



Assistive Technology for Kids with Learning Disabilities: An Overview

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Assistive technology (AT) is available to help individuals with many types of disabilities — from cognitive problems to physical impairment. This article will focus specifically on AT for individuals with learning disabilities (LD).

The use of technology to enhance learning is an effective approach for many children. Additionally, students with LD often experience greater success when they are allowed to use their abilities (strengths) to work around their disabilities (challenges). AT tools combine the best of both of these practices.

This article will introduce parents to the role of AT in helping their children with LD. The better informed you are about AT, the greater the chances your child will experience success in school, in recreation and, eventually, at work. You will also want to learn how **to choose AT tools that are reliable** and to **select technology that is tailored to your child's individual needs, abilities, and experience**.

What is assistive technology for LD?

AT for kids with LD is defined as any device, piece of equipment or system that helps bypass, work around or compensate for an individual's specific learning deficits. Over the past decade, a number of studies have demonstrated the efficacy of AT for individuals with LD.¹ AT doesn't cure or eliminate learning difficulties, but it can help your child reach her potential because it allows her to capitalize on her strengths and bypass areas of difficulty. For example, a student who struggles with reading but who has good listening skills might benefit from listening to audio books.

In general, AT compensates for a student's skills deficits or area(s) of disability. However, utilizing AT does not mean that a child can't also receive remedial instruction aimed at alleviating deficits (such as software designed to improve poor phonic skills). A student could use remedial reading software as well as listen to audio books. In fact, research has shown that AT can improve certain skill deficits (e.g., reading and spelling).^{2,3}

AT can increase a child's self-reliance and sense of independence. Kids who struggle in school are often overly dependent on parents, siblings, friends and teachers for help with assignments. By using AT, kids can experience success with working independently.

What types of learning problems does assistive technology address?

AT can address many types of learning difficulties. A student who has difficulty writing can compose a school report by dictating it and having it converted to text by special software. A child who struggles with math can use a hand-held calculator to keep score while playing a game with a friend. And a teenager with dyslexia may benefit from AT that will read aloud his employer's online training manual. There are AT tools to help students who struggle with:

Listening

Certain assistive technology (AT) tools can help people who have difficulty processing and remembering spoken language. Such devices can be used in various settings (e.g., a class lecture, or a meeting with multiple speakers).

Math

Assistive technology (AT) tools for math are designed to help people who struggle with computing, organizing, aligning, and copying math problems down on paper. With the help of visual and/or audio support, users can better set up and calculate basic math problems.

Organization and memory

Assistive technology (AT) tools can help a person plan, organize, and keep track of his calendar, schedule, task list, contact information, and miscellaneous notes. These tools allow him to manage, store, and retrieve such information with the help of special software and hand-held devices.

Reading

There is a wide range of assistive technology (AT) tools available to help individuals who struggle with reading. While each type of tool works a little differently, all of these tools help by presenting text as speech. These tools help facilitate decoding, reading fluency, and comprehension.

Writing

There is a wide range of assistive technology (AT) tools available to help students who struggle with writing. Some of these tools help students circumvent the actual physical task of writing, while others facilitate proper spelling, punctuation, grammar, word usage, and organization.

What kinds of assistive technology tools are available?

The term "assistive technology" has usually been applied to computer hardware and software and electronic devices. However, many AT tools are now available on the Internet. AT tools that support kids with LD include:

Abbreviation expanders

Used with word processing, these software programs allow a user to create, store, and re-use abbreviations for frequently-used words or phrases. This can save the user keystrokes and ensure proper spelling of words and phrases he has coded as abbreviations.

Alternative keyboards

These programmable keyboards have special overlays that customize the appearance and function of a standard keyboard. Students who have LD or have trouble typing may benefit from customization that reduces input choices, groups keys by color/location, and adds graphics to aid comprehension.

Audio books and publications

Recorded books allow users to listen to text and are available in a variety of formats, such as audiocassettes, CDs, and MP3 downloads. Special playback units allow users to and search and bookmark pages and chapters. Subscription services offer extensive electronic library collections.

Electronic math work sheets

Electronic math worksheets are software programs that can help a user organize, align, and work through math problems on a computer screen. Numbers that appear onscreen can also be read aloud via a speech synthesizer. This may be helpful to people who have trouble aligning math problems with pencil and paper.

Freeform database software

Used in conjunction with word processing or other software, this tool allows the user to create and store electronic notes by "jotting down" relevant information of any length and on any subject. He can later retrieve the information by typing any fragment of the original note.

Graphic organizers and outlining

Graphic organizers and outlining programs help users who have trouble organizing and outlining information as they begin a writing project. This type of program lets a user "dump" information in an unstructured manner and later helps him organize the information into appropriate categories and order.

