

ENHANCING ACCESSIBILITY: ASSISTIVE TECHNOLOGY'S ROLE IN EDUCATION

Jennifer Wren, BS
Laura Mack, COTA/L, ATP



University at Buffalo

Center for Assistive Technology

School of Public Health and Health Professions

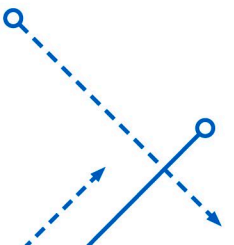
What is Assistive Technology?

- **Per the Individuals with Disabilities Education Act (IDEA), 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 individuals with disabilities.”

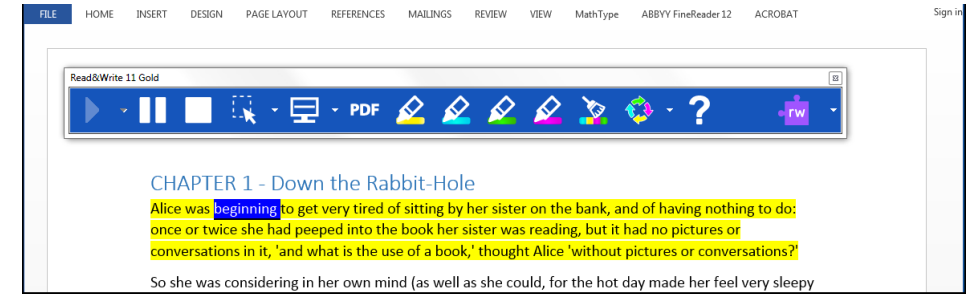
- **Definition of AT service:**

"Any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device."

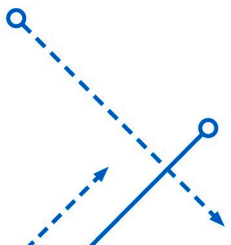


What can assistive technology enable people to do?

- Complete activities of daily living (ADLs)
- Access their environment
- Access computer systems/ other devices
- Communicate
- Participate in play, recreation, and leisure
- Complete vocational (job and educational) tasks
- Position and move their bodies
- Facilitate independence



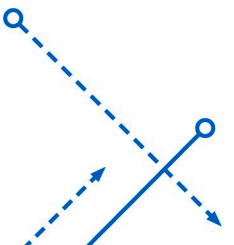
Assistive Technology can help “bridge the gap” between what an individual needs or wants to do, and what they are able to do.





AT-Related Laws and Regulations

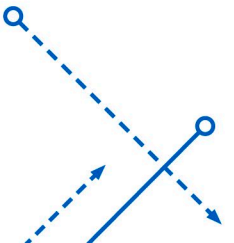
- Technology-Related Assistance for Individuals with Disabilities (TRAIL) Act in effect as of 1988; was reauthorized in 1993, 1998, and most recently in 2004
 - Goal was to promote awareness of and access to AT devices and services
- IDEA requires students with disabilities to be educated in the *Least Restrictive Environment* with appropriate supports and services. Assistive technology is one of those supports. For that reason, this law requires that AT be considered for every student on an IEP.
- Elementary and Secondary Education Act (ESEA, 1965), the latest version of which is known as Every Student Succeeds Act (ESSA, 2015) includes assistive technology among the “appropriate accommodations” a state must provide students with disabilities to promote their equitable access to education





Supporting Students with Technology

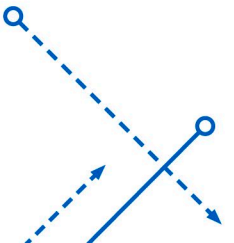
- Using technology can help the students make more effective progress in their curriculum by:
 - Increasing their ability to access learning materials
 - Increasing their ability to show their work
 - Increasing their independence in the learning process
 - Increasing their engagement and feelings of success
 - Enable students to keep up with the curricular requirements while working on underlying difficulties
- If the school district is not able to meet a student's AT needs internally, an external evaluation is necessary.





