Assistive Technology, AAC, and ASD

- Assistive Technology
  - 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
  - Technology-related Assistance for Individuals with Disabilities Act of 1988 [Tech Act]

- AT service
  - directly assisting an individual with a disability in the selection, acquisition, or use of an assistive technology device.
  - Technology-related Assistance for Individuals with Disabilities Act of 1988 [Tech Act]
Assistive Technology, AAC, and ASD

- Augmentative-Alternative Communication (AAC)
  - area of research, clinical and educational practice
  - compensate for temporary or permanent impairments, activity limitations, and participation restrictions of persons with severe disorder of speech-language production and/or comprehension
  - includes spoken and written modes of communication (e.g., listening, speaking, reading, writing)

Assistive Technology, AAC, and ASD

- AAC
  - Augmentative Communication: support of existing speech-language using aided or unaided systems, including support of comprehension
  - Alternative Communication: developing use of a nonspeech symbol system using aided or unaided systems that takes the place of verbal speech-language
  - AAC systems and other visual supports are used to increase comprehension and understanding of the environment and task expectations
Visual Schedule:
Where Should I Be? What will I do?

PODD Communication Book: Requesting Letters in Name & What’s Next
Visual Supports: Comprehending the Environment to Answer Specific Questions

- Visual Supports used for:
  - Telling the child where she will be and what she will do
    - First child not totally independent in use of visual schedule; required physical and verbal prompts
    - Second child a little more independent in use of visual schedule; clinician bringing schedule to her
  - Telling child when activity was over; both used an all done symbol to move back to the schedule
  - Communication: PODD communication book

Visual Supports: Comprehending the Environment to Answer Specific Questions

- Communication: PODD communication book
  - Visual symbols in book used to facilitate verbal language by working on requesting
  - Aided language modeling was used by the clinician to model the use of the book for requesting
  - Matching task used for spelling child’s name with the letters provided on the sheet and child matching smaller letters to each letter in her name; child was finding the letters on her alphabet page in the PODD book
  - Child using single word responses at this time (e.g., letter name)
Visual Schedule:
Where Should I Be? What will I do?

- Independent use of his visual schedule
- Child moved independently from a computer task with a number system that you will see shortly
- Looked at schedule
- Turned and walked toward table where “tiles” activity was
- The only prompts were visual prompts built in to the tasks (e.g., number system, tasks occurring within a structured environment)

Visual Supports: Comprehending the Environment to Answer Specific Questions
**Dynamyte AAC Device:**  
**Responding to Questions**

- Power Point book created with an interest area (i.e., Harry Potter)
  - Age appropriate
  - Provided a what to work on answer verbal questions related to the story but only through visual supports for communication
- Page of Dynamyte created with characters, settings related to the book
- Allows student to begin to understand information that needs to be provided when asked various questions
Writing with Classroom Suite:
Initial Sounds in Words

Classroom Suite: intervention tool using Universal Design for Learning (UDL): systematic, explicit instruction and flexibility to create a variety of differentiated learning tasks in areas of listening, speaking, reading, writing and math

Current task: visual supports to facilitate independent writing for a 4 year old child while reinforcing sound-letter correspondence and initial sounds of words

Number system: tells child “How many do I have to do? How will I know when I am done?”
Four primary components of AAC must be considered:

- **Aids**: whether or not some type of external tool is used
- **Symbols**: how messages will be represented
- **Techniques**: how messages will be accessed and transmitted by the individual
- **Strategies**: strategies to facilitate message formulation

### Aids:

- **Unaided**: no external tool required and includes vocalizations, word approximations, gestures, facial expressions, manual signs
- **Aided**: external tools required which may be non-electronic or electronic
  - **Nonelectronic**: Communication symbols, boards and books, including PECS as well as visual schedules, social stories and a variety of other visual supports
Aided then Unaided Communication: Requesting “My Turn”

- Visual line drawn symbols on a sentence strip to facilitate the use of “my turn” (aided system)
- Later in activity child spontaneously used verbal request “my turn” (unaided system)
Combining Single Symbols: Requesting Snack

- Child using a modified Picture Communication Exchange System (PECS) (aided system)
  - Child selected symbols to put onto the sentence stripe
  - Child pointed to and spoke the request
  - Later child would use her fingers as she spoke the request (touching each of four – five fingers for each word in the request: "I want Pepsi please." or "I want more Pepsi please.")
- Both systems are visual supports for communication
Assistant Technology, AAC, and ASD

- Electronic:
  - Elementary devices: BIGmack, step-by-step, GoTalk, CheapTalk, TechTalk
  - High Tech devices: Dynavox systems, Prentke-Romich system, computers with Boardmaker & Speaking
    Dynamically Pro, iPad with AAC apps (over 110 AAC apps)

BIGmack Single Step Communicator:
Providing Repeated Line
**BIGmack Single Step Communicator:**

- Child using a single step communication (elementary electronic aided device) and a PODD communication book (nonelectronic aided device) to facilitate her participation in the reading activity.
- Child waited and anticipated her role in the reading.
- Requested using a 3 symbol + verbal approximation (e.g., I want ____.)
- It took approximately 4 months of modeling the use of the device in this activity using aided language stimulation before child began to use the pointing and verbal approximations.

