Using Digital Tools to Support Adults with Disabilities

Practical, easy-to-implement, low or no cost technology solutions to improve performance & productivity

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Goals for this session

Identify and examine a few selected digital tools to help adults with disabilities be more successful in educational or work environments.

Define terms: accommodations, adaptive and assistive technology, universal design

Identify strategies and preview a few products to support these disabilities:
- Fine motor impairments
- Hearing impairments
- Visual impairments
- Cognitive/learning impairments
What can help adults with disabilities?

Predictability, high structure

Clarity: lesson objective/learning target, success criteria, expectations

Focus on understanding and concepts over memorizing facts

Use of focal and positive language, i.e. “this is important, make sure this is in your notes”

Use student’s/worker’s name and use proximity to help focus

Talk less: keep instructions brief, explicit

Check for understanding: repeat, paraphrase, summarize periodically

Model and provide guided practice

https://sites.google.com/site/lrtsas/3-information-for-classroom-teachers/2-students-with-learning-challenges
What role can digital tools play?

Digital skills are part of literacy in today’s society. These include the ability to find, evaluate, organize, create and communicate information.

Digital tools
- are more interactive and engaging (gaming theory)
- can provide more options and nuances (images, pronunciation)
- Are easily accessible from a variety of available devices (Smartphones, tablets, iPads)
- Are neutral and non-judgmental, help to lower the affective filter
- FUN!
The power of technology

Increase independence, personal productivity and empowerment
Increase curriculum access and participation
Transform static resources into flexible tools

Then and now

Educational and work environments have changed

Consider the different expectations and skill sets needed today

Can we afford not to utilize technology in education and training?
Questions to consider (technology neutral)

What symptoms or limitations is the individual experiencing?
How do the individual's symptoms or limitations affect job performance?
What specific job tasks are problematic as a result of these symptoms and limitations?
What accommodations are available to reduce or eliminate these problems?
Are appropriate resources being used to determine accommodations?
Has the individual been consulted regarding possible accommodations?
Once accommodations are in place, would it be useful to meet with the individual to evaluate the effectiveness of the accommodations and determine whether additional accommodations are needed?

Do supervisory personnel and employees need disability awareness training or training on the Americans with Disabilities Act?

Accommodations

An “accommodation” is any change(s) to instruction, testing or work situations that allow an individual access to or demonstration of knowledge \textit{without} altering standards or expectations.

These may include a combination of tech and non-tech solutions

From JM Taymans, 2009. “\textit{Learning to Achieve: A Review of the Research Literature on Serving Adults with Learning Disabilities.”}
Types of accommodations

the work space and equipment needed to do the task,
the communication of the work,
the tasks themselves and
the time and place that the work is done.

https://ldaamerica.org/job-accommodation-ideas-for-people-with-learning-disabilities/
Accessible & Assistive Technology

Accessible

- Accessibility of information technology (IT), such as websites and computer programs, is dependent on IT products being designed and created using principles of Universal Design so that they are useable by everyone, without the need for AT.
  - Spell check, auto correct, short cut keys

Assistive (AT)

- Any piece of equipment, product or system that is used to “increase, maintain or improve the functional capacities of people with disabilities.”
  - Large keys, voice activated, voice synthesizer

Universal Design

Based on work by Anne Meyer and David Rose in 1990’s

Takes advantage of different parts of the brain

- Affective Networks: the WHY of learning (engagement, motivation)
- Recognition Networks: the WHAT of learning (representation, present in different ways)
- Strategic Networks: the HOW of learning (action & expression, different ways to demonstrate mastery)

http://www.udlcenter.org/aboutudl/udlguidelines_theorypractice
Universal Design

Helps all members of the organization

Nice for non-disabled individuals but necessary for those with disabilities

Non-tech examples:
  ◦ Lighting
  ◦ Color, color coding
  ◦ Structural/physical manifestations (ramps, separate workspaces)

Technology-driven examples:
  ◦ Auto correct on a cell phone
  ◦ Motion-activated devices
  ◦ Icons/shortcuts on devices
Some common disabilities

Fine Motor impairments

Hearing impairments

Visual impairments

Cognitive impairments
  • Learning disabilities: Organizational issues
  • Learning disabilities: Literacy issues
Solutions recommended

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Steps to Evaluate Assistive Technology Solutions

Define the problem.

Can the work be modified?

Can the environment in which the job is done be modified?

Is there some piece of hardware, software or equipment that is currently being used in the organization that could be applied in this situation?

Is there something commercially available that will solve the problem?

Can something be created or modified to solve the problem?