Integration into Curricular Tasks/ Environment

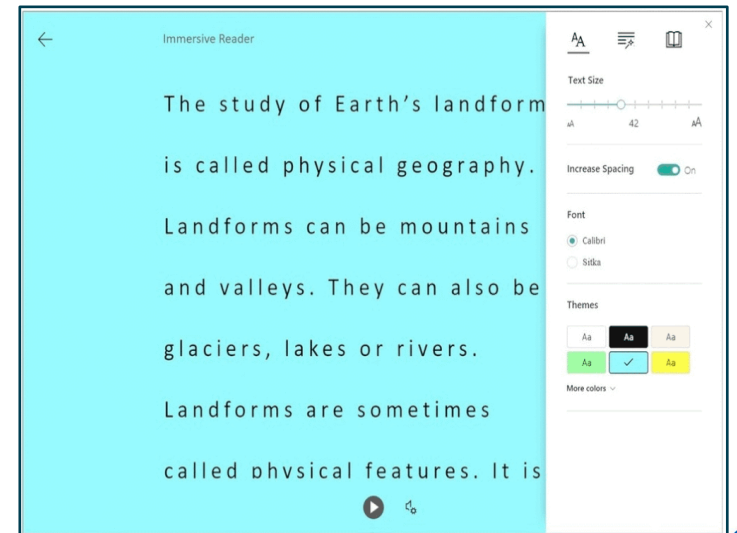
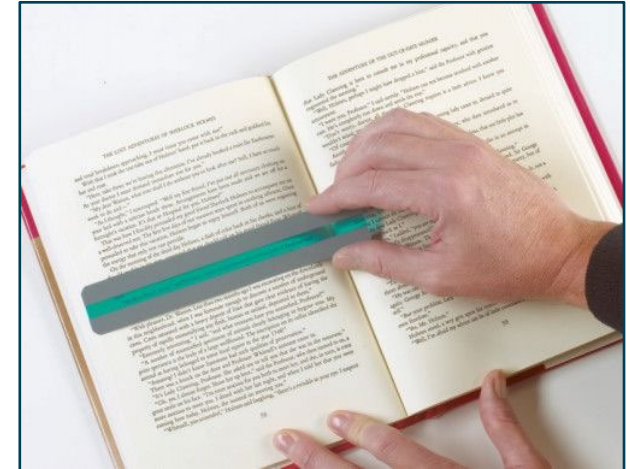
- In line with the “least restrictive environment” concept, accessible technology that is built into the system(s) a student is already using should first be applied
- If built-in options do not suit their needs, then AT that integrates with the current operating system should be trialed next
- If this does not meet the student’s needs, a new system/device may be needed, for which extensive AT options exist for different needs and goals
 - Example: If the Chromebook built-in Magnifier is not functional for a student, a Windows 11 computer with ZoomText software may be recommended instead





Spectrum of Assistive Technology

- Spans from low tech to high tech
- Specific device used depends on many factors, including individual needs and preference, as well as functionality
- Low tech example: reading guides
- High tech example: Microsoft 365's Immersive Reader feature





Accessibility by Platform

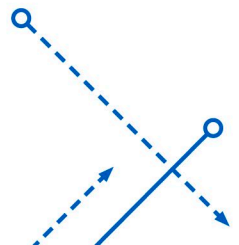
- All devices have accessibility options - you just have to look for them
- Many helpful resources are available online!



- Website for Windows Accessibility: <https://www.microsoft.com/en-us/windows/accessibility-features?msockid=128b375ac6ac683322fa2267c7ef6940>
- Website to Google for Education's Accessibility: <https://edu.google.com/why-google/accessibility/>
- Website for Apple's Accessibility: <https://www.apple.com/accessibility/>
- Website for Chromebook Accessibility: <https://edu.google.com/why-google/accessibility/chromebooks-accessibility/>



chromebook



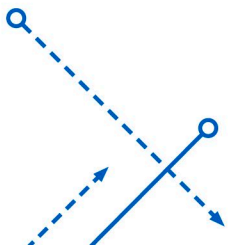
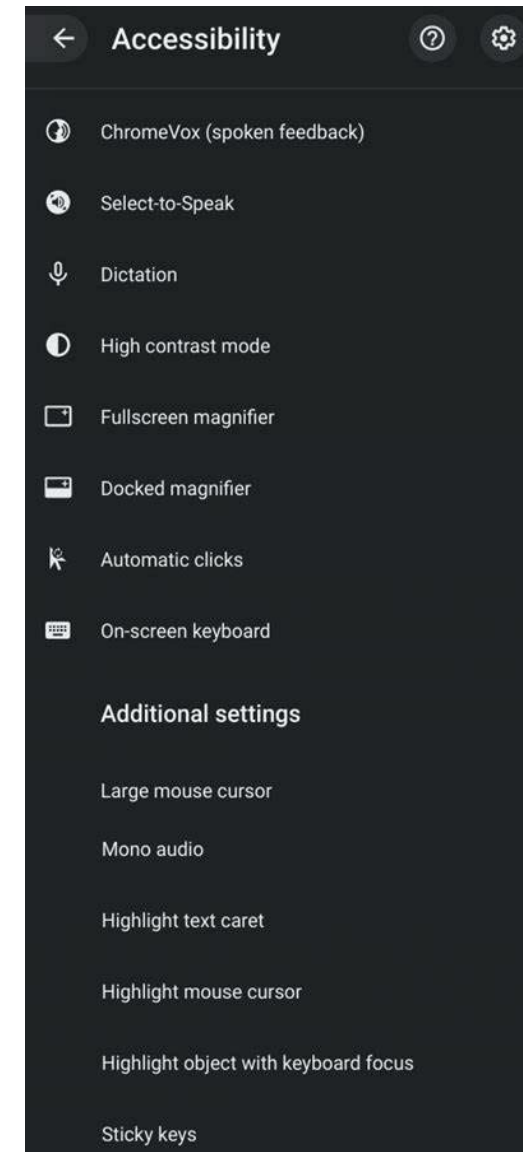


