Idaho Assistive Technology Project

The Idaho Assistive Technology Project is a federally funded program administered by the Center on Disabilities and Human Development at the University of Idaho.

Our goal is to increase the availability of assistive technology devices and services for Idahoans with disabilities.
Presentation Goals

- IDEA and Assistive Technology (AT)
- AT for Reading
- AT for Written Language
- AT for Mathematics
- Tablets and Assistive Apps
- How to Access Assistive Technology Services

This presentation is meant to give a general overview of the wide-variety of assistive technology available to help your students. Please contact us for specific technology recommendations.
Individuals with Disabilities Education Act and Assistive Technology
It is always good to begin a conversation with a definition. We will begin with the definition of an assistive technology device also known as an AT device.

**Assistive Technology Device**

*Assistive technology device means* 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.

**IDEA 2004 § 300.5**
Not only is an AT device defined in IDEA, the AT service is also defined in IDEA. (Read the slide and further explain the definition with the notes below.)

**Assistive Technology Service**

Assistive technology service means any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device.

IDEA § 300.6

The term includes—

(a) The evaluation of the needs of a child with a disability, including a functional evaluation of the child in the child’s customary environment;

(b) Purchasing, leasing, or otherwise providing for the acquisition of assistive technology devices by children with disabilities;

(c) Selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, or replacing assistive technology devices;

(d) Coordinating and using other therapies, interventions, or services with assistive technology devices, such as those associated with existing education and rehabilitation plans and programs;

(e) Training or technical assistance for a child with a disability or, if appropriate, that child's family; and

(f) Training or technical assistance for professionals (including individuals providing education or rehabilitation services), employers, or other individuals who provide services to, employ, or are otherwise substantially involved in the major life functions of that child.
Let's go to the Regulations for IDEA and find out what they say about glasses and hearing aids. (Read the slide and then read below for further explanation below.)

**However,** if it is not a surgically implanted device and a child’s IEP Team determines that the child requires a personal device (e.g., eyeglasses) in order to receive FAPE, the public agency must ensure that the device is provided at no cost to the child’s parents.

But….most of the time…..no….
IEP and “considering” AT

(a) Development of IEP—(1) General.
In developing each child’s IEP, the IEP Team must consider—
(2) Consideration of special factors.
The IEP Team must—
(v) Consider whether the child needs assistive technology devices and services.

§ 300.324 Development, review, and revision of IEP.
But...what does “consider” mean? Many definitions describe “consider” as careful and deliberate thought. Idaho has designed a great IEP format to do this.
You have an area to enter the “careful and deliberate thoughts” about AT Devices under each of the IEP goals. You also can add AT services on the “Services” page.

With this background in mind, let’s look at the different types of AT under reading, writing and mathematics. This presentation will serve as an “awareness” with additional presentations available on the Idaho Training Clearinghouse. We will finish our look at AT for these three areas with a quick peek at some Apps.
Assistive Technology for Reading
What if one of your students is having difficulty reading?

- The student spends a great deal of time in decoding individual words
- The student is having difficulty reading grade level textbooks
- The student is a very slow reader and takes much, much longer to read an assignment than same level peers

We read to learn information, experience other points of view, and explore topics of interest. If the student is unable to keep up with the reading requirements of the curriculum, they fall further and further behind. As you know, these are some warning signs of reading difficulties. There are many tools that can help the student learn the information required for their grade level.
Here are some low-tech solutions. A cut-out window helps the student stay on one line of text at a time and can be made from a common file folder. Often putting a colored filter or colored transparent report cover over the page of text makes it much easier for the student to read. There is no one color that works best for every student so experiment with different colors. Highlighting has long been used to mark important ideas in personal books. Highlighting text to help keep one area separate from another can make reading easier. Now, erasable highlighters and removable highlighting tape can be on materials that do not belong to the student.
When students are learning to read, unfamiliar words are often shown as a picture. Pairing pictures with text can improve the learning of unfamiliar words and vocabulary. Several software programs and online resources exist that will automatically pair any text with pictures.
Sometimes the student only needs to hear one unfamiliar word aloud and quickly hear its definition to understand an entire passage. Reading pens scan in a word and then tell you the definition. Talking dictionaries also provide quick support for students who have difficulty reading the definition in text alone.
Students with visual impairments have been listening to text for years. Students with reading problems also benefit from listening to text being read to them. Most literature considered to be classic is available for free because it is in the Public Domain. These are easily found and downloaded. Current books are available also, but there is often a cost involved.
There are many talking word processor programs; free, low-cost, and commercial ones are available. These also help with the writing process and it is much easier to edit text with your ears than with your eyes alone.
Text-to-Speech

