FXS

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Assistive Technology and the IEP

The concept of Assistive Technology (AT) can be overwhelming for many families and Individualized Education Program (IEP) teams. The purpose of this article is to provide parents with useful information about AT and how to go about addressing it as part of their child's IEP. We also want to demystify AT and remind everyone that it does not mean just a computer or other communication device. AT is in fact very broad, and there should be a systematic process in place to document its consideration and use as part of the IEP.

WHAT IS AT?

Under I.D.E.A. (Individuals with Disabilities Education Act, 1997 regulations), Assistive Technology is defined as: "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 functional capabilities of children with disabilities."

Further elaboration is provided in *Assistive Technology Solutions for IEP Teams* (Purcell and Grant, 2002): "AT bridges the gap between a child's functional skills and his ability to participate in the educational process. It breaks through the barriers associated with vision, hearing, communication, processing and motor skills and allows students to do the same things as their general education peers."

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ONGOING RESEARCH

There is an overall lack of efficacy research regarding the use of AT, though much research is currently underway. The UC Davis M.I.N.D. Institute *(www.mindinstitute.org)* is currently conducting a research study entitled "Assistive Technology Enhancement of Written Expression for Students with Neurodevelopmental Disorders" under principal investigator Randi Hagerman, MD. For additional information about AT research, we encourage readers to visit the Rehabilitation Engineering Research Center for the Advancement of Cognitive Technologies (RERC-ACT) at www.rerc-act.org, as well as University Centers for Excellence in Developmental Disabilities (UCEDD) at www.aucd.org.

STUDENTS BEFORE DEVICES!

Assistive Technology must be addressed on *every* IEP, based on the individual student's goals and objectives. However, many families and IEP teams make the mistake of starting with a device or system in mind and then work to design the IEP around the AT. This is backwards, and it often ends in "device abandonment" (i.e. the AT sits on the shelf), because it does not put the student first.

The AT should specifically assist the student in achieving his or her goals. So begin with outlining how your student is performing. On the IEP this is noted in the "present levels" section. If *any* AT is currently being used, it is critical to document it in this area. From there, the team should discuss proposed goals and objectives, which is where consideration of AT is essential. For example, if a proposed goal is to "write first and last name," then AT considerations would be specific to that goal and could include low-tech to high-tech AT, depending on the student's needs. Therefore, it may be appropriate for the student to use a pencil grip *or* a rubber stamp *or* word processing to achieve the goal.

Another goal may be for the student to interact socially with peers. AT considerations could include use of picture exchange, topic boards, social stories, or a voice output communication aid (VOCA). Keep in mind that multiple AT strategies used in combination may be appropriate, again depending upon the student's individual needs.

ACTION PLAN

AT should be documented in the IEP in the "present levels of performance" section and under "goals and objectives." IEP team members should be identified via roles and responsibilities for implementing the AT. Some IEP teams develop an "action plan" that includes timelines and strategies for measuring AT effectiveness. This strategy can be very helpful. For example, the IEP team may decide to implement a visual schedule. The

classroom teacher would be given the assignment of giving the class schedule to the speech therapist. The speech therapist would then make the pictures for the schedule. The speech therapist and teacher would work together to implement the schedule and train the classroom staff. The team would review within two weeks how the schedule is working. Based on the outcome of the initial schedule use, the OT would work with the teacher and speech therapist to determine whether a similar visual structure would be helpful for the obstacle course.

TRY IT OUT—AND ALWAYS HAVE A BACKUP...

Many companies have loan periods or rental programs. There are also software demos to try before purchasing. Work with your IEP team to determine a suitable trial period for any given technology and how it will be implemented and documented. Many school districts have small lending libraries.

A trial with a "like" system or device can give an IEP team an opportunity to collect data and determine whether specific AT strategies will be effective. For example, if the team is considering a dynamic communication device, it would be important to assess whether the student can scan and discriminate picture icons and if so, how many icons could be represented on a single page. The student would also need to be able to independently categorize by subject, notice whether an item was missing on a page, and fluidly navigate between pages.

An AT trial would begin in a more "low-tech" way by using printed pages or overlays. The team should collect data on how the student accesses the various pages to determine if a dynamic device would match the student's needs. Also, the paper pages would serve as a backup if and when the more "high-tech" AT was out of order (which is inevitable) for service or programming. Always have a "low-tech" backup. This is also important for environments where the dynamic device may not be suited, such as in the pool or bath.