Information/data managers

This type of tool helps a person plan, organize, store, and retrieve his calendar, task list, contact data, and other information in electronic form. Personal data managers may be portable, hand-held devices, computer software, or a combination of those tools working together by "sharing" data.

Optical character recognition

This technology allows a user to scan printed material into a computer or handheld unit. The scanned text is then read aloud via a speech synthesis/screen reading system. Optical Character Recognition (OCR) is available as stand-alone units, computer software, and as portable, pocket-sized devices.

Personal FM listening systems

A personal FM listening system transmits a speaker's voice directly to the user's ear. This may help the listener focus on what the speaker is saying. The unit consists of a wireless transmitter (with microphone) worn by the speaker and a receiver (with earphone) worn by the listener.

Portable word processors

A portable word processor is a lightweight device that is easy to transport (e.g., from classroom to home). It can be helpful to kids who may have trouble writing by hand and prefer to use a keyboard. Word processing allows the user to edit and correct his written work more efficiently than doing so by hand.

Proofreading programs

Students who struggle with writing (e.g., spelling, grammar, punctuation, word usage, and sentence structure) may benefit from software programs (included in many word processing systems) that scan word processing documents and alert the user to possible errors.

Speech-recognition programs

A speech recognition program works in conjunction with a word processor. The user "dictates" into a microphone, and his spoken words appear on the computer screen as text. This can help a user whose oral language ability is better than his writing skills.

Speech synthesizers/screen readers

These systems can display and read aloud text on a computer screen, including text that has been typed by the user, scanned in from printed pages (e.g., books, letters), or text appearing on the Internet.

Talking calculators

A talking calculator has a built-in speech synthesizer that reads aloud each number, symbol, or operation key a user presses; it also vocalizes the answer to the problem. This auditory feedback may help him check the accuracy of the keys he presses and verify the answer before he transfers it to paper.

Talking spell checkers and electronic dictionaries

Talking spell checkers and electronic dictionaries can help a poor speller select or identify appropriate words and correct spelling errors during the process of writing and proofreading. Talking devices "read aloud" and display the selected words onscreen, so the user can see and hear the words.

Variable-speed tape recorders

Tape recorders/players allow a user to listen to pre-recorded text or to capture spoken information (e.g., a classroom lecture) and play it back later. Variable speed control (VSC) tape recorders speed up or slow down the playback rate without distorting the "speaker's" voice.

Word-prediction programs

Word prediction software can help a user during word processing by "predicting" a word the user intends to type. Predictions are based on spelling, syntax, and frequent/recent use. This prompts kids who struggle with writing to use proper spelling, grammar, and word choices, with fewer keystrokes.

Your child's profile

Here are several factors to consider when evaluating AT products for your child:

- What are her specific needs and challenges? In what academic skill areas does she struggle?
- What are her strengths? AT should utilize your child's abilities to help compensate for her disability.
- What is her interest, skill and experience in using technology? In what settings and situations will she use the AT tool? AT can help a child with LD function better at school as well as in other settings such as home, work, social gatherings and recreational events.

Other technology tools for learning

There are other forms of technology designed to help all students, including those with LD, improve their academic performance. These technologies differ somewhat from AT but are worth mentioning.

Instructional software is used to teach specific academic skills (like reading and writing) or subject matter content (such as history and science). It differs from AT in that it provides instruction rather than bypassing areas of difficulty.

Universal Design for Learning (UDL) is a philosophy that encompasses learning models, methods and products to enhance the educational experience of diverse learners (whether or not they have learning disabilities). In this approach, AT is often built into educational materials and can be customized to help students with disabilities be successful with the general curriculum.



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Endnotes

1 Multiple studies: Collins, 1990; Elkind, 1993; Elkind, Black & Murray, 1996; Higgins & Raskind, 1995; Higgins & Raskind, 1997; MacArthur, 1993, 1998; MacArthur, Schwartz, & Graham, 1991; McNaughton, Hughes & Clark, 1997; Priumus, 1990; Raskind & Higgins, 1995; Raskind, Higgins & Herman, 1997.

2 Higgins, E. L. & Raskind, M. H. (2000). Speaking to Read: The Effects of Continuous vs. Discrete Speech Recognition Systems on the Reading and Spelling of Children With Learning Disabilities. *Journal of Special Education Technology*, 15 (1), 19-30.

3 Raskind, M. H. & Higgins, E. L. (1999). Speaking to Read: The Effects of Speech Recognition Technology on the Reading and Spelling Performance of Children With Learning Disabilities. *Annals of Dyslexia*, 49, 251-281.