Cognitive Limitations: Functional Application of Assistive Technology

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Georgia Assistive Technology Project, Tools for Life
AGENDA

♦ Definition of Cognitive Limitations

♦ Assessment

♦ Cognitive Assistive Technology
"Genius? Nothing! Sticking to it is the genius! I've failed my way to success."

--Thomas Edison
Cognition

♦ The act or process of knowing or being aware of thoughts or perceptions; the various thinking skills and processes are considered cognitive skills.
Cognitive

♦ Cognitive Ability - Intellectual ability; thinking and reasoning skills.

♦ Cognitive Limitation - Difficulty with one or more of the basic functions of the brain: perception, memory, expression and processing skills.
Cognitive Limitations

♦ Learning Disabilities

♦ Stroke

♦ Acquired Brain Injury (ABI) Statistics
Categories to Consider

♦ Perception
♦ Expression
♦ Memory
♦ Processing
Human Activity Technology (HAAT) Model

- **Human**: represents the skills and abilities of the person with a disability
- **Activity**: a set of tasks to be performed by the person with a disability
- **Context**: the setting or social, cultural and physical contexts that surround the environment in which the activity must be completed
- **Assistive Technology**: devices or strategies used to bridge the gap between the person’s abilities and the demands of the environment
Perception
Dysfunction that affects a person’s ability to perceive sensory stimulation accurately (INPUT)

- **Includes problems with:**
  - Receptive Aphasia
  - Visual Perception
  - Auditory Perception

- **May limit ability to:**
  - Understand speech
  - Distinguish between written words or images
  - Distinguish between spoken words or sounds
Expression
Dysfunction that affects a person’s ability to express themselves verbally or non-verbally (OUTPUT)

• Includes problems with:
  • Expressive Aphasia
  • Dysgraphia
  • Cognitive Motor Abilities
  • Behavioral Expression
  • May limit ability to:
    • Speak
    • Write (express thoughts coherently)
    • Write (form letters properly)
    • Follow social norms (e.g. hyperactivity, impulsive)
Memory
Dysfunction that affects ability to store and retrieve information in either short-term or long term memory.
(STORAGE & RETRIEVAL)

- Includes problems with:
  - Amnesia
  - Visual Memory
  - Auditory Memory
  - Procedural Memory
- May limit ability to:
  - Recall recent or past events or information
  - Form mental image of things seen
  - Form mental image of things heard
  - Learn repetitive motor tasks (e.g. tying shoes)
Processing
Dysfunction that affects ability to understand accurately perceived info. And perform value added functions on information (IMPLEMENTATION)

- Includes problems that may affect:
- Attention and Concentration
- Executive Functions
- Visual Processing
- Auditory Processing
- Dementia/MR
- May Limit ability to:
  - Focus on a given task
  - Organize/Schedule tasks
  - Problem Solve
  - Understand accurately perceived images
  - Understand accurately perceived sounds
  - Understand and complete self-care functions (e.g. dressing, eating..)
Acquired Brain Injury (ABI) Statistics

ABI is an injury to the brain tissue caused by an external or internal physical force, resulting in total or partial functional cognitive disability or psychosocial impairment, or both

♦ 1.9 million Americans experience ABI each year. About half of these cases result in at least short-term disabilities, and 52,000 people die as a result of their injuries. (NIDRR 1996)

♦ An estimated 31% of ABI injuries involve moving motor vehicles, making traffic accidents the largest single cause of ABI. (NIDRR 1996)

♦ Household accidents are the second leading cause, accounting for 26.3% of cases. Workplace accidents are much less frequently cited.
Acquired Brain Injury (ABI) Statistics

♦ 500,000 to 700,000 head injuries occur each year. (National Head Injury Foundation 1986)
♦ Motor vehicle crashes cause 51% of all ABI, with falls accounting for 21%; assaults and violence 12% and sports and recreation 10%. (Interagency Head Injury Task Force 1996)
♦ Young men are more than twice as likely as women to suffer head injuries.
♦ Only one head-injured survivor in 20 is receiving appropriate rehabilitation today
♦ Head injury kills more Americans under the age of 34 than all other causes combined.
Learning Disabilities
A chronic condition of presumed neurological origin that affects a person’s ability to perceive, understand or express verbal or non-verbal, spoken or written language.