POINTS TO KEEP IN MIND

AT provides tools for people, but people are not defined by their devices and systems. They simply use AT as tools for specific functions.

- Effective AT does not have to be expensive! If a pencil grip meets the needs of a student, there is no need to jump ahead to the laptop computer. The point is neither to save nor spend money but rather, to address individual student needs in the least restrictive manner.

> *People are not defined by their devices and systems.*

- People with the same disability do not always benefit from the same AT. For example, not all children with FXS need voice output communication devices.

- Professionals are not the only source of information about a student's needs. Parents and family members are critical to the IEP and AT consideration process. Also, whenever possible, the student's opinions and interests should be considered. For example, many students do not want to look different than other students and would resist use of a laptop if other students are not using them. In those situations, it may make sense for the student to have computer access only in the lab when the other students are engaged in the same activity, then at home for targeted skills during homework.

- AT trials and refinement never end! AT can (and most likely will) be a trial-and-error process. If one AT application does not work, it's important to explore other options. Also: do not hesitate to revisit previously explored applications in the future.

CATEGORIES AND TYPES OF AT

"No-tech"—This includes strategies rather than devices or equipment per se. Example: using seating and placement strategies within the classroom for students who have trouble paying attention or have low vision. Therefore, it may be written into the IEP that in order to increase time on task, "Johnny will sit near the front of the class," or "Johnny will sit in a study carrel at the back of the class for seat work." No-tech strategies may also include breaking down activities into smaller, more manageable units.

Low-tech—This includes simple devices such as pencil grips, timers (visual timers found at *www.timetimer.com*), picture communication systems, simple voice output communication aides (VOCAs) and devices, social stories/scripts and visual schedules.

High-tech—This includes more elaborate electronic devices and computers, such as laptops, touch screens, adapted keyboards (such as IntelliKeys thru *www.intellitools.com*), portable word processors such as Alpha Smart (*www.alphasmart.com*), and dynamic communication devices such as DynaVox or the Tango! (*www.mayerjohnson.com*, *www.ablenetinc.com*). Computer software programs would

also fall into the "high-tech" category, including CO:Writer, Write:Outloud and Kidspiration (www.donjohnston.com).

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AT and Developmental Domains

The following is adapted from the Wisconsin Assistive Technology Initiative (www.wati.org) to reflect the AT most commonly utilized by students diagnosed with FXS. Please note that the AT is listed from no- to low- to high-tech considerations. The list is not exhaustive nor is it designed as a "how to" list. Rather, it is meant as a guideline to provide ideas about consideration of AT across the domains. You may find that your student currently utilizes many AT strategies listed below.

COMMUNICATION
- Gestural system/strategies
- Pictures
- Picture exchange
- Communication board/book with pictures/objects/letters/words
- Simple voice output device (switches)
- Voice output device w/levels
- Voice output device w/dynamic display
- Device w/speech synthesis for typing
- Other: _____

SOCIAL SKILLS
- Structured greetings and departures
- Breakdown of turn-taking steps
- Breakdown of conversational reciprocity, including topic maintenance and role playing
- Topic boards designed with words and pictures
- Visual supports including pictures, written scripts
- Other: _____

PLAY (RECREATION AND LEISURE)
- Toys adapted with Velcro, magnets, handles, etc.
- Toys adapted for single switch operation
- Modified utensils (e.g. rubber stamps, brushes, etc.)
- Visual supports for game directions/rules
- Modified game procedure and sequence
- Modified game boards/pieces
- Adapted tricycles/bicycles
- Adapted bats and balls (softer, larger, etc.)
- Electronic aids to control/operate TV, VCR, CD player, etc.
- Games on the computer (single user and turn-taking)
- Other: _____

ACTIVITIES OF DAILY LIVING (ADLS)
- Task analyses and breakdown of steps in an ADL sequence. Consideration of chaining methods
- Non-slip materials to hold things in place
- Color coded items for easier locating and identifying
- Visual structure and picture supports outlining steps and sequencing to ADL tasks
- Adaptive eating utensils (e.g. foam handles, deep sides)
- Adaptive drinking devices (e.g. cup with cut-out rim)
- Adaptive dressing equipment (e.g. elastic shoelaces, Velcro instead of buttons, etc.)
- Adaptive devices for hygiene (e.g. toothbrush, colored mouthwash, soap pumps rather than screw caps, etc.)
- Adaptive equipment for cooking
- Other: _____