- Ebooks/text readers – read aloud text and highlight as the word is spoken aloud

Highlighting text as it is read aloud offers a great deal of reinforcement for learning new words. Text-reading devices and software also have free, low-cost, and commercial programs available.
Text-to-Speech

- Scan and read systems

  Scan in your own books and have them read aloud by the computer

With the scan and read systems, a text is scanned into the computer and OCR (optical character recognition) software reads the scanned text aloud. There are several copyright issues that need to be considered before using this type of software. One of the best features of these programs is that graphics, maps, and charts are viewed as the text within them is read aloud.
Another method to improve reading success is to reduce the amount of actual reading involved. Students have long used “Cliff Notes” to shorten reading assignments. One disadvantage to the use of these types of programs is that often the flavor of the text is lost in the condensation process. However, the student who is struggling with reading often gets far more from class discussions, when they have been able to read the condensed text.
Assistive Technology for Written Language
What if one of your students is having difficulty writing?

The physical process - handwriting

- The student’s handwriting is very difficult to read
- The student spends more time erasing than writing
- The student cannot copy text from the board or projector quickly enough to keep up with the lesson

We express our ideas, answer questions, and help remember information all through writing. The physical task of writing is one aspect of this. Sometimes a student’s handwriting is so difficult to decipher that even the student can’t read what he/she has written. These difficulties greatly hinder the task of learning.
The other aspect of writing is the actual organization and expression of ideas and information. This process requires correct spelling and use of grammar for the reader to understand what the writer is saying. Poor spelling skills greatly decrease the success of written work. Some students will use grade-level vocabulary when speaking, but their compositions use a vocabulary that is several grades below the student’s current grade. This is often because the student only uses words that they feel they know how to spell correctly, rather than take the chance that the word is misspelled.
Aids for Handwriting

- Different widths of lined paper
- Boxes for magnetic letters or words
- Skipping lines (color in skipped line)
- Dot where to begin
- Spacers – spaceman, stickers, stamps, dashes, post-it strips, graph paper, small candies
- Reduce sizing – paper, sentence strips, post-it, labels, boxes
- Typing – portable word processor or computer

All of these low-tech aides are very worth trying with a student who has difficulty writing. An aide that is very successful for one student may not work at all for another; so keep trying different types. The gauges for the success or not of an aide are both increased legibility and reduced amount of time spent doing the writing.
Oftentimes an item as simple as a clipboard or slanted writing surface greatly improves handwriting. Providing a tactile line boundary that the student feels as they dip below or above the line they started writing on are also often successful. Wikki sticks are repositionable waxed yarn sticks that are easily moved and put on a different line of the paper. As they come in many colors, alternating different colors on the paper can make it much easier for the student to keep their place with their handwriting.
We all have preferred diameters for writing utensils. Some find big, fat pens easier to use and others may prefer a slim pen or pencil. A Writing Bird is just one example of a different style of writing implement. The Handiwriter provides extra pressure on the hand and keeps the pen or pencil from being dropped. Many pens and mechanical pencils now come with a soft grip of the barrel of the pen to make it more comfortable to hold. Add on pen and pencil grips allow you to modify any pen or pencil to make it easier for the student to use.
The older portable word processors such as the Neo, pictured, are strictly for text entry and typing practice. They connect to the computer either through a USB cable or to a printer through Infrared.

