The Importance of
ASSISTIVE TECHNOLOGY
for Students with Disabilities

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for Students with Disabilities

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Imagine a middle school student with low vision who uses a screen reader to access the same literary content as her full-sighted peers. Or a nonverbal student with autism who uses a speech-generating device to share his ideas. A word-prediction program and an extended pointer help a high school senior with cerebral palsy type her final exam papers.

What do these students have in common? Each one is using an assistive technology (AT) device to take part in school and community life. AT helps students and adults with disabilities work around their challenges.

Assistive technology creates wonderful opportunities for students with learning and mobility differences. In an academic context, AT helps students develop greater "independent thinking skills, maintain self-reliance, increase autonomy, and develop problem-solving skills."[1] Devices such as electronic switches and visual symbols on communication boards help foster a sense of belonging within a community. Mobility tools such as power wheelchairs and braces can provide access to fitness, recreation, and leisure activity.

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Experts across multiple disciplines, from education to psychology to rehabilitation, agree on the critical impact of AT on an individual's quality of life. DC-based pediatric rehabilitation psychologist, Via Strong, PsyD, reflects on the role of AT for children transitioning home following an inpatient hospitalization: "When we discharge children from our hospital, access to assistive technology can make the difference between returning to school and having access to their 'normal life,' or being homebound and feeling cut off from friends and the community. The right assistive technology can make all the difference."[2]

AT provides great potential for students with special needs to capitalize on their strengths and minimize the challenges of their disability. It helps learners make the most of their educational experiences. And, when used thoughtfully, AT can benefit all students—those with and without disabilities.

There is a wide range of AT devices and services to address many different types of disabilities. An eye-tracking communication device is an example of high-tech AT. Other AT, such as a pencil grip or a slant board, is low tech. The purpose of these devices is to help students who have difficulty with speaking, reading, writing, typing, remembering, pointing, seeing, hearing, learning, walking, or completing other aspects of daily living.[3]

> AT provides great potential for students with special needs to capitalize on their strengths and minimize the challenges of their disability.

2   V. Strong, personal communication, May 21, 2020

3   Assistive Technology Industry Association, 2020

A Brief History of Federal Legislation and AT

Assistive technology was first formally defined in the Technology-Related Assistance for Individuals with Disabilities Act (Tech Act) in 1988. In the years following the Tech Act, additional federal legislation was passed to create greater access to and further the availability of assistive technology for persons with disabilities. These legislative acts include[4]:

- The Rehabilitation Act of 1973 (amended in 1992, 1998)

- The Americans with Disabilities Act of 1990

- The Assistive Technology Act (Tech Act) of 1998 (amended 2004)

- The Individuals with Disabilities Education Act (IDEA) of 2004

IDEA is the legal safeguard that ensures students with disabilities receive a free and appropriate public education (FAPE) in the least restrictive environment (LRE). The legislation requires school districts to provide special education and related services based on an Individualized Education Program (IEP) and defines assistive technology using the language of the Tech Act.

Assistive Technology Device: any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability. The term does not include a medical device that is surgically implanted, or the replacement of such device.[5]

4   Ohio Center for Autism and Low Incidence, 2013
5   IDEA 2004, Part B, Subpart A, Sec. 300.5

Assistive technology can be simple and inexpensive, or quite sophisticated. Most assistive technologies can be useful across different settings. For example, a dictation app on a smartphone can help a student with dysgraphia write using her voice at school and also at home. A blind student may use a braille reader to read a book in class, experience a history museum exhibit in his community, and enjoy a birthday card at home.

IDEA does not provide a specific list of approved AT devices and services. It does, however, outline a process for evaluating, acquiring, and implementing assistive technology that meets the unique needs of individual students with disabilities.