MOTOR ASPECTS OF WRITING
- Regular pencil/pen
- Pencil/pen with adaptive grip
- Adapted paper (e.g. raised line, highlighted lines)
- Slantboard
- Use of prewritten words/phrases
- Portable word processor to keyboard instead of write
- Computer with word processing software
- Other: _____

COMPOSING WRITTEN MATERIAL

- Word cards/word book/word wall
- Pocket dictionary/thesaurus
- Writing templates
- Electronic/talking electronic dictionary/thesaurus/spell checker
- Word processing with spell checker/grammar checker
- Talking word processing
- Word processing with writing supports
- Other:_____

READING

- Standard text
- Predictable books
- Changes in text size, spacing, color, background color
- Book adapted for page turning (e.g. page "fluffers," 3-ring binder)
- Use of pictures/symbols with text
- Talking electronic device/software to pronounce challenging words
- Other:_____

LEARNING/STUDYING

- Print or picture schedule
- Low-tech aids to find materials (e.g. index tabs, color coded folders)
- Highlight text (e.g. markers, highlight tape, ruler, etc.)
- Recorded material (books on tape, taped lectures with number coded index, etc.)
- Software for organization of ideas and studying
- Palm computers
- Other:_____

MATH

- Abacus/Math Line
- Adapted work sheets showing enlarged and fewer math problems
- Money calculator and "Coinulator"
- Talking watches/clocks
- Calculator/calculator with printout
- Calculator with large keys and/or large display
- Talking calculator
- Other:_____

COMPUTER ACCESS

- Regular keyboard
- Touch screen for cause and effect
- Word prediction, abbreviation/expansion to reduce keystrokes
- Key guard
- Alternate mouse such as track ball/track pad/joystick
- Alternate keyboard
- Other:_____

PRE-VOCATIONAL AND VOCATIONAL

- Task analyses and breakdown of steps in a work task sequence. Consideration of chaining methods
- Visual supports and structure for work task sequence
- Color coding and labeling for jobs including clerical, stocking/sorting, etc.
- Other:_____

Sample IEP Goals and Suggestions for AT

The following is a case summary of a student diagnosed with FXS and "pervasive developmental disorder not otherwise specified" (PDD-NOS). It reviews his use of AT throughout his school career. This summary is designed to give a flavor of AT and is not an exhaustive list. The summary is not intended as a set of specific recommendations for all children diagnosed with FXS or PDD-NOS. Our hope is that the summary highlights the breadth and scope of AT across the developmental domains and IEP goal areas for students of all ages. Readers will notice that some AT considerations/applications changed as this student became older, and some themes remained consistent based on his individual needs.

PRESCHOOL AND KINDERGARTEN (AGES 3-6)

DEVELOPMENTAL DOMAIN and GOAL AREA	AT CONSIDERATIONS
Socialization/Communication	Task analysis of turn-taking, picture exchange, single switch VOCA mounted on the classroom door saying "hi" and "bye"
Play Skills	Task analysis for game directions and turn-taking, modified game pieces, large softballs, lower play equipment
Computer Access	Touch screen, cause-and-effect computer software
Pre-writing	Rubber name stamp
Positive Behavior Management, Transitions, Classroom Participation	Visual timers, visual schedules, seating with boundaries (cube chair) and carpet squares, token system for individual task completion

ELEMENTARY SCHOOL (1ST-8TH GRADE)

DEVELOPMENTAL DOMAIN and GOAL AREA	AT CONSIDERATIONS
Socialization/Communication	Topic boards, social scripts, picture cue cards
Play Skills (recreation and leisure)	Adapted tricycle, modified board/card games, turn taking software games
Computer Access	Adapted/alternate keyboard
Positive Behavior Management, Transitions, Classroom Participation	Checklists, visual schedule with destination match, color coding and labeling for school work and materials, token system for completion of day's work
Academics	Predictable books with pictures, books on tape, number line and math manipulatives, calculator/ "coinulator," modified work sheets, pencil grip, alternate responding methods, increased time for assignments and tests
Activities of Daily Living Skills	Toileting schedule, place mat with outline for utensils etc., visual sequences for classroom chores, visually structured classroom areas for backpack, books, toys etc.