Built-in Accessibility: Chromebook



chromebook

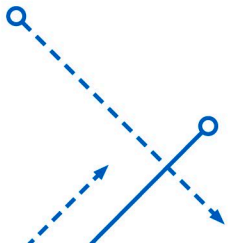
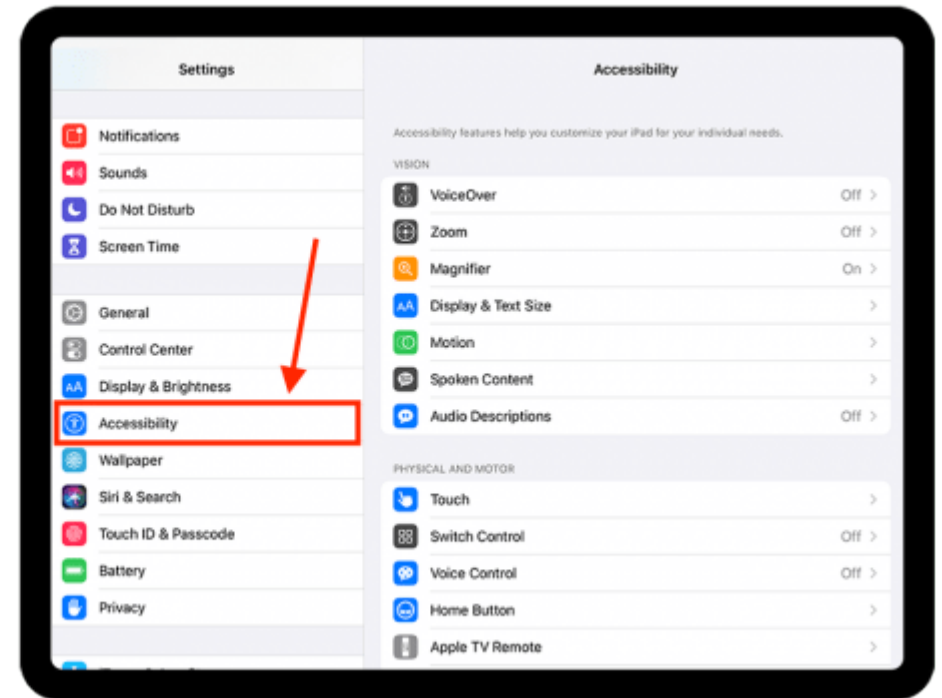
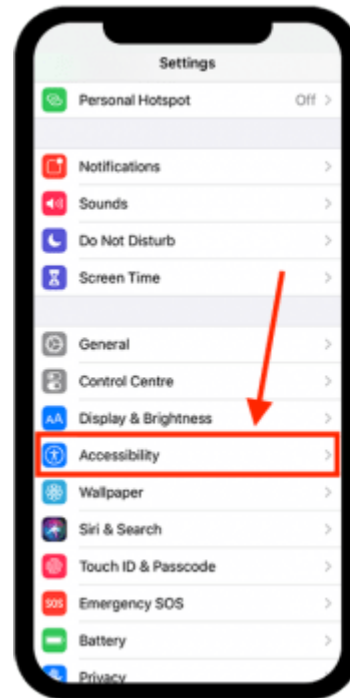
- Found under Settings - Accessibility- Manage Accessibility Settings
- Some key features include:
 - **ChromeVox:** built-in screen reader, reads *everything* on the screen
 - **Select-to-Speak:** instead of reading full pages, enables user to have only the text they select read aloud
 - **Dictation:** enables user to dictate text in any edit field
 - **Magnification:** full screen or docked screen magnifier
 - **On-screen keyboard:** includes word prediction
 - **Live Caption:** automatically creates real-time captions for any audio or video played within the Chrome browser