♦ LD in the general population is 15-20%. (National Institute of Health)

♦ 51% of all students enrolled in national special education programs are classified as having Learning Disabilities. (US DOE 1991)

♦ 132,497 students with learning disabilities ages 14 to 21 exit the educational system. 65,851 exit with a graduate diploma, 14,318 graduate with a certificate and 52,328 drop out or leave for other reasons. (US DOE 1993-94)
**Stroke**

Stroke is the term commonly used to refer to a cerebral vascular accident (CVA), which is defined as a localized injury to the central nervous system as a result of impaired blood flow.

- Stroke has killed 154,350 people in 1994 and accounted for about one of every 15 US deaths.
- Stroke is the third largest cause of death, ranking behind diseases of the heart and cancer.
- Approximately 3,890,000 stroke survivors are alive today (1,870,000 are male and 2,030,000 are female).
- From 1984 to 1994, the death rate from stroke declined 19.8 percent.
- There are 500,000 strokes per year in the US.
- 80% are caused by blood clots.
- 28% of stroke survivors are left with a permanent disability.
- There are 150,000 stroke deaths per year.
Assistive Technology
Assistive Technology Evaluation: What Works for the Individual

- Selection of an AT device depends on an analysis of the following conditions:
  - Prior experience or knowledge, and interests;
  - the individual’s specific strengths, weaknesses;
  - the specific device (reliability, ease of operation, technical support, cost);
  - usefulness across settings and over time.
AT Providers

♦ Case Manager
♦ Technologist
♦ Occupational Therapist
♦ SLP and PT
♦ Engineer
♦ Technician
Most Effective Technological Products

♦ Able to level out the playing field
♦ Work in cross-settings
♦ Portable
♦ Easy to maintain
♦ Affordable to replace and/or maintain
♦ Good and reliable technological support
♦ Accessible Training Format
### Alternative & Augmentative Communication (AAC) - Digitized Speech

Portable communication devices that provide a limited choice of short recorded message

<table>
<thead>
<tr>
<th>Device</th>
<th>Company</th>
<th>Contact Information</th>
<th>Website</th>
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</thead>
<tbody>
<tr>
<td><strong>Attainment 15 Talker</strong></td>
<td>Attainment Company, Inc. 15</td>
<td>1-800-327-4269</td>
<td><a href="http://www.attainmentcompany.com">www.attainmentcompany.com</a></td>
</tr>
<tr>
<td><strong>Attainment 5 Talker</strong></td>
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<tr>
<td><strong>Cheap Talks</strong></td>
<td>Toys for Special Children</td>
<td>1-800-832-8697</td>
<td><a href="http://www.enablingdevices.com/shop">www.enablingdevices.com/shop</a></td>
</tr>
<tr>
<td><strong>Digivox</strong></td>
<td>Sentient Systems</td>
<td>888-697-7332</td>
<td><a href="http://www.sentient-sys.com">www.sentient-sys.com</a></td>
</tr>
<tr>
<td><strong>EasyTalk</strong></td>
<td></td>
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<tr>
<td><strong>Digicom 2000</strong></td>
<td>Great Talking Box Company</td>
<td>877-275-4482</td>
<td><a href="http://www.gtb-sym.com">www.gtb-sym.com</a></td>
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<tr>
<td><strong>Hawk</strong></td>
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<td><strong>Black hawk</strong></td>
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<td><strong>Hawk II</strong></td>
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<td><strong>Hawk III</strong></td>
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<tr>
<td><strong>Super Hawk</strong></td>
<td>Adamlab</td>
<td></td>
<td><a href="http://www.wcresa.k12.mi.us/adlab/">www.wcresa.k12.mi.us/adlab/</a></td>
</tr>
<tr>
<td><strong>Holly Com</strong></td>
<td>Communication Devices</td>
<td>1-800-604-6559</td>
<td><a href="http://www.comdevices.com">www.comdevices.com</a></td>
</tr>
<tr>
<td><strong>Macaw</strong></td>
<td></td>
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<td><strong>Parrot</strong></td>
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<td><strong>Parakeet 15</strong></td>
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<td><strong>Messagemate</strong></td>
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<tr>
<td><strong>Words+</strong></td>
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<tr>
<td><strong>Ultimate Chatbox</strong></td>
<td>Tash, Inc.</td>
<td>1-800-463-5685</td>
<td><a href="http://www.tashint.com">www.tashint.com</a></td>
</tr>
<tr>
<td><strong>Voice in a Box</strong></td>
<td>Frame Technologies</td>
<td>920-869-2979</td>
<td><a href="http://www.frame-tech.com">www.frame-tech.com</a></td>
</tr>
</tbody>
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Georgia Assistive Technology Project, Tools for Life
Alternative and Augmentative Communication (AAC)- Synthesized
Larger communication devices that provide a broader array of selections with picture (iconic) displays these (EXPRESSION)

