. To subscribe, send a message with a blank subject line to listserv@maelstrom.stjohns.edu. In the body of the message type "subscribe easi [first name] [last name]."

Uaccess-I is for discussion of universal access to information systems. To subscribe, send a message with a blank subject line to listserv@trace.wisc.edu. In the body of the message type "subscribe uaccess-I [first name] [last name]."

WAI Interest Group is a very active forum for discussing issues relating to web accessibility. It's hosted by the Web Accessibility Initiative (WAI) of the World Wide Consortium (W3C), the group responsible for the Web Content Accessibility Guidelines. For more information and to subscribe, consult the WAI Interest Group Home Page (<http://www.w3.org/WAI/IG>).



Accessible tech is good for students like these—special needs or not.

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their solutions. That often translates into bad news for students with disabilities, many of whom are forced to use tools that only loosely address their specific needs.

To raise public awareness of the issue—and influence those who hold the purse strings—summit participants called on stakeholders to take the conversation to lawmakers on Capitol Hill and elsewhere.

"Disability access is often left out of public-policy discussions," according to Hilary Goldmann of the Higher Education Information Technology Alliance, a group dedicated to pursuing the collective interests of libraries and colleges in matters of federal information technology policy.

Goldmann said the idea behind generating more interest in this policy strand is to connect the different revenue streams that can be used to feed disability and distance education.

That might be happening already on the federal level.

The summit took place just one day before the U.S. Senate passed a bill that aims to fully fund IDEA for the first time in its history, advocates of the bill say.

If the bill becomes law, the federal government would contribute 40 percent of the cost of educating the nation's special-needs students—the full amount specified by the act—within the next seven years.

Lawmakers say the revised law, which at press time sat before a conference committee of House and Senate members, would reduce the paperwork burden on teachers and would unite parents and schools to better meet the needs of children with disabilities. The program currently contributes \$11 billion in federal money to special-education projects.

Summit participants also said they would petition lawmakers to address the accessibility of distance-education courses when Congress reauthorizes the Higher Education Act in the coming months.

LINKS:

National Center on Disability and Access to Education

<http://ncdae.org>

Consortium for School Networking

<http://www.cosn.org>

EASI: Equal Access to Software and Information

<http://www.rit.edu/~easi>

WebAIM: Web Accessibility in Mind

<http://www.webaim.org>

Higher Education Information Technology Alliance

<http://www.heitalliance.org>

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Examples of accessible technology products and services

Universally designed curriculum

IntelliTools Inc. is one of the few companies that provides a complete set of curriculum software based on the principles of universal design. The IntelliTools Classroom suite is a software platform for delivering K-6 curriculum aligned with content standards. It includes programs for reading (IntelliTalk 3), math (IntelliMathics 3), and multimedia creation (IntelliPics Studio 3) that are equally applicable to general education and special-needs students.



By using drawing, animations, video, and sound to create multimedia presentations with IntelliPics Studio 3, exploring math concepts with virtual manipulatives in IntelliMathics 3; or composing with a word processor that combines graphics, text, and speech in IntelliTalk 3, students can draw upon a host of tools for cross-curricular activities. For example, sixth-grade students who have developed a classroom survey about parent carpooling can visualize the results as fractions or percent in IntelliMathics 3, describe the methodology of the survey in IntelliTalk 3, and create a multimedia presentation for the school board in IntelliPics Studio 3, the company says.

Teachers can track students' responses to activities and quizzes and then record, report, and print student records for assessment purposes. The software tracks each student's performance in his or her own private portfolio, records student responses, compares them with expected answers, and makes the results available in both detailed and summary reports. A sampling of 30 activities in four grade ranges in reading, writing, math, social studies, and science also is included.

In addition to access by a standard keyboard, mouse, or touch-screen display, this cross-platform software suite features speech output, single-switch scanning, integrated word prediction to assist in writing fluency, and embedded help for ongoing and immediate support. An optional Supplementary Access Kit contains overlays and an Access Guide for using the software with the company's IntelliKeys programmable alternative keyboard, which enables users with physical, visual, or cognitive disabilities to easily type, enter numbers, navigate on-screen displays, and execute menu commands.

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Books for blind and physically handicapped students

For special-education teachers, providing required reading for blind and learning-disabled students is a significant challenge. Now, thanks to the aid of Bookshare.org, a nonprofit digital book service based in Palo Alto, Calif., educators have free access to more than seventeen thousands titles they can download and reproduce for use on screen readers or as MP3 files. For more information, see <http://www.eschool->

news.com/news/showStory.cfm?ArticleID=5087.

In addition, the National Library Service for the Blind and Physically Handicapped (NLS)—a program of the U.S. Library of Congress—administers a free library program of braille and audio materials circulated to eligible borrowers in the United States by postage-free mail.