Built-in Accessibility: iOS - Vision



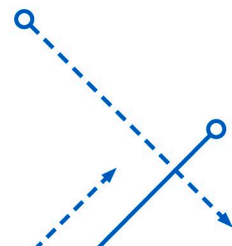
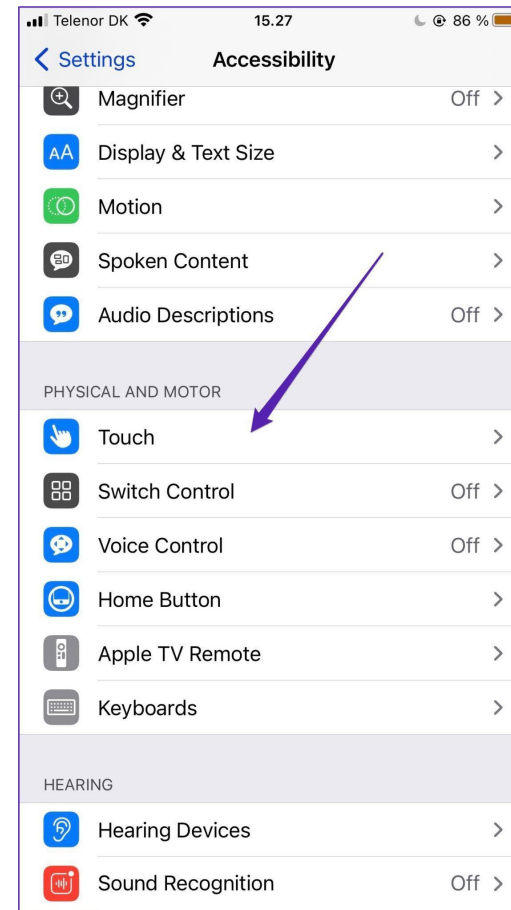
- iOS (iPads, iPhones)
 - **VoiceOver**: built-in screen reader
 - **Zoom**: built-in screen magnifier
 - **Magnifier**: accesses device camera for use as portable magnifier
 - **Display and Text Size**: Larger Text, Bold Text, Contrast, Button Shapes, Display Accommodations
 - **Motion**: options to reduce motion
 - **Spoken Content**: options for on-demand text-to-speech
 - **Audio Descriptions**: enable automatic audio descriptions for video content



Built-in Accessibility: iOS- Physical and Motor



- iOS (iPads, iPhones)
 - **Touch:** can activate AssistiveTouch to reduce the amount of touch needed for physical interaction- such as changing the volume and taking a screenshot
 - **Switch Control:** enables user to operate device with switch(es)
 - **Voice Control:** control the device with voice
 - **Home/Side Button:** adjust how home/side button reacts to touch

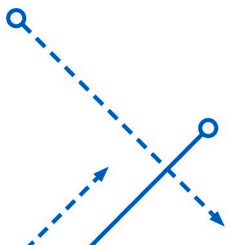




Windows 11 Accessibility Settings: Vision



- **Helpful for students who have a vision impairment, such as blindness, color blindness, or low vision**
- **Text size** – adjustable, applies throughout Windows and apps
- **Visual effects** – includes the ability to always show scroll bars, amount of time notifications are present on screen before dismissing
- **Mouse pointer and touch** – pointer style/color and size, touch indicator to show a circle on screen when it is touched
- **Text cursor** – indicators with customizable size and color, adjustable text cursor thickness
- **Magnifier** – customizable zoom level increments, Full screen, docked, and Lens views
- **Color filters** – includes grayscale, inverted colors, and those for blue-yellow and red-green color blindness
- **Contrast themes** – 4 high contrast themes with the ability to edit specific colors
- **Narrator** – built-in screen reader that describes elements present on the screen

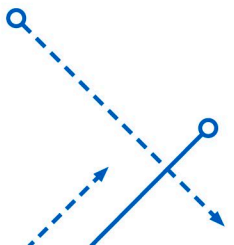




Windows 11 Accessibility Settings: Hearing



- Helpful for students who are deaf or with hearing loss
- Captions can also be helpful for many, including but not limited to:
 - Emerging readers
 - Visual learners
 - Individuals with auditory processing difficulties
 - Non-native speakers/ language learners
- **Audio** – ability to combine left and right audio channels into one, options for flashing the screen during audio notifications
- **Hearing devices** – can connect to Bluetooth Low Energy (LE) Audio devices (if supported)
- **Captions** – toggle on live captions, customizable caption style, including the text, background, and window

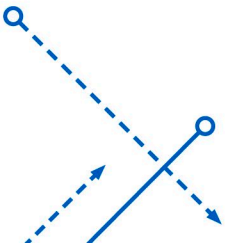




Windows 11 Accessibility Settings: Interaction



- **Helpful for students who require alternative ways of interacting with a computer, such as those with a physical disability**
- **Speech** – voice access (computer control and navigation) and voice typing (dictation of text)
- **Keyboard** – sticky, filter, and toggle keys, on-screen keyboard
- **Mouse** – mouse keys (using numeric keypad to move mouse pointer), speed and acceleration
- **Eye control** – navigate and interact with computer using eye movements and dwell time of the user's gaze; an eye tracking device must be connected in order to use this feature