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**Dynamyte AAC Device:**

- Navigating System & Naming "Bugs"
Dynamyte AAC Device: Navigating System & Naming “Bugs”

- Child using her electronic high technology device to provide information for the clinician
- Device has numerous pages with visual symbols to support her communication skills
- Using another high interest area of hers (i.e., bugs)
- Demonstrates navigation abilities as she moved from her current “bug” page to a school page, then a science page where she knew she had the name of the “bug”

Assistive Technology, AAC, and ASD

- Symbols: how messages are represented; must be meaningful to individual
  - Unaided: signs, gestures, facial expression, vocalizations, word approximations and words
  - Aided: real objects, pictures, line drawings, orthography (range from transparent to opaque)

Unaided Symbols

Aided Symbols
Assistive Technology, AAC, and ASD

- Symbols range from transparent symbols such as objects to abstract symbols such as traditional orthography.
- Each individual should be assessed to determine the level of symbol that is most appropriate, especially for the visual schedule since independence is critical.

Hierarchy of symbols from transparent to opaque: systematically assess child’s ability to match, comprehend, and use symbols for productive purposes.
Iconicity Hierarchy
Matching Task for Assessment

Object Cup
Object Glasses
Object Ball
Object Pencil
Object Spoon

Easiest: matching more abstract item to several concrete items

Object Spoon

More Difficult: matching more more concrete item to several abstract item

Iconicity Hierarchy
Comprehension Task for Assessment

Systematically assess understanding of each level of the hierarchy (i.e., objects, photographs, line drawings, and printed words)

Comprehension: Show me____. Point to ____.
• Begin with a level where you believe child can respond (e.g., objects, photographs, line drawings, orthographic symbols)
**Iconicity Hierarchy**
*Production Task for Assessment*

- Systematically assess productive use of each level of the hierarchy
  - Naming task
  - Requesting task
  - Providing information: responding to questions in which they have to use the symbol for productive use

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**Iconicity Hierarchy: Bingo**

Bingo Game: Assess comprehension, Production, & Matching
- Use different bingo boards at each level of the hierarchy (i.e., photos, line drawings, printed words)
- Use cards with different levels of the hierarchy represented
- Adult can assess all three levels during game
Assistive Technology, AAC, and ASD

- Techniques: how symbols will be accessed and transmitted by individual
  - Direct selection: accessed/transmitted directly using body parts, eye gaze, and other types of pointers
  - Indirect selection: accessed/transmitted indirectly through scanning and switches

Direct Selection

Indirect Selection

Direct Selection: Full Prompt-Pointing Response
Direct Selection: Full Prompt-Pointing Response

- Clinician used aided language modeling and child had been using some single symbol requests.
- For "I want help." Clinician used full physical prompt on "I" then child pointed to and used verbal approximations for "want help."
- For "I want juice." child spontaneously pointed to juice and clinician expanded response by physically prompting child to use "I want" then she spontaneously pointed to juice.
- Clinician would rotate between providing only aided language stimulation without prompt with the prompt.

Direct Selection: Combining Symbols for Describing
Direct Selection:  
Combining Symbols for Describing

- Using computer aided learning which sets up a positive learning experience for this child
- Laureate Learning Systems: Prepositions
- Previously worked on comprehension then single word production of prepositions then prepositional phrases (e.g., “in the wagon”) using visual supports
- Communication board facilitates use of descriptive sentence (e.g., “The robot is on the box.”)
- Continue to use the number strips to let child know how many he has to complete and when he is finished

Indirect Selecting:  
Single Switch Scanning
Indirect Selecting: Single Switch Scanning

- Indirect selection using scanning is not an access technique we have to use with most of our children on the spectrum.
- However, you need to know that this technique for access is available.
- Student uses a high-level electronic device with a keyboard and single-switch automatic scanning.
- Starts scanning by selecting her switch.
- Selects item by selecting her switch.
- Also uses “word prediction”... words are predicted on the basis of what letters she is selecting (strategy to facilitate communication).

Assistive Technology, AAC, and ASD

- Strategies: ways of enhancing message timing, assist grammatical formulation, and enhance communication rate.

Word Prediction
Child with autism using a word wall and word prediction to facilitate writing task
- Child has listened to a narrative/story
- Responded to questions over the story using visual supports
- Reordered the pictures of the narrative
- Retold the story primarily using single words
- Now he is asked to write a sentence about one part of the story
  - Word wall for choices of words to use for the sentence
  - Word prediction using Co Writer