HIGH SCHOOL AND YOUNG ADULT

DEVELOPMENTAL DOMAIN and GOAL AREA	AT CONSIDERATIONS
Socialization/Communication	Social skills group utilizing visual structure for scripts and role playing
Recreation and Leisure	Modified board/card games, turn taking games on the computer, adapted adult tricycle, fitness videos
Pre-Vocational/Vocational	Job task analysis, chaining of steps, adapted and visually structured steps
Computer Access	Word prediction software and talking word processing
Positive Behavior Management, Transitions, Classroom Participation	Individualized and visually structured daily schedule and calendar
Activities of Daily Living Skills	Alternate lock for school locker using one with separate wheels rather than traditional dial lock, visual supports for completing cooking, laundry and household chores, use of a fanny pack rather than a wallet for ID, money etc.

Some Do's and Don'ts of AT

In closing, we hope AT is no longer "mysterious" or limited to a computer or communication device. AT is very much a dynamic, interdisciplinary team process, which must be individualized to each student based on current performance and needs. Remember to consider AT on every IEP. Collaborate and work together as an IEP team to document AT use and trial periods. Here are some parting do's and don'ts to keep in mind.

DO	DON'T
Begin with assessment and present levels of performance in all domains	Put a specific device or system first
Design goals and objectives, based on the present levels and CONSIDER if any AT would be appropriate in order for the student to meet his/her goals	Write goals merely based on a device or system. The AT is the TOOL to help attain the goals
Develop an action plan for each appropriate IEP team member if a trial of a system or device is agreed upon. Also agree upon how documentation will be collected and when it will be reviewed	Leave the IEP meeting without a clear plan in place for documentation and timelines
Begin with the "least restrictive" intervention first	Begin with a laptop if a pencil grip will work. This is *not* about saving money but more about doing the "least" first and not adding AT that is not necessary or may making the student feel different

DO	DON'T
Conduct a trial and include the consumer whenever possible	Purchase a device without really researching the features and assume that the student will automatically want to use it
Consider the individual's present levels and the diagnosis of FXS (and Autism Spectrum Disorder) as appropriate to the individual student's profile but stick to the student's individual goals and current needs	Assume that all students diagnosed with FXS (and Autism Spectrum Disorder) need the same AT
Train staff, family members and all who would interact with the student using the device or system on the specific features including programming etc.	Assume that a school system will program or use device or system just because one has been purchased
Have a "low-tech" backup for all "high- tech" AT applications	Rely solely on a "high-tech" system. There will inevitably be times where devices/systems break down, need repair etc. The individual will still need AT in place in order to participate and meet his/her goals
Try and try and try again. Modify, adapt, individualize, etc.	Give up! Be sure to document progress and make changes based upon individual student needs. Remember AT that was once considered ineffective may be worth revisiting at a later date based on the readiness of the student
Work as a team for consideration of AT across settings, activities and people	View AT as an isolated therapy or activity. Keep function first. For example, picture communication systems should not be used only in speech therapy. Repetition in variety of environments is critical
Get creative!	Rely solely on catalogs for purchasing AT items and systems
Consider the present levels of performance and the goals/ objectives on the IEP regarding specific AT use	Merely write down that the campus has a computer lab and that the classroom has calculators
Have a stash of batteries, chargers etc. based on the AT in use	Forget the juice! The AT is effective only if it is working. This may fall into an IEP team action plan for roles and responsibilities regarding obtaining batteries etc. and who is responsible for charging the device
Consider AT vendors and companies as "experts" in their specific devices and systems. Contact them for product information, customer service, trainings etc.	Conduct an AT evaluation with a specific vendor representing one product/line. This is never advisable
Conduct an AT evaluation as much as possible in the natural environment. AT trials should also occur in the environment where the student would be accessing the device/systems. An AT evaluation should be an interdisciplinary process and include all the appropriate IEP team members	Use one isolated evaluation session as completely diagnostic of all AT considerations. A clinic-based evaluation can certainly provide valuable information and directions for IEP teams. However, the use and trial of AT should be conducted in the natural environment along with data collection regarding effectiveness of the AT use