The iPad is a multi-purpose device and is very popular. However, transferring text to a computer may require Internet service through email or to a web service such as DropBox. Printing from an iPad requires a printer with wireless capabilities.
Talking Word Processing

- Auditory feedback helps trigger next letter/word/sentence
- Allows self-evaluation on word choice, sentence fluency and organization
- Often have spell-checking built-in

A talking word processing program facilitates writing complete sentences and staying on topic. You can listen to an entire paragraph at a time to make corrections more easily. Talking word processing programs are also excellent for proof-reading for anyone; our ears pick up mistakes much quicker than our eyes do.
Speech-to-text or voice recognition seems like an ideal solution for those students who have good verbal skills, but there are several drawbacks to its use. One drawback is the amount of attention and work necessary for the document to show what you said versus what the computer thought you said. Another drawback is the environmental requirements for the successful use of voice recognition – it is often difficult to find a quiet location for the student to do their dictation and at the same time not disturb others. Oftentimes voice recognition use is more successful in the home environment than in the school setting. Digital recorders are very useful for recording both what you want to say and what the teacher is saying.
The Livescribe Pen is used on specially designed paper and it is a digital recorder. As you write notes on the paper the pen records what the teacher has said. Later you put the pen back on the paper where you wrote the notes and it will replay the recording that goes with that note. The page can also be Xerox copied and the pen will play the same recordings as the original sheet.
Spelling issues are a big problem for many of us. Helpful tools to help with spelling include separate devices such as the speller shown above, computer talking dictionaries, and web/Internet services that can correct the most creative of spelling mistakes.
Webbing or Graphic Organizers

- Add every idea and then organize them
  - Then change to text mode and the outline is created

- One application asks questions about the topic and as you answer the questions in complete sentences you create your 1st draft

Graphic organizers are available both in commercial and free options. Many of them have speech available so that they will speak what text has been entered. They also use both pictures, shapes, and various colors to make the diagram easier to follow. The commercial programs include “Kidspiration” for grades K – 5, “Inspiration” and “Webspiration” for grades 6 – 12, and “DraftBuilder” for grades 2-9. “DraftBuilder” is the one that asks questions specific to the type of composition you are writing from one paragraph to an entire term paper. The answers are then shown as the outline for the document. Free options include “ReadWriteThink Webbing Tool” and “X-Mind”.

Word prediction and word completion both work by guessing what word you want based on the letters you have already typed. Word completion only offers the end of whatever word it thinks you have started to type. Word prediction provides word options on what it thinks you want to say. Many word prediction programs support phonemic spelling such as “physics” from your typed “fisiks”.

Word prediction programs often present the words in the grammatically correct form based on the rest of your sentence. These programs also offer text-to-speech as they will read aloud the list of words selected. Then you can find the word you want even if you cannot recognize it by reading it. In some respects, word prediction is not a rate enhancement option in that you type all or part of the word and then select that word from the list presented. This requires splitting your focus between where you are typing and the word prediction/completion window. However, it is rate enhancement in that the student is not having to do near as much editing to the document.
This segment of the session will take a look at assistive technology for students needing support in math. We break this process down into three phases:

Assessment- to develop a short list of likely ways to support the student
Classroom trial - of technologies suggested in the assessment for a 30 day period
Implementation – of the technology that provided the best support
The ability to learn and perform math depends on multiple competencies: sensory, perceptual, cognitive, memory, reading, and motor, among others. Depending on the reasons a student has an IEP, assistive technology may be needed to support just one, or possibly several of these. The first step is to determine where a student needs extra help.