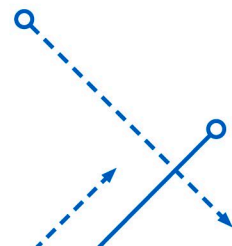
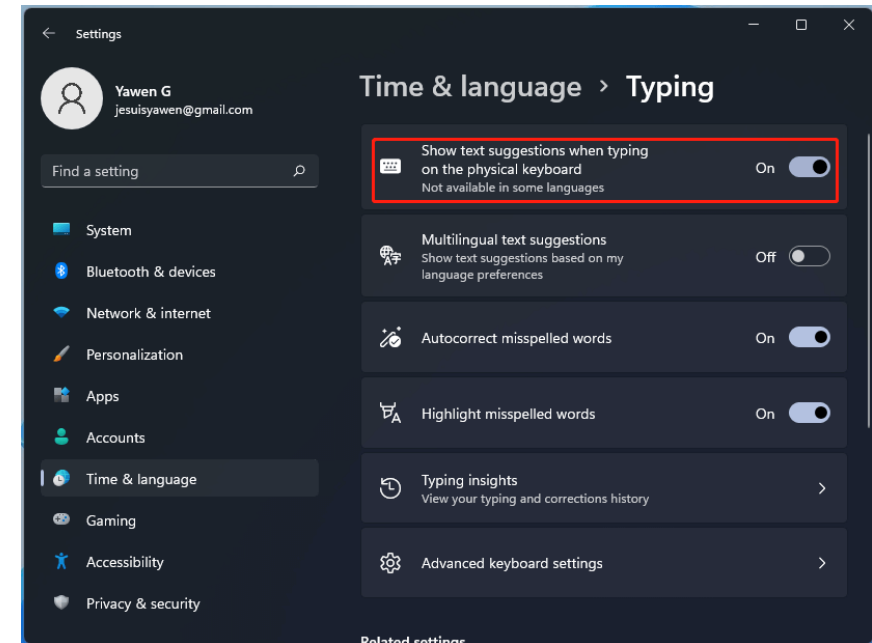




Windows 10/11 Feature - Typing Suggestions

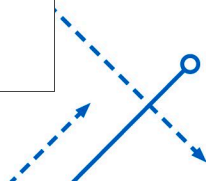
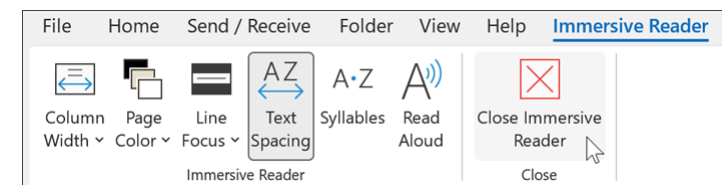
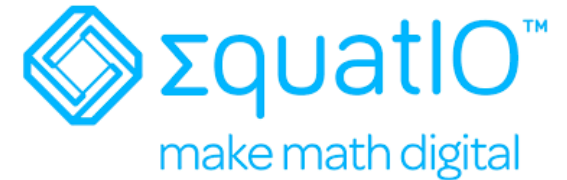
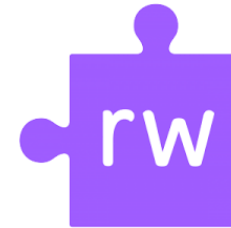


- **Helpful for students who experience difficulty with spelling, expanding their vocabulary, or who need cues when writing**
- Found in Settings – Time and Language – Typing – Show text suggestions when typing on the physical keyboard
- Similar to word prediction that appears for touchscreen keyboard
- Works for physical keyboards to provide typing suggestions
- After enabling, list of predictions appears above text being typed



Examples of AT for Reading

- **Read&Write**: toolset for Windows, Mac, and Chrome devices, with many tools targeting reading access and comprehension, as well as composition of written work (<https://www.texthelp.com/en-us/products/read-write/>)
- **EquatIO**: toolset for reading and editing math on Windows, Mac, and Chrome devices (<https://www.texthelp.com/en-us/products/equatio/>)
 - Both developed by Texthelp, free subscription for available for K-12 educators
- **C-Pen Reader 2**: portable pen-like device that provides speech output and definitions of scanned text (<https://cpen.com/products/c-pen-reader-2/>)
- **Immersive Reader**: accessibility tool in Office 365 programs; features include adjustable column width, page color, and text spacing, line focus, display of word syllables, and Read Aloud





Book Depositories

• Bookshare

- Free for students with a print disability resulting from a Learning Disability, Low Vision/Blindness and/or Physical Disability
- Provides access to books, nationwide newspapers, magazines, etc.



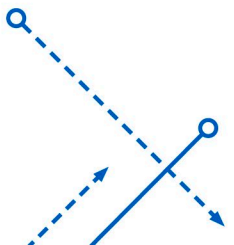
• Learning Ally

- Reading programs include Excite Reading (K-2) and Audiobook Solution (grades 3-12); professional development opportunities and resources for parents
- Provides user with natural reading voices, leisure books, textbooks, etc.