The Right to a Free and Appropriate Public Education in the Least Restrictive Environment

IDEA guarantees the right to a free and appropriate public education (FAPE[6]) for children with disabilities. IEP teams intentionally have some discretion to determine what constitutes an appropriate education because of the unique nature of each child's learning needs. However, there are several FAPE mandates requiring that all schools provide the following:

- **specialized instruction**, such as a multisensory reading program

- **related services**, such as occupational therapy or transportation services

- **accommodations and modifications**, such as flexible seating, extra time on tests, or use of a calculator in math

- an **individualized education program (IEP)** that identifies specialized services, annual goals, and progress monitoring

- **equal quality** in the curriculum and instruction for students with disabilities as in the curriculum and instruction of students without disabilities

- services that are **free of charge** to families

- education in the **least restrictive environment (LRE)**, allowing students with disabilities to be educated in the same setting as their nondisabled peers as much as possible[7]

Determining the Need for an AT Device or Service

In annual IEP meetings, the IEP team must consider whether the student with the disability needs an AT device or service to remain in his least restrictive environment. Questions the team should consider include: Will the assistive technology allow the child to be educated alongside his nondisabled peers? Can the device expand the child's access to the general education curriculum with fewer restrictions? What challenges is the child experiencing that the assistive technology is designed to help? The IEP team may need to order an evaluation to help determine if AT is needed.

Considering an example mentioned earlier—the blind student who uses a braille reader—the braille reader gives him increased independence by allowing him to read books, museum displays, and birthday cards by himself instead of relying on another adult or family member to read to him. Paired with other accommodations for students with visual impairments, such as audiobooks and raised line drawings, the braille reader lets the student participate in a general education classroom for most of his school day. Without it, he may require additional restrictions such as a dedicated aide or fewer hours in an inclusion setting.

Another example is the symbols-based communication board. Communication boards can be paper-based or electronic, and are often referred to as augmentative and alternative communication (AAC) devices. Paper-based communication boards may have a pre-set grid of symbols to which the student points to communicate wants and needs. Or, they may have a laminated, Velcro, or other base onto which interchangeable visual symbols such as SymbolStix SQUARES® can be placed.

Electronic communication boards on tablets, smartphones, or computers use a specialized program such as SymbolStix PRIME® to give students with communication disorders access to an enormous amount of vocabulary to describe and interact with the world around them. In the learning environment, these types of AT devices allow students to share what they know and ask questions when they don't understand. They are also a lifeline for building relationships with others.

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Appropriate assistive technology can open up the world for a student, not just for learning and literacy, but for social-emotional growth as well. Think of all the countless moments that communication occurs in a classroom: communicating a need, asking or answering a question, advocating for oneself, telling a story, making a friend laugh. Regardless of ability, when given appropriate AT, students can have better opportunities to engage with teachers and peers, giving them a voice that they may otherwise not be able to have in the classroom environment.[8]

Rebecca Politis
SPEECH-LANGUAGE PATHOLOGIST

PROVIDE ESSENTIAL VISUAL SUPPORTS FOR STUDENTS WITH COMMUNICATION CHALLENGES

Engaging and relevant symbols assist students in conveying understanding, expressing choices, and interacting with others.

SymbolStix SQUARES features high-frequency vocabulary words paired with engaging, recognizable symbols on 3"× 3" cards and can be used in communication boards, word walls, and pocket charts.

With SymbolStix PRIME, educators can access more than 90,000 symbols that can be used to create activities and communication boards to help students participate more fully in the classroom and at home.

8   R. Politis, personal communication, May 18, 2020.

Examples of AT by IDEA Disability Category

This list highlights a few examples of AT devices and services that may match the challenges of students with the disabilities listed below. The disabilities are organized by the 13 categories of disability under IDEA.

Specific Learning Disability (SLD)

- Magnification
- Calculators
- Spell-check, grammar tools, font size
- Assistive-writing programs
- Word-prediction programs
- Audiobooks/eBooks with screen-reading software

Other Health Impairment (OHI)

- Noise-cancelling headphones
- Microswitches
- Concept-mapping (graphic organizer) software to create visual representations that help organize thoughts about the text

Autism Spectrum Disorder (ASD)

- Pictures and symbols on an electronic device (communication board)
- Online clocks
- Visual schedules
- Text-to-speech software

Emotional Disturbance (ED)