The AT assessment should uncover the barriers to participation in math and suggest specific ways to help. The following slides will provide examples for each of these barriers.
Sensory impairments that affect participation include low vision, blindness, low hearing, and deafness. Low vision requires large print materials or a way to magnify standard materials. Magnifiers can enlarge the white board or display as well as the materials on a student’s desk. Manipulatives allow blind students to work with smaller numbers by touch. Some prefer a speaking calculator, others an abacus. A computer or tablet with screen reading capability works well when text is available in electronic format. Students with low hearing hear much more of what the teacher says with an FM listening unit. Deaf students benefit from well-organized visual materials, such as computer math learning programs.
Many students with learning disabilities see normally, but cannot decode or make sense of written words and math expressions. These students decode better when their materials are seen and heard simultaneously with the help of electronic reading devices that highlight as they read. The ear does a better job understanding, while the eye does a better job focusing attention. This method also benefits students with attention deficits.

Talking calculators can reduce numeral translation errors dramatically.

In rare cases, students can decode writing and numbers more easily when color films are laid over the print. In a larger number of cases students who have normal vision but decoding difficulty benefit from larger print.
Students with cognitive impairments need a simplified curriculum, tailored to the level they can understand and manipulate. In most cases it is preferable to use concrete, three-dimensional manipulatives for working simple problems. I sometimes use plastic dinosaurs for counting, grouping, adding, subtracting, counting by multiples, and dividing.

Students benefit in their understanding of math when it is incorporated into practical activities and non-math subjects. Space, time, volume, and number concepts are important for cooking food and managing money, but can also be creatively worked into science, story-telling, and art.
Many students have difficulty memorizing math facts and developing math fluency. For mild impairments, immersive math games can help students develop fluency in a matter of hours. For more severe impairments, students may need to have tables, formulas, and example problems available to help them.

Programmed learning of math on the computer helps to fill in the gaps when students struggle because of what went unlearned or unremembered from previous grades.

The decision to use calculators depends on the goal of the process. When the goal is to develop fluency or show mastery of basic facts, calculators defeat the goal. If, however, the purpose of the process is for the student to show an understanding of math procedures and correct application of formulas, struggling students can advance in math curriculum more easily when not hampered by calculation errors. Using a calculator can reduce the cognitive demand and improve attention to math procedure significantly.

Music learning depends on spatial memory, and may help some students understand number concepts or remember facts.
Students with disability in reading have difficulty making sense of math words, homework instructions, and word problems.

Students who need assistive technology for reading should use their technology for math too. Many students benefit from using a speaking electronic dictionary or reading pen to help them understand math terms and instructions.
Motor impairment can affect the ability to hold a pencil, write, and in some cases prevents students from manipulating a book or turning pages.

This is an area where A.T. has many solutions to offer: alternatives to pencil and paper include computers, tablet apps, computer programs, smartboards, and dictation.
Classroom Trials

- 30 day trial of recommended A.T.
- Device Library loans
- Teacher demo/training
- Frequent follow-up and problem solving
- Remote assistance by IATP
- If unsuccessful, determine the cause before trialing another solution

After your team decides what technology to try, it is time for a 30-day classroom trial. You can borrow items for 30-day trials from one of four Assistive Technology Loaning Libraries in Idaho.

In this step, the math teacher is the key player. In many cases assistive technology solutions have been offered, but never implemented because the teacher has not learned how to use the technology, or may feel the time required to use it will interfere with the planned pace of instruction.

Sp.ed. teachers and paraprofessionals can provide pivotal support by demonstrating technology use and providing frequent follow-up with regular-ed. teachers to solve problems.

The Idaho AT Project is your back-up for this support, and can provide ongoing help via email or telephone.

You must determine whether an intervention has failed because it is wrong for your student, or because of a technical problem the teacher was unable to solve. In some cases, a little help setting up the technology properly will produce results. If the problem rests with the student, you should move on to another solution.
Implementation

- Not every student needs a formal process for selecting A.T.
- IATP offers informal consultation to any teacher via phone or email.
- If you can provide examples of a student’s work with and without an intervention showing a difference in learning or output, you have what you need to justify making a change.

