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COGNITIVE TECHNOLOGIES:
PREPARING FOR THE ATP EXAM

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Access to Independence

Learning Objectives

- The participant will be able to list 3 functional areas which may be impacted by cognitive disabilities.
- The participant will be able to list 3 strategies to assist with task completion and organization for clients with cognitive disabilities.
- The participant will be able to list 3 general compensatory strategies for people with learning disabilities.

What we will be covering:

- Definitions
- Distraction, Memory Loss, Organization, Task Completion
- Daily Living
- Safety and Security
- Learning Disabilities

The ATP Certification

- The Assistive Technology Professional (ATP) certification is offered through the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA)
- This demonstrates a basic level of competence in the practice area of Assistive Technology
  - Over 4000 people hold the ATP certification
- This series of courses will include information to prepare the candidate for this examination

RESNA Rehabilitation Engineering and Assistive Technology Society of North America

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The ATP Certification

- The candidate must fulfill specific pre-requisites before taking the examination
- For Occupational Therapy Practitioners with a Bachelor's or Master's degree, 1000 hours of work experience is required over 6 years.
- For further information:
  - http://www.resna.org/get-certified/exam-eligibility-requirements

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Definitions

- Cognition
  - "The mental action or process of acquiring knowledge and understanding through thought, experience, and the senses."
    - Wikipedia

Definitions

- A person with a cognitive disability has greater difficulty with one or more types of mental tasks than other people
  - Clinical disability
  - Functional disability

Clinical Disability

- Autism
- Down syndrome
- Traumatic brain injury
- Dementia
- Attention deficit disorder
- Learning disabilities
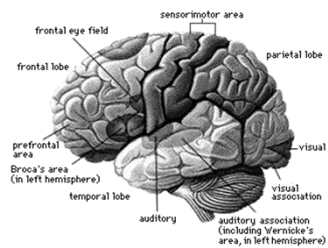
Functional Disability

- The capacity to:
  - Think
  - Concentrate
  - React to emotions
  - Formulate ideas
  - Problem solve
  - Reason
  - Remember

Technology

- Assistive Technology
- Educational Technology
  - Using technology to support the learning process
- Durable Medical Equipment
- Cognitive Orthoses/Cognitive Prosthetics
  - Compensatory strategies that alter environment and are directed toward functional skills

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Cognitive Orthoses

- Cognitive Orthoses/Cognitive Prosthetics
  - Attributes (Cole, 1999)
    - Uses computer technology
    - Designed specifically for rehabilitation purposes
    - Directly assists the individual in performing everyday activities
    - Customizable

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Cognitive Technologies

- Technologies for overcoming challenges with:
  - Distraction
  - Memory loss
  - Ability to organize
  - Task completion

Distraction

- We all get distracted
  - Normally, the brain helps us to filter out extraneous input and focus
- If the client is distracted, we need to reduce extraneous input externally
  - Reduce amount of buttons, controls, functions
  - Partition work areas
  - Noise cancelling headsets
  - FM systems and auditory feedback devices

Memory Loss

- We all use strategies to remember information
- This is more important with memory deficits
- Clocks, calendars
- Smartphones
  - Alarms with text
  - Alarms with spoken cues
  - Cognitive apps

| It's Done!	9:17 AM Thu, Jan 31, 2013	
Task Name	Take Medication	
Task Type	⏻ Recurring	⌄
Recurring Days	M T W T F S S	
Priority	⦿ High	⌄
Category	Health/Medicine Tasks	⌄
Reminder	9:15 AM	
Notifications	Both EMail & SMS	⌄
Task Notes	Aspirin 80 mg	

Ability to Organize

- We all have tasks to organize
- For clients with cognitive impairments, organization can be more challenging
  - Calendars, daily planners
  - Smartphones
    - Alarms to move someone through a task
    - Other organizational Apps