• National Library Service (NLS)/ Braille and Audio Reading Download (BARD)

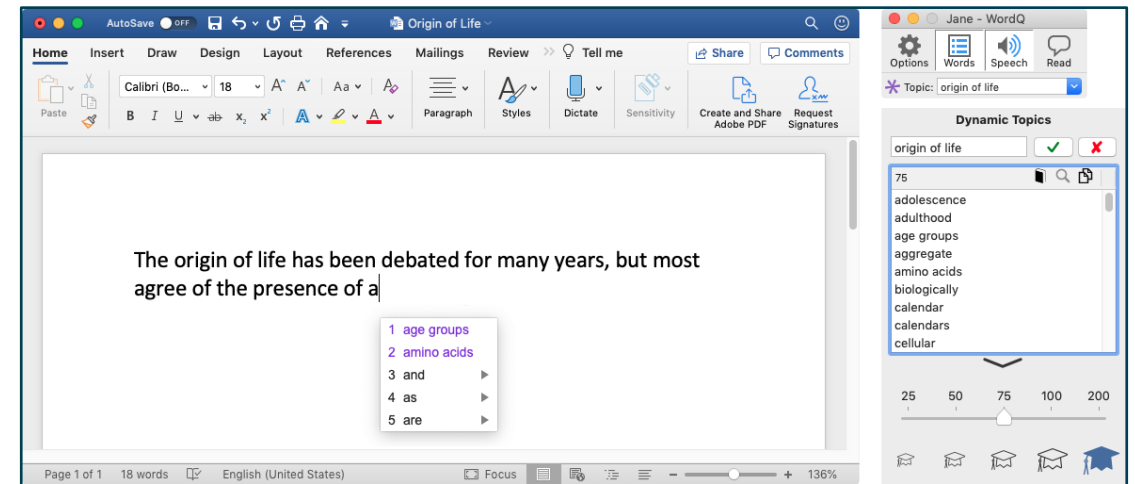
- Free service that provides reading material in audio and electronic braille (ebraille) for individuals with visual impairment
- Provides access to books, newspapers, magazines, etc.



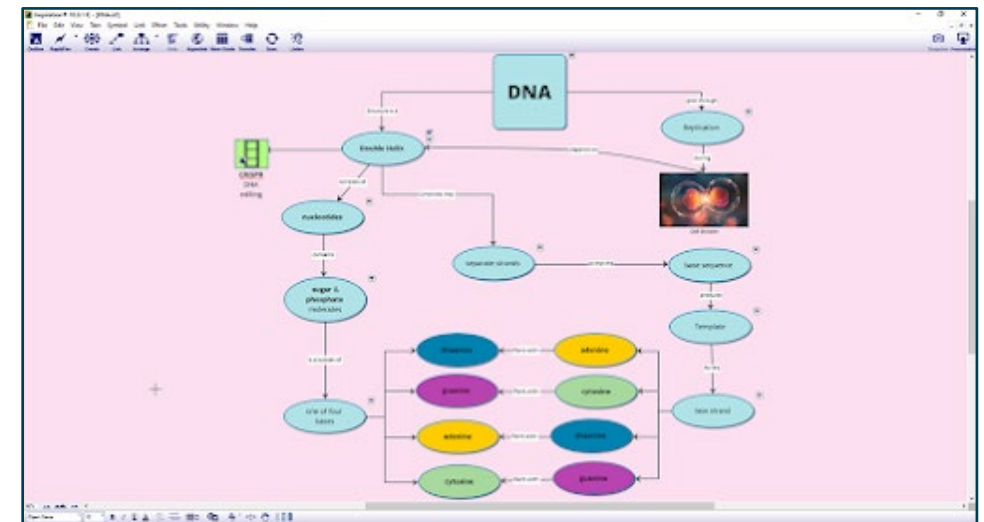


Examples of AT for Writing

- Word prediction
- Graphic organizers
- Speech-to-text



- **CoWriter**: common word prediction tool used in schools (<https://cowriter.com/>)
- **Read&Write**: toolset for Windows, Mac, and Chrome devices, with tools to assist with writing composition and proofreading
- **WordQ**: customizable word prediction software for Windows and Mac (<https://www.quillsoft.ca/wordq5>)
- **Inspiration**: graphic organizer and outline creator (<https://www.inspiration-at.com/>)

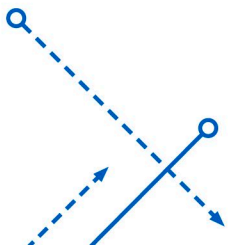


Examples of AT for Computer Access

- Adapted keyboards and mice
- Voice control, speech recognition
- Switch control
- Eye gaze
- Speech output
- Magnification