UNUMProvident, 1999
Impairments
- Range of motion, quadriplegic, back impairment, visual impairment, auditory impairment, speech impairment, psych impairment

Level of Functionality (good, moderate, minimal)

Representative Technology (suggestions of digital tools)

Summary chart also organizes tools by
- Computer centered solutions
- Phone centered solutions
- Office centered solutions
- Approximate cost
Examples of Assistive and Adaptive Technology For Fine Motor impairments

Microsoft Windows & Mac Universal Access
- StickyKeys (eliminates need to press multiple keys simultaneously)
- Ctrl-key shortcuts
- Filter keys (slows down acceptance of keystrokes to avoid accidental touches)
- Alternate Keyboards
  - minis, large keys, alternate configurations, ergonomic

Alternative Pointing Systems
- Trackballs, joysticks, HeadMouse (infrared detection and transmitter)
- Rollers, touchpads and alternate mouse configurations
- Eye tracking (Eye Gaze)
Let’s look at one

Microsoft Windows: https://www.microsoft.com/enable/

Mac Universal Access http://etc.usf.edu/techease/4all/getting-started/universal-access/?detectqt=false

No additional cost

Easy to implement (already there, just access!)
Examples of Assistive and Adaptive Technology For Hearing impairments

Hearing technology
- Assisted Listening Devices (FM, Infrared, communication/induction loops)
- Personal amplification (hearing aids, Cochlear implants)

Alerting devices
- Amplified, visual signal, vibrating

Communication supports
- Cell phones, Internet Relay Protocol, voice to text
- Brain-computer interface
- Speech recognition software
Let’s look at products

Voice to text

Note Vault: http://www.notevault.com/create-your-account-capterra
  ◦ Can translate text from a mobile device and add visuals/photos (cost)

Braina: https://www.brinasoft.com/braina/
  ◦ Artificial intelligence software for Windows PC-free! Download or Android app

Speechlogger: https://speechlogger.appspot.com/en/
  ◦ Transcription from voice, also does translation
Examples of Assistive and Adaptive Technology For Visual impairments

Text to Speech/Voice
- Kurzweil 3000, Word Q/Speak Q, CAST UDL Bookbuilder, OpenBook, Readplease

E-books
- Blio, Librrivox, Library of Congress, Internet Public Library

Optical Character Recognition Systems
- Scan printed materials and speak back with synthetic speech

Speech Systems
- Screen reader and synthesizer
Let’s look at products

Natural Readers: http://www.naturalreaders.com/index.html
- Free version for Windows/Mac limited features
- Will read Word/PDF files, emails & webpages

Open Culture: http://www.openculture.com/freeaudiobooks
- A huge collection of fiction, literature, poetry, non-fiction
- Compiles multiple providers and formats (MP3 files, iTunes, Spotify, Free Stream)
Examples of Assistive and Adaptive Technology For Cognitive impairments/LD

- Reading Level
- Vocabulary
- Organization/Memory
Reading levels

Technology makes it possible to easily check the readability of text and match text closely to students’ instructional/functional level

Readability
- Lexile Analyzer: https://lexile.com/analyzer/
  - Need to set up an account
  - Text must be in Plain Text format
  - Book Wizard, Level It Books app

Leveled text sets
- Newsela: https://newsela.com/
  - Library, news, text sets
Text to Speech

Text to speech can be helpful for those with reading disabilities or those with visual impairments.

May incorporate different speakers, different language, different speeds

AudioBookMaker: http://www.audiobookmaker.com/
TextSpeechPro: http://www.textspeechpro.com/

Building vocabulary

- Includes a word web of synonyms and antonyms

Software that organizes key vocabulary and related concepts in a visual way
- Wordle: [http://www.wordle.net/](http://www.wordle.net/) creates word clouds
- Vocabgrabber: https://www.visualthesaurus.com/vocabgrabber/

- Organized by themes, stronger in science content-words, pictures, will pronounce terms
Organization/Memory

Non-tech

- Diagrams or written instructions to explain the process of an assigned task
- Separate, quiet workspace

Technology enhanced

- Messaging-Remind: https://www.remind.com/
- Audio recorders (SmartPhone, Smart pens, tablets) to record instructions for multiple playbacks/review
- Concept mapping software
  - Inspiration: http://www.inspiration.com/
  - Mindmeister: https://www.mindmeister.com/
- Online platforms
  - Edmodo: https://www.edmodo.com/
  - Moodle: https://moodle.org/
Barriers to the use of digital tools

Knowledge of what is available
Professional development/training in the use of devices
Technical support
Fear of failure and reliance on the cult of experts
Limited resources
Using old metrics to measure new results.

Lots of help

Center on Technology and Disability (CTD) http://www.ctdinstitute.org/

PACER Center http://www.pacer.org/

National Center on Accessible Educational Materials http://aem.cast.org/

National Federation of the Blind Technology Resources https://nfb.org/technology-resource-list


The NEAT (New England Assistive Technology) Center at Oak Hill http://www.neatmarketplace.org/

Tech Matrix http://techmatrix.org/
My favorite “go-to” sites

Job Accommodation Network: http://askjan.org
  ◦ Comprehensive site: ADA, accommodations

Learning Disabilities Association of America: https://ldaamerica.org/
  ◦ Sections for educators and adults

Assistive Technology Center: http://www.assistivetechnologycenter.org/
  ◦ Special sections for “At School & Learning” and “At Work and Earning”
For more information

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