Cognitive Apps

- Schedules/Reminders
  - *Aida Reminder
    - Speech reminder option
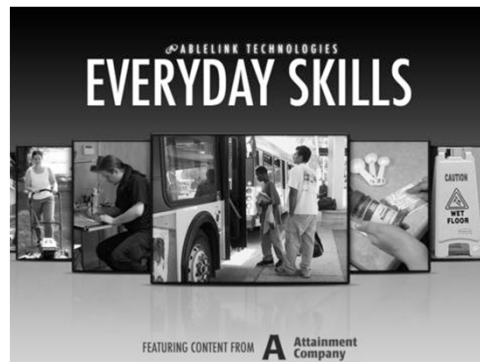   - Helpful for clients who do not read or have visual impairments
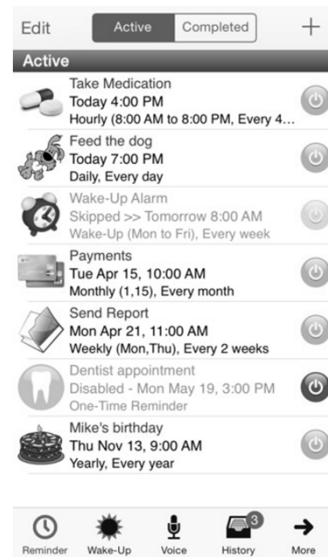
Cognitive Apps

- Schedules/Reminders
- Apps that break tasks down into steps
  - *iProcrastinate

Cognitive Apps

- Independent living skills
  - Money management
  - Transportation
  - Safety
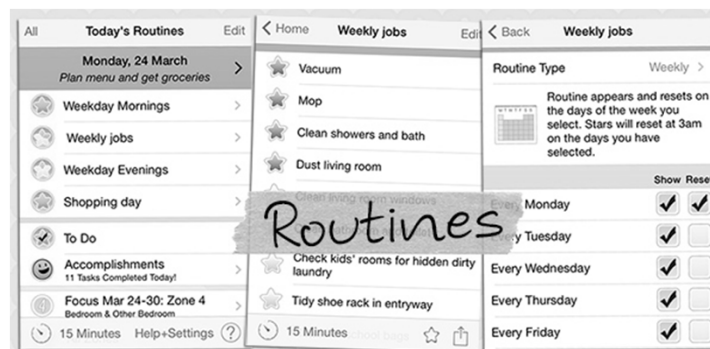 - Health management
  - *Everyday Skills

Organizational Apps

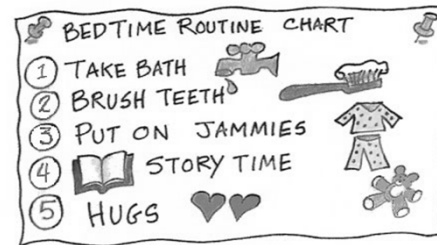• Many productivity Apps can be helpful for clients who are working

Task Completion

• List of task steps
• Smartphone/Tablet Apps

General Suggestions

- Routines
- Consistency
- Simplify tasks
- Break tasks down into small steps
- Reduce choices
- Reduce environmental clutter

Cognitive Technologies for Daily Living

- Kitchen
- Bathroom
- Location devices
- Medication devices
- Comforting aids
- Environmental aids

Kitchen

- People with cognitive impairments may have safety issues in the kitchen, such as leaving an appliance on or the water running
- This impacts independence and safety
  - Auto shut-off appliances
  - Alarms to remind an individual to turn off stove, lock door, take medicine, turn off the water, etc.
  - IR faucet – turns off automatically

Bathroom

- The bathroom can also be a safety risk
  - Safety features
- If the shower is too much tactile input, a bath may be better tolerated
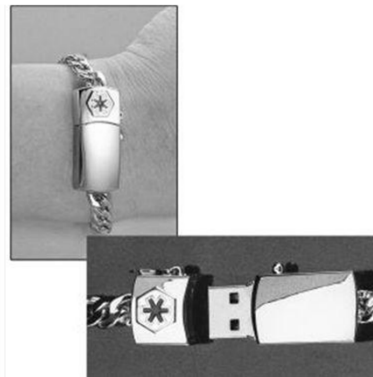 - Sensory issues