Alpha Talker
Vanguade
Liberator II
Delta Talker
Prentke Romich
www.prentrom.com

Dynavox
DynaMyte

Sentient Systems
www.sentient-sys.com/

Say-it-all

Innocomp
www.sayitall.com/

Companion
Assistive Technology, Inc.
www.assistivetech.com

Gus Multimedia Speech System
Gus Communications, Inc.
www.gusinc.com/

Speaking Dynamically
Pro Brordmaker

Mayer Johnson
www.mayer-johnson.com

Crick Software
Crick Software
www.cricksoft.com/

Picture It
Synergy
www.speakwithus.com

Talking Screen
Words+
Alternative & Augmentative Communication (ACC)-Text-Based Speech
communication devices with a letter keyboard that allows the user to type in their message and have it spoken in synthetic speech. (EXPRESSSTION)

<table>
<thead>
<tr>
<th>Device Name</th>
<th>Manufacturer</th>
<th>Website</th>
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<tbody>
<tr>
<td>Aurora for Windows</td>
<td>Aurora System, Inc.</td>
<td><a href="http://www.djtech.com/aurora/">www.djtech.com/aurora/</a></td>
</tr>
<tr>
<td>Crespeaker Maxx</td>
<td>Crestwood Company</td>
<td><a href="http://www.communicationaids.com/">www.communicationaids.com/</a></td>
</tr>
<tr>
<td>Dubby</td>
<td>TASH, Inc.</td>
<td><a href="http://www.tashusa.com/">www.tashusa.com/</a></td>
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<tr>
<td>EZ Keys</td>
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<tr>
<td>LightsWRITER</td>
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<tr>
<td>Link</td>
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<tr>
<td>Text to Speech Communicator</td>
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<tr>
<td>TS2020X</td>
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<tr>
<td>SC&amp;D, Inc.</td>
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<td>SC&amp;D, Inc.</td>
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<tr>
<td>Write It</td>
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<tr>
<td>Synergy</td>
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<td>Synergy</td>
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Georgia Assistive Technology
Project, Tools for Life
Amplifier (FM Listening Systems)

Wireless FM system that can be utilized to enhance listening. These devices may increase intelligible communication by bypassing disturbing background noise.

(Perception & Processing)

- Personal FM System
  - www.nfss.com/

- ADCO
  - www.nfss.com/

- Comtek AT-72 FM System
  - www.comtek.com/

- Voice – IT
  - Voice Corporation
  - www.voiceit.com
Calculators - Talking
Calculators with the standard visual displays that also offer a speech output feature (Perception & Processing)

- Bossert Specialities
  - www.syspac.com/~bossert/index.html

- LS&S Group
  - Download catalog as pdf file
  - www.lssgroup.com
Cognitive Training Software (Memory & Perception)

Adam and Abby Learning Series
Captains Log
Adam & Abby Learning Series
www.sirus.com
Brain Train
www.bRAINtrain-online.com
Labeling_Tutor
Memory and Attention Cognitive Retraining
Millennium Software
Logic and Reasoning
www.members.aol.com
www.parrotsoftware.com/

Georgia Assistive Technology Project, Tools for LIfe
Computer Input Devices
Adaptive devices that makes it easier for a person to perform keyboard and mouse functions w/ limited fine motor control (Expression)

Head Mouse
Origin Instruments Corp.
www.orin.com/access

Head Master
Prentke Romich
www.prentrom.com

Expert Mouse
Kensington Technology Group
www.kensington.com/

Intellikeys Keyboard
IntelliTools
www.intellitools.com
Keyguards

Increase accuracy when typing  (Expression)  
Tech –Able AssistTech,Inc.