- Talk lights
- Reminder devices
- Voice-recognition software
- Audiobooks

Visual Impairment, Including Blindness

- Screen readers

- High-contrast mode on screens

- Light-tech reading supports such as magnification

- Braille readers

Deafness

- Captioning

- Visual alerting systems

- Real-time transcription

- Text messaging

- Video-chat applications

Hearing Impairment

- Amplifiers

- LCDs (Listening Communication Devices)

- FM Systems

- Sound-field systems

Deaf-Blindness

- Braille readers

- TTY telephones

- Closed-circuit monitors

Intellectual Disability (ID)

- Pictures and symbols on paper (communication board)

- Touchscreens that give choices for communication

Traumatic Brain Injury (TBI)

- Talking clocks
- Talking calendars
- Handheld microcomputers
- Adjustable head pointers
- Small voice recorders

Multiple Disabilities (MD)

- Speech generating devices
- Eye-gaze technology
- Programmable keyboards
- Interactive whiteboards
- Smart pens

Speech or Language Impairment (SLI)

- Electronic switches
- Text-to-speech and speech-to-text software

Orthopedic Impairment

- Power wheelchairs
- Book holders, page turners
- Adaptive keyboards
- Reachers and grabbers
- Dictation apps
- Word-prediction programs

Please note: This list is not absolute or exhaustive. Certainly, some assistive technologies may be beneficial to students in more than one disability category. What works for one student may not work for another student with the same disability. It is important to remember that each student with a disability is a unique child with a specific and individualized set of strengths and challenges.

How to Choose the Right Assistive Technology

In a school setting, the IEP team determines AT needs for students with disabilities. In fact, it is written into IDEA that the IEP team must consider whether a child needs assistive technology when developing that child's IEP.[9] Edutopia writer Jennifer Sullivan, MS, offers several guiding questions for IEP teams to consider during this process:

- What difficulty is the student experiencing, in school or at home, that the AT is intended to address?

- What tools has the student already tried?

- What new technology could be tried?

- How will we determine whether a technology tool is effective?[10]

It is important that a multidisciplinary IEP team make the decision for which assistive technology each student needs. It is advised that a team of professionals trained to match particular assistive technologies to specific needs weigh in.[11] The team could "include family doctors, regular and special education teachers, speech-language pathologists, rehabilitation engineers, occupational therapists, and other specialists including consulting representatives from companies that manufacture assistive technology."[12] And, both the parent and the student (if appropriate) should be part of the decision-making process.

9   IDEA, 2004
10   Sullivan, J., 2019
11   Gabbert, D., 2017
12   Assistive Technology Industry Association, 2020

Purchasing Devices or Services—Who Pays?

Thanks to the protections of FAPE under IDEA, parents are not required to purchase AT devices or services that are specified in their child's IEP. While parents may provide permission for their private health insurance to be billed for the cost of an AT device or service, they are never required to do so. School districts are responsible for paying for learning materials and any technology specified in an IEP.

There are other sources that may help with the cost of AT outside of a student's IEP. Government agencies, private health insurance, rehabilitation and job training programs, and employers are possible sources. Families may also choose to pay out of pocket for AT.

Assistive Technology and Universal Design for Learning (UDL)

Universal design for learning (UDL) is a research-based approach to teaching and learning that optimizes accessibility for all learners. It stresses the best possible design to meet the needs of a diverse group of learners. Rather than making endless adaptations to the curriculum and delivery of instruction for students with disabilities, a UDL approach guides teachers to plan lessons with all of their diverse learners in mind from the beginning. This means that the instruction and assignments are inherently flexible. Students should have multiple entry points for accessing the learning objectives and multiple opportunities to demonstrate understanding of the content. A meta-analysis of empirical research from 2013–2016 suggests that UDL is an effective teaching methodology for improving the learning process for all students.[13]

The Three Core Principles of UDL[14]

1   **The WHY of learning**

Provide multiple means of engagement to motivate learners.

2   **The WHAT of learning**

Provide multiple means of representing information for increased access.

3   **The HOW of learning**

Provide multiple means of expression to help students show what they know.