Location Devices

- If the client loses objects
  - Alarm on device that can be triggered to help find it
  - Like having someone call your phone…

Location Devices

- If the client gets lost
  - Photos on bedroom doors and other strategies to orient someone at home
- Strategies to find the client if they wander off
  - Lifeline
  - GPS

Medication Devices

- The client may be able to be independent in taking medication with help
- Important to ensure client will not skip or accidentally take an extra dose
  - Pill holders
  - Pill alarms
  - Smartphone apps

Comforting Aids

- Some clients with cognitive impairments also have sensory issues
- Specific sensory input can calm in general, reduce anxiety and agitation and increase alertness
  - Pets
  - Tactile – blanket
  - Vestibular – rocking
  - Proprioception – deep pressure
  - Auditory – music
  - Visual – fish tanks, etc.

Environmental Aids

- Our environment can impact our emotional state and help a client by more successful in their daily living
  - Lighting level
  - Noise level
  - Reduce clutter

General Suggestions

- Generally organizing the environment in such a way as to ease daily living tasks
  - Pictures, charts, symbols
  - Label items
  - Color coding

Self-adhesive signs and label Collection

Cognitive Technologies for Safety and Security

- Fire and Smoke alarms
- Water safety
- Phones
- Aids to limit access
- Identification
- Monitoring and surveillance devices

Fire and Smoke Alarms

- A client with cognitive impairments may have difficulty recognizing an emergency
- Alarms can alert the client that something is happening
  - Smoke alarms
  - Carbon monoxide alarms
- Inform local emergency personnel that someone lives in the residence with cognitive limitations

Water Safety

- Clients with cognitive impairments may be at risk of scalding
  - Valves to regulate temperature
- Clients may accidentally leave water running
  - Overflow monitors

Phones

- Standard phones may be difficult for a client to use
- Speed dial does not require the client to memorize phone numbers
- 911 can be on speed dial or programmed into a photo phone
- Auto call phones will automatically call programmed numbers in sequence until someone answers and may play a recorded message

Phones

- If a client does not understand how to use 911 properly, this should not be an option
- The client should not be left unattended
- The fire department doesn't like accidental calls
  - Or when the client just likes seeing the fire truck…

Aids to Limit Access

- Why limit access?
  - The client may be able to access areas or items that can be hazardous, such as a sharp object
  - The client may get out of the home and be unsafe on their own

Aids to Limit Access

- Determine the client's cognitive level
  - "Child proof" the environment for that level
  - Outlet covers
  - Drawer and cabinet locks
  - Door and window locks
  - Stove knobs, hot surfaces, etc.

Aids to Limit Access

- Fences, gates around water areas
- Gate alarms
- Door alarms
- Bio-locks on front door
  - This allows others to quickly open the door, but not the client
  - Dangerous to impede exit in case of emergency
  - Many clients with autism figure out other locks

Identification

- ID to let others know who this person is and who to contact if the client is lost
  - Medical IDs
  - Road ID

Monitoring and Surveillance Devices

- Alarms to alert caregivers that the client may be in an unsafe situation and to check on the client
  - Doorknob alarm
  - Motion detectors

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Monitoring and Surveillance Devices

- Surveillance equipment allows caregivers to remotely check-in on clients who are unsupervised
  - Baby monitors (from another room)
  - Cameras and Smartphones
    - From another room to any location