Not every intervention requires a formal process for selecting A.T. Teachers with access to assistive technology for one student can put it to work right away for other students who may benefit.

IATP also offers informal consultation by responding to questions you have about assistive technology or specific students in your school.

Whether your process is formal or informal, if you can provide examples of a student’s work showing improvement in learning or output with the A.T. you have tried, you have what you need to justify implementing it.
Tablets and Assistive Apps
Tablets and Assistive Apps

- Tablets have various uses
  - Tablets can access large App markets
- Built-in Accessibility Features
  - Ever Expanding
- Pros and Cons

Tablet computers are gaining popularity. There is an abundance of low-cost, downloadable applications for these devices that relate to education. Through accessing the App market place, and by using built-in accessibility features, tablets can become a powerful tool for students with disabilities.

Pros
Tablets and Apps are fairly affordable
Tablets are ‘cool,’ which supports inclusion and technology usage
Tablets can be used by students to learn in multiple ways – hear, see, touch, speak

Cons
Tablets are not ideal for word processing as they do not have a mouse, file-conversion is not straight forward, and most do not come with a standard keyboard.
Tablets are not a one size fits all device. Technology should always be suited to the child’s individual needs, not the other way around.

Although there are several types of tablets, the iPad is the most used currently in special education and will be focused on in this presentation.
Video chat and instant messaging supports distance communication for students with hearing impairments.

For in-person communication, speech-to-text and text-to-speech can be used to facilitate communication between hearing and deaf communicators. If two iPads are available, in-person instant messaging can be used between hearing and deaf communicators.

The iPad is compatible with certain hearing aids, many sound loops, and supports mono-audio for those with functional hearing in only one ear.

Many Apps are available to access sign-language vocabularies, amplify environmental sound, and provide access to traditional relay services.
For students with low-vision or blindness, the iPad has many built-in features. Using VoiceOver, and Siri, a blind user can interact with most iPad features using only their hearing and speech. Siri will open Apps, send emails, set calendar appointments and answer questions. VoiceOver will read aloud any text displayed on the device and allows visionless navigation of the iPad.

The iPad is compatible with Braille displays and Braille keyboards.

Walking directions, object identification, optical character recognition Apps, and audio-books can be accessed using the iPad.
The iPad is user friendly, interactive, and more intuitive than computers that use external mice and keyboards. Many educational Apps are modeled off of and resemble games, which can be motivating for students.

Many Apps are available to aid attention, memory, reasoning, problem solving, and decision making. These include, but are not limited to, the following App types:

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<th>iPad for Cognition</th>
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<td>• iPad is User Friendly and Intuitive</td>
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<td>• Apps</td>
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<td>– Visual Schedules</td>
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<td>– Prompting</td>
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<td>– Calendaring</td>
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<td>– Behavior modeling</td>
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<td>– Building personalized social stories</td>
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<td>– Sound/video Recording</td>
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**Visual Schedules**

**Prompting**

**Calendaring**

**Behavior modeling**

**Building personalized social stories**

**Sound/Video Recording**
The iPad can be used by individuals with limited mobility. For this population, device accessories will likely be required. The accessories pictured include a table-top suction mount; stylus; and keyguard to support accurate touch selection.

For switch users, the iPad screen can act as a single switch. Alternatively, external switches can be used to access the device.

Siri is a powerful tool for people with limited mobility. Siri enables voice control over many Apps and features in the iPad.

Assistive Touch is an iPad feature that allows people with limited mobility to virtually shake the device, perform multi-finger gestures using only a single finger, and virtually press the buttons on the device.

Environmental control Apps and accessories are available to turn on or off lights, control a television, and control a power-wheelchair.
Many interactive Apps for initial letter and word learning are available. These often include colorful pictures and animations to support the learning process.

Apple recently partnered with several K-12 text-book manufacturers in an effort to offer standard textbooks as downloadable eBooks. These eBooks contain interactive content, videos, and can be accessed using the text-to-speech feature called VoiceOver. Accessible Instructional Material from Bookshare.org and other sources can also be downloaded directly onto the iPad.