Turning Point Therapy & Technology, Inc. Prentke Romich
www.turningpointtechnology.com/ www.prentrom.com
Language (Remediation) Software
Software to assist people with language deficits
(Perception & Expression)

Adam and Abby Learning Series
www.sirus.com

Aphasia Tutor
Speech Pacr
Vowel Target
Bungalow
www.teleport.com

Labeling Tutor

Reading and Word Finding

Millennium Software
Member.aol.com/peuapeu/index.html

Grammar and Vocabulary
www.parrotsoftware.com/
A low tech method for providing tactile or more pronounced visual feedback to text, graphs or other hard copy material (Perception)

**Spot’n Line Pen**  
**Hi-marks 3D Marker**  
**Maxi Aids**  
[www.maxiaids.com](http://www.maxiaids.com)

**Swell-form**  
**American Thermoform**  
[www.atcbrilleqp.com](http://www.atcbrilleqp.com)

**Picture Braille Graphics Software**  
**Quantum Technology**  

**Thermo Pen**  
**Independent Living Aids**  
[www.independentliving.com](http://www.independentliving.com)
Screen Magnification Software 
enlarges text and graphics  (Perception)

Zoom Text  
Ai Squared  
www.aisquared.com/

MAGic  
Henter-Joyce  
www.hj.com

InLarge  
(for Macintosh only)  
Alva Access Group, Inc.  
www.aagi.com
Screenreader Software provides voice output for print-based materials (Perception, Expression, Memory & Processing)

<table>
<thead>
<tr>
<th>Software</th>
<th>Website</th>
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</thead>
<tbody>
<tr>
<td>CAST eReader</td>
<td>CAST <a href="http://www.cast.org/">www.cast.org/</a></td>
</tr>
<tr>
<td>TextHelp System</td>
<td>TextHELP System <a href="http://www.texthelp.com">www.texthelp.com</a></td>
</tr>
<tr>
<td>JAWS</td>
<td>Henter-Joyce <a href="http://www.hj.com">www.hj.com</a></td>
</tr>
<tr>
<td>Window Eyes</td>
<td></td>
</tr>
<tr>
<td>OutSPOKEN</td>
<td>ALVA Access Group <a href="http://www.gwmicro.com">www.gwmicro.com</a></td>
</tr>
</tbody>
</table>
OTHER HELPFUL AT!

♦ Typing Training Programs  
  (www.sunburstdirect.sunburst.com)

♦ Video training Materials  
  (www.selfadvo.com)
Optical Character Recognition (OCR)

- OCR systems may be used to “read” material from hard copy (books, magazines, etc.). The system consists of a scanner, speech synthesizer with aid of software (i.e. screen reader software which will read any text input or document by the user) and computer.
Online Services

♦ The easiest way to have access to this wealth of electronic information is to join a commercial online service. You will find electronic books, electronic mail, forum of individuals with LD, current research
Read & Write

♦ Tool for people with reading and writing difficulties
♦ works with a windows based application
♦ Screen reading, including menus and icons
♦ Advanced phonetic spell checker
Read & Write (2)

♦ Homophone support
♦ Innovative contextual word prediction
♦ Abbreviation expansion for increased productivity
♦ Log which will record typical spelling errors for future analysis
♦ 180,000 word dictionary - both UK and USA
Writing With Symbols

♦ Type with text and a corresponding symbol pops onto the screen
♦ Speaks the word
♦ Great multisensory tool
♦ 1,500 symbols
♦ easily create (print) worksheets, stories etc..
Voice Organizers

- Helpful for organizing, keeping and retrieving information
- Compartmentalized Sections
- Audio and/or Visual Feedback
- Portable
Talking Watch

- Talking Watch helps students tell accurate time
- Look for easy to read LCD display
- Alarm
- Come in many different styles
- Low in cost
Snap-On Amplifier

♦ For ADD/ADHD
♦ Provides the ability to significantly amplify the incoming portion of telephone conversations.
♦ Portable
♦ Lightweight
Hearit

- Increased phonological awareness for all auditory input-results in better focus and comprehension
- Noticeably reduces distractions - task!
Stroke Resources

♦ American Heart Association  
  (214.373.6300)

♦ National Stroke Association  
  (303.649.9299)

♦ Sister Kenny Institute  
  (612.863.4463)
LD Resources

♦ Learning Disabilities Association of America (www.ldanatl.org)

♦ National Network of Learning Disabled Adults (215.275.7211)
ABI Resources

♦ European Brain Injury Society  
   (322.502.34.88)

♦ Brain Injury Association (703.236.6000)

♦ Brain Injury Law Office (800.922.9447)
RESNA & Oklahoma Able Tech

RESNA:  http://resna.org/
Oklahoma Able Tech:
http://okabletech.okstate.edu