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General Suggestions

- The goal is to make the environment as safe as possible
  - Color code items
  - Look for potential hazards and remediate
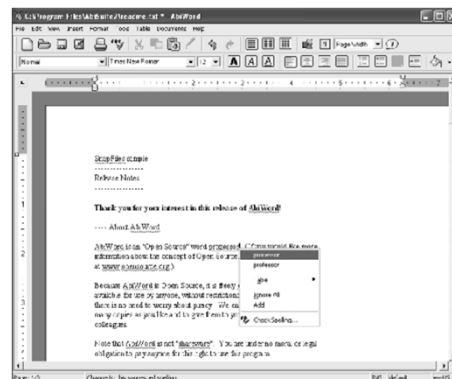 - Mirrors – remove as needed
  - Lighting
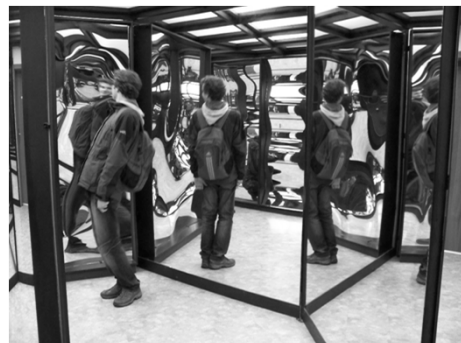
Learning Disabilities

- There are many learning disabilities
  - i.e. dyslexia
- Degree of severity varies
- Remediation vs. Accommodation

Learning Disabilities

- Computers
  - Display
    - Text size
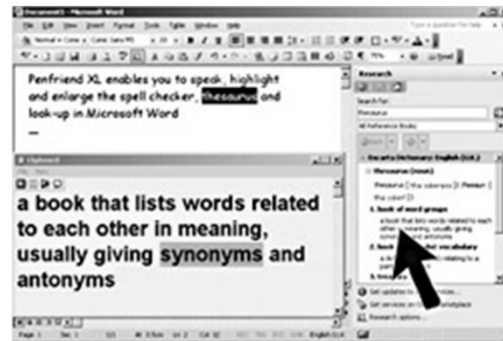   - Text contrast
    - Color of text and background

Learning Disabilities

- Computers
  - Strategies to accommodate writing:
    - Spell check
    - Rate enhancement:
      - Word prediction
      - Word completion
      - Abbreviation Expansion
    - Concept mapping
      - To organize thoughts

Learning Disabilities

- Computers
  - Alternative Input for writing
    - Voice recognition

Learning Disabilities

- Apps
  - Writing
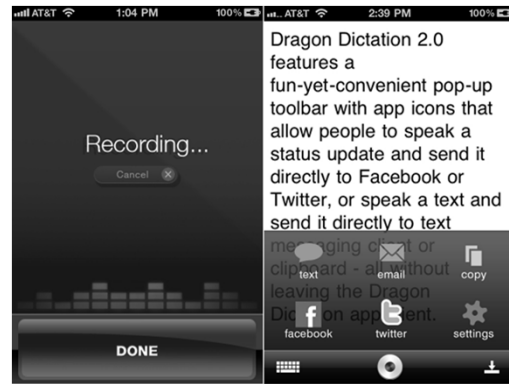 - Reading
  - Education
  - Executive Function

Writing Apps

- Alternative to handwriting
- Customizable keyboards
- Rate Enhancement (i.e. word prediction)
- Writing tools
  - *Abilipad
- Typing programs

Writing Apps

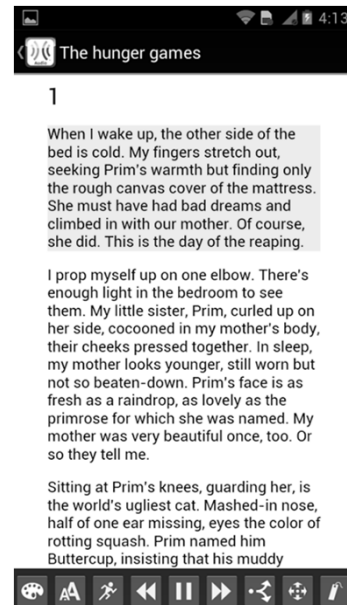- Text to speech
- Voice recognition
  - *Dragon Dictation
- Recording
  - Record verbal notes, rather than write

Recording...

