Assistive Technology for Working and Learning: An Introduction

Bridge Multimedia
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Assistant Technology for Working and Learning

- Assistive technology helps governments and organizations support workforce diversity, recruit from a larger pool of candidates, and enhance team collaboration and communication among all employees—including those with disabilities.

- Accessibility can also help governments and organizations interact and deliver services more efficiently to its citizens.

- Assistive technology is becoming less costly and more ubiquitous. Many accessible technologies are now built right into personal computers, tablets and mobile devices.

- According to the Organization of Economic Cooperation and Development, as many as 35% of school-age students need some kind of special support or have been diagnosed as having special needs. Students with and without disabilities are our future workforce.

- Assistive technology is democratizing communication by granting more people the opportunity to access information.
Who Benefits from Assistive Technology?

People with:

1. Mobility and dexterity impairments
2. Auditory, speech, and language impairments
3. Vision impairments
4. Cognitive and learning disabilities; social/emotional deficits
5. Low/no literacy
6. Age-related impairments including vision or hearing loss and mobility/dexterity impairments
Assistive Technology (AT) can be provided in two ways:

(a) Specialized assistive technology products, and

(b) Accessibility features built into widely-used software applications, following principles of universal design

This AT Primer presents both product-based and software-based assistive technologies.

There are six AT categories:
1. Mobility and Dexterity
2. Auditory / Speech / Language
3. Vision
4. Cognitive/learning disabilities and social/emotional deficits
5. Low literacy/No literacy
6. Universal Access
Mobility and Dexterity Impairments

Types:
- Cerebral palsy
- Multiple sclerosis
- Parkinson’s disease
- Congenital absence of limbs or digits
- Accident-related loss of limbs or digits
- Spinal cord injuries
- Brain injuries
- Repetitive stress injuries such as carpal tunnel syndrome

Assistive Technologies:
- Speech-activated navigation (software)
- Talk-and-type, i.e., speech recognition (software)
- Specialized keyboards including ergonomic and on-screen
- Mice and trackballs
- Joysticks, switches (can be used by feet, chin, etc.)
- Alternative input devices and cursor controls: head/eye controlled; sip/puff; tongue switch; foot-controlled
- Touch screens (software/hardware)
Mobility and Dexterity Impairments

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Assistive Technologies:
- Speech-activated navigation
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Assistive Technologies:

- Talk and type, i.e., speech recognition (including Facebook and Twitter)
**Mobility and Dexterity Impairments**

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**Assistive Technologies:**
- Touch screens
Auditory/Speech/Language Impairments

**Types:**
- Hearing loss
- Deafness
- Inability to efficiently communicate orally
- Aphasia (inability to express or comprehend words)

**Assistive Technologies:**
- Sound amplification/speech clarity devices (software and hardware)
- Auditory trainers to increase sonic clarity and reduce room-related distractions
- Captions (media)
- Graphical sign language (voice output)
- Signing avatars (software)
- Computer-generated speech i.e., type-and-talk, via standard keyboard or on-screen keyboard
- Augmentative and alternative communication (AAC) devices (software)
- Screen design modifications
Intro

Mobility and Dexterity

Auditory/Speech/Language

Vision

Cognitive & Social/Emotional

Low/No Literacy

Universal Access

Find Out More

Auditory/Speech/Language Impairments

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• Hearing loss
• Deafness
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**Intro**

**Mobility and Dexterity**

**Auditory/Speech/Language**

**Vision**

**Cognitive & Social/Emotional**

**Low/No Literacy**

**Universal Access**

**Find Out More**

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**Auditory/Speech/Language Impairments**

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Assistive Technologies:
- Screen design modifications
Vision Impairments

Types:
- Low vision
- Reduced acuity
- Field loss
- Color blindness
- Blindness

Assistive Technologies:
- Optical devices (such as magnifiers and monoculars)
- Large-print keyboards
- Screen magnifiers (software)
- Screen readers (software) and scanners (hardware)
- eBook readers (software & hardware)
- Video description (media)
- Braille devices (electronic and manual)
- Tactile Graphics
- GPS and wayfinding devices (software)
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Assistive Technologies:
- Large-print keyboards
Vision Impairments

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Assistive Technologies:
- Screen magnifiers (software)
Vision Impairments

Types:
- Low vision
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- Blindness

Assistive Technologies:
- Screen readers and optical scanners: written text is read aloud by computer-generated voice, i.e. text-to-speech (TTS)
Vision Impairments

Types:
- Low vision
- Reduced acuity
- Field loss
- Color blindness
- Blindness

Assistive Technologies:
- Book readers (software and hardware)
Vision Impairments

Types:

- Low vision
- Reduced acuity
- Field loss
- Color blindness
- Blindness

Assistive Technologies:

- Video description
Vision Impairments

Types:
- Low vision
- Reduced acuity
- Field loss
- Color blindness
- Blindness

Assistive Technologies:
- Braille devices (electronic and manual)
Vision Impairments

Types:

- Low vision
- Reduced acuity
- Field loss
- Color blindness
- Blindness

Assistive Technologies:

- Tactile graphics: laminated and Braille
Vision Impairments

Types:
- Low vision
- Reduced acuity
- Field loss
- Color blindness
- Blindness

Assistive Technologies:
- GPS and wayfinding (software and hardware)
Types:

- Intellectual disabilities including mental retardation
- Learning disabilities such as dyslexia
- Auditory processing disorder
- Organizing and planning skills deficits (can be the result of traumatic brain injury)
- Autism spectrum disorders including Asperger Syndrome
- Attention deficit disorder
- Emotional and behavior disorders
- Psychiatric conditions including bipolar disorder, OCD

Assistive Technologies:

- User interface simplifications (software)
- “Talk-and-type, i.e., speech recognition (software)
- Word prediction programs (software)
- Text-to-speech: screen readers and type-and-talk (software)
- Auditory trainers—audio distractions are minimized
- Schedulers, automated reminders (software)
- Augmentative and alternative communication (AAC) devices (software & hardware)
- Touch screens (software)
- Simulated environments as role models for behavior management and activities of daily living (software)
Cognitive/Learning and Social/Emotional Deficits

Types:
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Assistive Technologies:

- “Talk and type.” Command your computer by voice, i.e., speech recognition (software)
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Assistive Technologies:

• Word prediction (software)
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Assistive Technologies:
- Text-to-speech: screen readers and type-and-talk

Assistive Technology Example:

![Talking Clipboard](image)
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Assistive Technologies:

- Auditory trainers: audio distractions are minimized

![Assistive Technology Diagram]
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Assistive Technologies:
- Schedulers/automated reminders, including verbal prompting (software)
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Assistive Technologies:

- Augmentative and alternative communication (AAC) devices (software & hardware)
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Assistive Technologies:
- Touch screens, including on-screen virtual keyboards
Cognitive/Learning and Social/Emotional Deficits

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- Psychiatric conditions including bipolar disorder, OCD

Assistive Technologies:

- Simulated environments as role models for behavior management and activities of daily living (software)
Types:
- Guest workers
- New immigrants
- Severe cognitive impairment

Assistive Technologies:
- Language-to-language translation tools (software)
- Speech-activated navigation and typing (software)
- Screen readers and eBook readers (software)
- Dictionary and thesaurus apps (software)
- Picture instructions (software)
Low/No Literacy

Types:

- Guest workers
- New immigrants
- Severe cognitive impairment

Assistive Technologies:

- Language-to-language translation (software)
Low/No Literacy

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Assistive Technologies:
- Screen readers and eBook readers (software)

Some books are to be tasted, others to be swallowed, and some few to be chewed and digested; that is, some books are to be read only in parts, others to be read, but not curiously, and some few to be read wholly, and with diligence and attention. Sir Francis Bacon
Low/No Literacy

Types:
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Assistive Technologies:
- Dictionary and thesaurus apps (software)
Low/No Literacy

Types:
- Guest workers
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Assistive Technologies:
- Picture instructions (software and print)
Universal Access

Universal Access: Many apps integrate global accessibility standards, for users and creators

The following are some of the functions that are available in many widely-used applications. These features do not preclude the need for specific assistive technology products for some people.

- All standard computer functions may be controlled without the mouse by using only the arrow keys, tab, space bar, etc.
- Consolidate/simplify/customize keyboard commands
- Command your computer by voice (speech recognition)
- Text-to-speech (TTS): written text—on-screen and eBooks—is read aloud by computer-generated voice
- Computer screen appearance: Screen colors, overall text size, font size, and screen icons may be adjusted for readability
- Zoom in or out of documents
- Language-to-language translation
- Check spelling and grammar; word prediction
- Add optional descriptions of photos and graphics, i.e., ALT text
- Conversion/connection with Braille devices
More About Assistive Technology and Universal Design

- G3 ICT: A Global Initiative for Inclusive Information and Communication Technologies (A United Nations GAID Advocacy Initiative) [http://g3ict.org/about](http://g3ict.org/about)


- Grameen Foundation [http://www.grameenfoundation.org](http://www.grameenfoundation.org)


More About Assistive Technology and Universal Design

- Family Center for Technology and Disability (An ED/OSEP-funded project)  [http://www.fctd.info/](http://www.fctd.info/)
- The Tech Matrix (An ED/OSEP-funded project)  [http://www.techmatrix.org/Home](http://www.techmatrix.org/Home)
Bridge Multimedia provides accessible technology systems integration, develops accessible technology, and produces accessible media content. Projects include:

- **The Universal eLearner**: Developed an operating system with Pearson Digital providing scaffolded accessible multi-sensory content for streaming media.
- **The Virtual Vocational Job Skills Builder**: Developed a platform and methodology for job training for individuals with disabilities using simulated environments.
- **The Signing Sign Language Dictionaries** (with TERC): Produced high-quality spoken word audio for computers and the iPhone, with emphasis on speech intelligibility. Boston Museum of Science; English/Spanish.
- **NIH: Knowledge Pays**, a fully accessible, bilingual game-based assessment tool used as part of a training program for at-risk adolescent girls re: Fetal Alcohol Syndrome.
- **The Universal eBook**: A multi-sensory platform providing unique mark-up for electronic documents with emphasis on students on the autism spectrum.
- **The Cove**: Japanese cultural adaptation and dubbing; Spanish and Japanese subtitling of the 2010 Academy Award winning Best Documentary Feature.
- **Video Description**: Bridge has audio described and captioned programming in English, Spanish, Portuguese, French, Japanese and Mandarin Chinese. Under a 5-year contract with the U.S. Dept. of Education, we are currently describing children’s programming for PBS, Electric Company, Nickelodeon and others.

http://www.bridgemultimedia.com
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