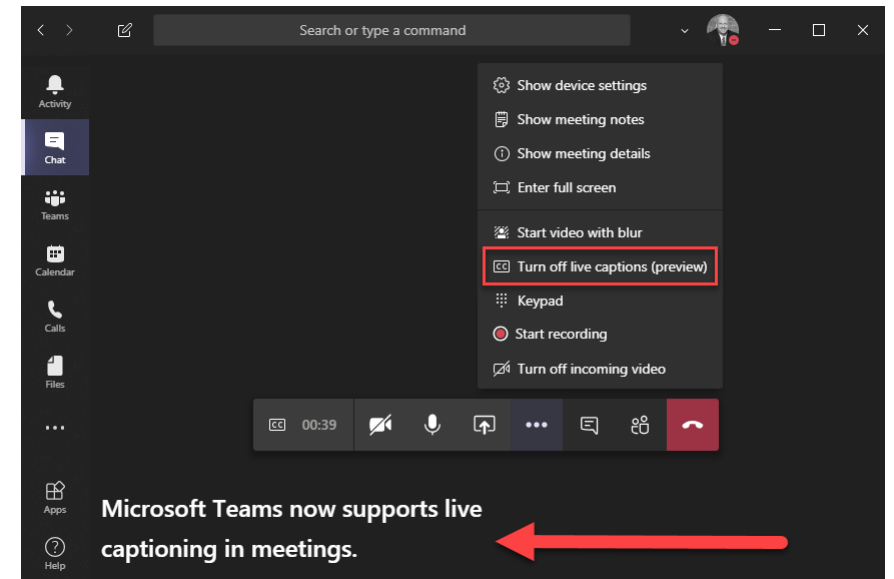


- **Dragon NaturallySpeaking**: speech recognition software for Windows computers (<https://www.nuance.com/dragon.html>)
- **Grid 3**: provides communication and switch control access (<https://thinksmartbox.com/product/grid-3/>)
- **PCEye**: compact eye tracker that enables people with physical disabilities to control a Windows computer with their eyes (<https://us.tobiidynavox.com/pages/pceye>)



Examples of AT for Auditory Access

- Amplification
- Captioning
- **Pocket Talker 2.0:** personal amplification system (<https://williamsav.com/product/pkt-e1/>)
- **Wireless Hearing Aid microphones:** wireless technology that transmits speech directly to hearing aids and cochlear implants, helping to overcome distance and noise. (<https://www.phonak.com/en-int/hearing-devices/microphones>)
- **Real-time Captioning in PowerPoint and Teams:** automatic captions/subtitles in Microsoft PowerPoint and Teams (<https://support.microsoft.com/en-us/office/present-with-real-time-automatic-captions-or-subtitles-in-powerpoint-68d20e49-aec3-456a-939d-34a79e8ddd5f>)
- **Captions in Google Slides:** automatic captions in Google Slides (<https://support.google.com/docs/answer/9109474?hl=en>)



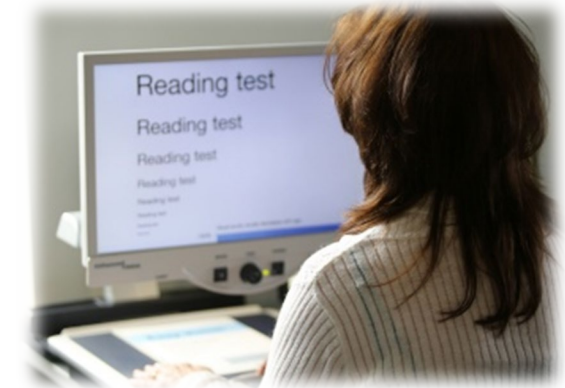


About CAT Client Services

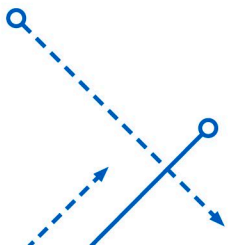
- Since its inception in 1988, the CAT Client Service program has provided AT services to several thousand Western New Yorkers of all ages
- CAT's assistive technology (AT) services, include:
 - Assessment
 - Training
 - Consultation
 - Demonstration and Loan
 - Professional Development
- Current contracts include:
 - The New York State Commission for the Blind (NYSCB)
 - Adult Career and Continuing Ed Services - Vocational Rehabilitation (ACCES-VR)
 - School districts
 - UB Accessibility Resources