Cancel ✕

DONE

Dragon Dictation 2.0 features a fun-yet-convenient pop-up toolbar with app icons that allow people to speak a status update and send it directly to Facebook or Twitter, or speak a text and send it directly to text messaging client or clipboard - all without leaving the Dragon Dictation application.

text email copy

facebook twitter settings

Reading Apps

- Reading Apps may be used with clients with:
  - Learning disabilities
  - Visual limitation
- Audiobooks
- Audio textbooks
  - *Learning Ally
  - Read2Go

The hunger games

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When I wake up, the other side of the bed is cold. My fingers stretch out, seeking Prim's warmth but finding only the rough canvas cover of the mattress. She must have had bad dreams and climbed in with our mother. Of course, she did. This is the day of the reaping.

I prop myself up on one elbow. There's enough light in the bedroom to see them. My little sister, Prim, curled up on her side, cocooned in my mother's body, their cheeks pressed together. In sleep, my mother looks younger, still worn but not so beaten-down. Prim's face is as fresh as a raindrop, as lovely as the primrose for which she was named. My mother was very beautiful once, too. Or so they tell me.

Sitting at Prim's knees, guarding her, is the world's ugliest cat. Mashed-in nose, half of one ear missing, eyes the color of rotting squash. Prim named him Buttercup, insisting that his muddy

Educational Apps

- The clinician's role is primarily access at this point
- Many educational apps are available for a variety of ages and educational goals
- Some may be a better match for a specific client's learning style, motor skills and vision
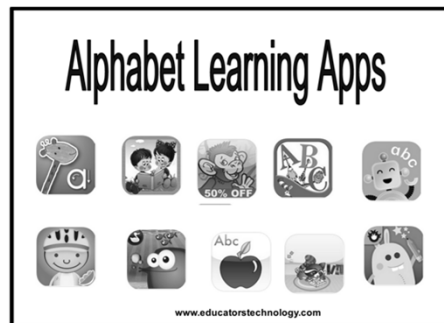
Something to Consider…

- Apps are very cool, but still are just one tool in our toolbox
- For example, a student can use an App to learn or reinforce a math skill, but still requires instruction and other learning methods

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Executive Functioning

- Some clients have learning disabilities that impair executive functioning
- Executive functioning includes attentional control, inhibitory control, working memory, and cognitive flexibility, as well as reasoning, problem solving, and planning

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Executive Function Apps

- Time management
- Task completion
  - High Score House Kids

Executive Function Apps

- Schedules, routines
  - First Then Visual Schedule
- Tracking
  - i.e. classes, projects, tests, homework
- Prioritizing

Conclusion

- Many people have some form of cognitive limitation
- This may be accompanied by motor and sensory limitations, as well
- A number of cognitive technologies are available to compensate, to increase independence and to ensure safety
  - Low tech
  - High tech

References

1. Stock, S. E., Davies, D. K., & Gillespie, T. (2013). The state of the field in applied cognitive technologies. *Inclusion*, *1*(2), 103-120.

2. Heyn, P. C., Cassidy, J. L., & Bodine, C. (2014). The Rehabilitation Engineering Research Center for the Advancement of Cognitive Technologies. *American journal of Alzheimer's disease and other dementias*, 1533317514531444.

3. Harniss, M., Brown, P. A., & Johnson, K. L. (2014). COGNITIVE TECHNOLOGIES FORWAYFINDING. *Assistive Technology for Cognition: A Handbook for Clinicians and Developers*, 146.

4. Shimizu, S., Inoue, H., Nara, H., Takahashi, N., Hirai, N., Shimotsuke-city, J. C., ... & Kato, S. (2013). The Relationship between Human Brain Activity and Movement on the Spatial Cognitive Task. *Cognitive2012*, 89-94.

5. Herrington, J., & Parker, J. (2013). Emerging technologies as cognitive tools for authentic learning. *British Journal of Educational Technology*, *44*(4), 607-615.

Resources

- Assistive Technology for Individuals with Cognitive Impairments
  - A handbook for Idahoans with Cognitive Impairments and the People who Care for Them
  - http://www.idahoat.org/Portals/0/Documents/cognitive_impair.pdf

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Thank you!

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