Under a special provision of the U.S. copyright law and with the permission of authors and publishers of works not covered by the provision, NLS selects and produces full-length books and magazines in braille and recorded formats. Reading materials and playback machines are distributed to a cooperating network of 57 regional and 77 subregional local libraries, where they are circulated to eligible borrowers. Reading materials and playback machines are sent to borrowers and returned to libraries by postage-free mail. Braille books, magazines, and music materials also are available on the internet through Web-Braille.

Established by an act of Congress in 1931 to serve blind adults, the program was expanded in 1952 to include children, in 1962 to provide music materials, and again in 1966 to include individuals with other physical impairments that prevent the reading of standard print. Any resident of the United States or American citizen living abroad who is unable to read or use standard printed materials as a result of temporary or permanent visual or physical limitations may receive service. More than 23 million copies of recorded and braille books and magazines were circulated to a readership of 766,137 in 2003.

Playback equipment is loaned free of charge to readers for as long as they borrow recorded materials provided by NLS and its cooperating libraries. Readers with very limited mobility may request a remote-control unit. Hearing-impaired readers may be eligible for an auxiliary amplifier for use with headphones. A cassette machine designed primarily for persons with limited manual dexterity also is available.

Ask your local public librarian for more information about the program and how to apply for service. Information also is available on computer diskette or recorded cassette upon request or online at <http://www.loc.gov/nls>.

Communication aids for hearing or speech-impaired students

Telex Communications of Burnsville, Minn., supplies the listening devices for the NLS book-exchange program. Telex also sells sound amplification systems to schools, including a full line of educational headphones, headsets, and listening centers for the K-12 through college markets, as well as sound-field systems that increase the signal-to-noise ratio in the classroom both for the teacher's voice and also for other sources such as a CD player. These products make every spot in the room a good place to hear for every student, and they help the teacher's voice make it through the end of the day.

In addition, Telex sells a complete, battery-operated (and rechargeable), portable sound-field system in a kid-resistant tote bag, called the ClassMate Sound-Buddy. It's ideal for use by students who have mild to moderate hearing losses, cochlear implants, or whenever a portable system is needed, Telex says.

(952) 884-4051

<http://www.telex.com>

With almost 14 years of experience in providing Telecommunications Relay Services (TRS) for the hearing impaired, **Sprint Corp.** offers assistive technologies that enable standard voice telephone users to talk to people who are deaf, hard of hearing, or speech-disabled on the telephone.

Under Title IV of the Americans with Disabilities Act, all telephone companies must provide free relay services either directly or through state programs. Students and schools within the 32 states for which Sprint provides relay services are eligible for the following free services:

Traditional relay services (TRS) involve a relay operator serving as an intermediary for phone calls between a deaf, hard of hearing, or speech-disabled user and a hearing party. The TRS operator speaks words typed by a deaf user on a text telephone (TTY) or via the internet and relays the hearing person's spoken response by typing back to the deaf user.

Video relay services (VRS) provides students and faculty members with the opportunity to use video conferencing to communicate using American Sign Language (ASL). VRS requires users to have a personal computer or television monitor, a web camera or videophone, and high-speed internet connectivity. Sprint Video Relay, powered by CSD (Communication Services for the Deaf), is a free service through the internet that enables hearing-impaired users to communicate in sign language with other telephone users. To connect with a video interpreter, visit <http://www.sprintvrs.com>.

Sprint Relay Online is also a free service that combines TRS with the ease and ubiquity of the internet, allowing users to make calls from any PC or web-enabled internet device without having to use traditional TTY equipment. To connect with a Sprint Relay Online operator, visit <http://www.sprintrelayonline.com>.

Sprint Relay Wireless is an easy way to make a relay call from a wireless device. Based on technology developed by GoAmerica, Sprint Relay Wireless enables users to connect to Sprint Relay Online from virtually anywhere using a choice of wireless handheld devices and pagers.

CapTel (Captioned Telephone) relay service is a leading-edge technology developed by Ultratec Inc. of Madison, Wis., that allows people in participating Sprint Relay state programs to receive both voice and text captioning, nearly simultaneously. A special, CapTel-equipped phone is required to place a call through the CapTel relay service. For more information on CapTel, visit <http://www.captionedtelephone.com>.

Relay Conference Captioning (RCC), developed by Caption Colorado, is a free service that combines real-time captioning and standard relay service to provide relay conference captioning calls for deaf and hard-of-hearing individuals in participating Sprint Relay state programs. By using an Internet Text Streaming platform supported by skilled captioners, RCC provides highly accurate, real-time captioned text for any live conference call.

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