Humanware BrailleNote Touch



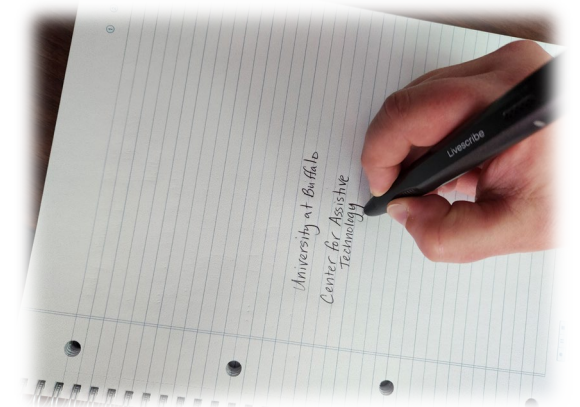
Enhanced Vision Merlin CCTV



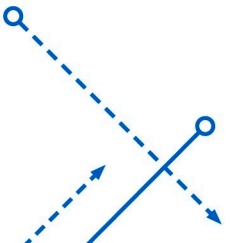


University at Buffalo Accessibility Resources- Assistive Technology Consultation Services

- CAT Client Services provides consultation services to University at Buffalo students through Accessibility Resources.
- CAT staff is available to meet with students supported by Accessibility Resources, remotely or in-person, three days per week.
- Accessibility Resources consultation services include:
 - Individualized services to consider appropriate solutions for notetaking and audio recording, text-to-speech, speech-to-text, computer access, and visual and auditory access to courses.
 - Testing of accessible workstations, and maintenance of Accessibility Resources' AT inventory.
 - Collaboration with Accessibility Resources staff to support student accommodation and access needs.



Livescribe Echo 2 Smartpen





Technology-Related Assistance for Individuals with Disabilities (TRAID)

- CAT is one of twelve providers of the New York State Technology-Related Assistance for Individuals with Disabilities (TRAID) Program
- Administered by the NYS Justice Center through grants from the US Department of Health and Human Services Administration for Community Living (ACL), the NYS Department of Health, and ACCES-VR
- Enables the provision of free demonstrations and short-term loans of assistive technology (AT) equipment to individuals with disabilities, caregivers, providers, educators, and students.
- CAT maintains an extensive inventory of AT devices for all ages, including those for mobility, seating/positioning, vision, hearing, environmental access, education, and more
- Counties served: Erie, Genesee, Niagara, Orleans, and Wyoming



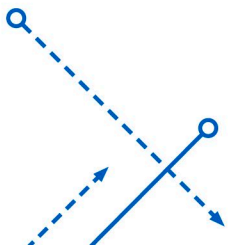
Special Tomato Seating Systems



Guided Hands



Ziggo Pediatric Wheelchair





TRAID- FAQs

- Do I need an appointment for TRAID?
Yes!
- Are there any requirements I need to meet to utilize the TRAID Program?
No, the TRAID Program is available to ALL members of the community. No referrals or special documentation needed!
- How long can I loan a device through TRAID?
The standard device loan period is 60 days.
- What happens if the device I want to loan is currently being loaned by someone else?
We will add you to our TRAID waiting list and contact you as soon as the device is returned and available to loan.
- Does the TRAID Program accept donations?
Yes, on a case-by-case basis. Please contact us with specific questions.



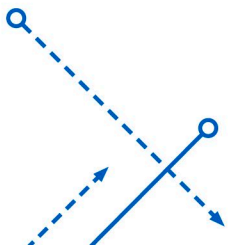
Switch Toys



Lifeware Level Adaptive Spoon

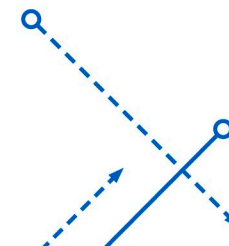


Jenx Multi-Stander

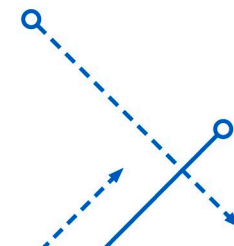


AT Websites and Resources

- Center for Assistive Technology: www.sphhp.buffalo.edu/cat
- NYS TRRID: <https://www.justicecenter.ny.gov/services-supports/assistive-technology-traid>
- RESNA: Rehab Engineering Organization: www.resna.org
- CAST: Universal Design for Learning: www.cast.org
- Access to Recreation: www.accesstr.com
- NYS Office of State Assessment Accommodations for Testing: <http://www.p12.nysed.gov/assessment/accommodations/>
- ACCES-VR: <http://www.acces.nysed.gov/vr>
- NYSCB: <https://ocfs.ny.gov/main/cb/>



Questions?





University at Buffalo

Center for Assistive Technology

School of Public Health and Health Professions

Contact us

University at Buffalo Center for Assistive Technology

210 John Glenn Drive, Suite 14

Amherst, NY 14228

By appointment only

(716) 836-1168

cat-traid@buffalo.edu

<http://sphhp.buffalo.edu/cat/client-services.html>

Provider of NYS TRAIID Program for Erie, Niagara, Genesee, Orleans, and Wyoming counties

<https://www.justicecenter.ny.gov/traid-program>