For each core principle, UDL offers guidelines that further help educators plan instructional goals, methods, materials, and assessments for all students. For example, UDL guidelines ask teachers to illustrate concepts through multiple media, offer alternative modes in addition to auditory and visual for conveying information, and offer ways of customizing the display of information. UDL guidelines also speak to the importance of tools and AT. Assistive technology is a way for teachers to provide multiple pathways for engaging in the **why**, **what**, and **how** of learning.

For example, educators can:

- Use an online learning system such as **n2y's Total Solution**, which features built-in supports and differentiated instruction for a diverse group of learners that can be tailored to individual classroom and student needs. (**why**, **what**, and **how**)

- Provide choices for reading a story in print, listening to it as an audio file, or viewing it as a video with captions. (**what** and **how**)

INTEGRATED AWARD-WINNING SOLUTIONS TO SUPPORT UNIQUE LEARNERS

n2y's Total Solution offers differentiated instruction, a behavior management program, and interactive resources that provide multiple pathways for engaging students, building academic skills, and supporting social and emotional growth. Audio, text to speech, captioning, touchscreen, and symbol supports are built in to help meet different assistive needs.

- Offer a graphic organizer to help students organize their thoughts before writing an essay. A graphic organizer is low-tech assistive technology for students with a writing disability. It can also help students with executive functioning difficulties. For students without disabilities, a graphic organizer helps keep the writing process structured. (**how**)

- Project an online clock for all to see. This helps all students with time management. (**why**)

- Use speech-to-text software (e.g., captioning) in synchronous online learning to improve the learning outcomes for all students.[15] (**how**)

Together, assistive technology and a UDL framework make the inclusion classroom an inviting place for all students. Rather than relying on a special education teacher or paraprofessional to differentiate lesson plans and materials after the fact, the UDL approach considers the learning styles, challenges, and abilities of all students from the beginning and lessons are planned accordingly. Assistive technologies are tools that enable these flexible plans.

Some teachers worry that adding new technology in the classroom may lead to extra work, but there are many assistive technologies that are quick and easy to put in place. Calculators, guided reading strips, captioning for videos, and computer-assisted writing instruction are all examples of AT that does not require significant time, training, or expense to implement.

Some teachers may also worry that assistive technology could limit student learning. They may be concerned that assistive technology will do the work for the student or that it could be considered a form of cheating.[16] However, some of the more commonly known AT tools are items such as hearing aids, glasses, and walkers—tools that make learning more accessible. While they make the lives of the students who use them easier and richer, no one would consider them a barrier or an unfair advantage. The same is true for other types of AT used in the general education classroom. In an inclusion classroom, AT creates invitations for all students to meaningfully participate in learning.

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15   Hwang, Shadiev, Kuo, & Chen, 2012

16   Understood, 2020

Conclusion

Assistive technology is intended to improve the quality of life for students with disabilities. From apps on smartphones to specialized adaptive equipment, AT means to empower. It creates opportunities in the classroom. It opens doors to recreation and leisure activities. It makes activities of daily living simpler. And for some students, it provides a lifeline for building relationships with peers.

Over the past few decades, federal education legislation has evolved. There is an increased focus on the importance of AT for students with disabilities. Amendments to IDEA ensure IEP teams must consider AT as one of several important tools to support students. These amendments also ensure that families won't have to pay for it.

Schools have diverse learners with unique strengths and specialized learning needs. With new technologies emerging almost daily, schools now have the opportunity to ensure students benefit from the incredible inclusion and innovation that assistive technology brings to the classroom and community.

SymbolStix PRIME is a powerful symbol database that helps educators create visual communication tools and activities to ensure unique learners have access to learning, language, and self-expression. Over 90,000 dynamic symbols, with changeable skin tones, depict relevant and age-respectful people and activities. Available in 10 languages plus text to speech!

Explore more at n2y.com/symbolstix-prime

n2y's TOTAL SOLUTION

n2y's Total Solution empowers educators to teach and unique learners to achieve through differentiated, standards-based academic content; robust assessment, data collection, and reporting; a weekly online newspaper; symbol communication tools; skill-based games; and a behavior management program, all supported by best-in-class professional development.

Explore more at n2y.com/total-solution

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