Large-print/high contrast can be enabled on the iPad. Some Apps support multi-modal reading, where text is read aloud as well as highlighted on-screen.

The iPad makes looking up word definitions, performing web searches for background information on a word or concept, and creating flash cards relatively simple.
An external keyboard can be helpful for older students who perform large amounts of writing tasks. For students with reading/writing disabilities, speech-recognition can be used to dictate writing assignments.

Thousands of Apps are available to support and teach writing skills. For young writers, moveable alphabets, spelling quiz, and letter tracing Apps are available. For struggling writers, word prediction, and mindmapping/outlining Apps are available.

Audio of classroom lectures can be recorded on the iPad for later review to support note-taking. Pictures of the white-board or other material can be incorporated seamlessly into class notes.
Hundreds of Apps are available for individuals with disabilities affecting their ability to verbally communicate. Apps such as the pictured Proloquo2Go, enable symbol-to-speech, and text-to-speech functionality.

Apps to support SLP’s are available. They are geared toward data collection, or to support specific activities such as word discrimination and accurate production of speech sounds.

The iPad contains an abbreviation expansion feature to reduce the amount of keying required to produce a message. It also has a feature called Guided Access that will lock a user into a specific App. This feature ensures that a student with a communication disability cannot exit out of their communication App. The feature is very useful for keeping students on task, as it locks them into one App and won’t let them change Apps without a teacher password.
There are thousands of Apps that relate to math available for the iPad. While some Apps strictly replicate traditional math curriculum, most have an interactive element to them that students often find motivating and fun. For students already using physical math manipulatives, the iPad can replicate these and add in fun sounds and visual reinforcement. Some Apps even take advantage of the iPad’s gyroscope to allow the user to tilt and move the device to count/sort.

Several math Apps offer video instruction and access to a virtual math instructor.

Downloadable calculators of all types are available, including a big-button and talking model. Do you want to teach measurement or time skills? Download an App!
The iPad can be used in new and interesting ways in the classroom. For example, a decibel meter App can be activated and shown on a projector to monitor classroom sound levels.

The iPad can also integrate with existing classroom technology. For example, any person in the classroom with an iPad can wireless share their device screen on an existing projector. This enables easy sharing of work with the entire class, or wireless instruction.

Certain Apps now enable teacher tracking of student progress. These Apps enable the ability to, in real-time, tell if students are on-task on their device.

Submission of completed assignments to the teacher can be accomplished through email, file-sharing Apps, or through printing to a wireless printer.
How to Access Assistive Technology Services
Do you have a student on an IEP who you think might benefit from Assistive Technology? Request an assessment from the Idaho Assistive Technology Project. An assistive technology professional will work with the student and their IEP team to determine what assistive technology will suit the students needs in their school environment.

Many school districts also have their own in-house AT teams that are available to help you and your students.

If you need help or training related to assistive technology, please request a training from the Idaho Assistive Technology Project.
Online Trainings
AT trainings archived on the Idaho Training Clearinghouse
http://www.idahotc.com/

Free Computers
• Computers for Kids AT Application
  – www.cfkidaho.org

This training and many other helpful trainings related to assistive technology can be accessed on the Idaho Training Clearinghouse. These trainings are in webinar format, and can be accessed by anyone free of charge.

The IATP has partnered with C4K to provide Idaho students on IEPs with free computers. Computers are also available for school use in resource rooms.
Lend Assistive Technology
• AT Lending Libraries in Moscow, Idaho Falls, Coeur d’Alene, and Boise.
  Request items online www.idaho.at4all.com

The IATP operates 4 AT lending libraries in the state. These libraries provide a free “try before you buy” opportunity for consumers that is aimed at reducing technology abandonment rates in the state. The nearest lending library to you is located in Boise.
Thank you

Please contact the Idaho Assistive Technology Project for more information, or to request AT services.