

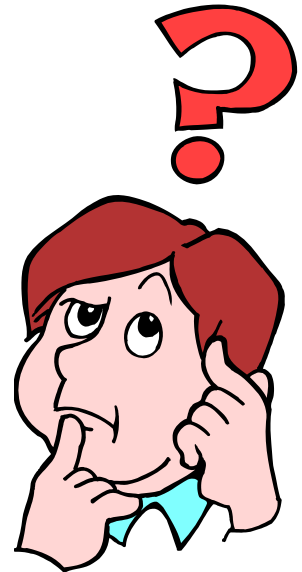
**Finding, Understanding, and Using  
Research about Assistive  
Technology to inform your Practice,  
Part 1**

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# Why we need to know about research

- Guide decision making
- Guide purchasing
- Set goals
- Compare results



# From Final Regulations:

- 300.320 (a) (4) A statement of the special education and related services and supplementary aids and services, **based on peer-reviewed research to the extent practicable**, to be provided to the child, or on behalf of the child, and a statement of the program modifications or supports for school personnel that will be provided to enable the child--

# Types of research

- Teacher surveys about knowledge, attitude, etc.
- AT user surveys
- Reviews/synthesis of research
- Application research
- Outcomes research



# Survey shows: Need for training

- Teachers who receive 40 or more hours of training about AT report that AT is essential to students' daily activities.
- Teacher who have not received training about AT report that AT is not important and are not confident in identifying and using AT with students.

– Ashton, Lee & Vega (2005)

# Synthesis of Research shows: Quality of Research in a specific area

- Reviewed 256 research articles about AT for VI
- Found only two that used true research design. They were both single subject design.
- They found, “A large percentage of the literature consists of anecdotal evidence of the impact of AT without evaluating the effectiveness of AT”.

– Kelly, S. & Smith, D., (2011). Impact of AT on Educational Performance of Students with Visual Impairments.

# Secondary analysis shows: Big picture

- AT not provided to majority of students with VI who could benefit from it.
- AT more likely to be provided if parents are highly involved.
- AT more likely to be provided if student is in residential placement.
  - Kelly, S. (2009). Use of AT by Students with VI: Findings from a National Study.

# Application studies

- Can use of cognitive mapping improve grasp of critical information?
- High school students with behavior outbursts and LD in reading
- Use of Inspiration software changed scores on chapter quizzes from <15% to >75%
- Decreased off task behavior and reliance on teacher for help

– Blankenship, Ayers, & Langone, (2005).

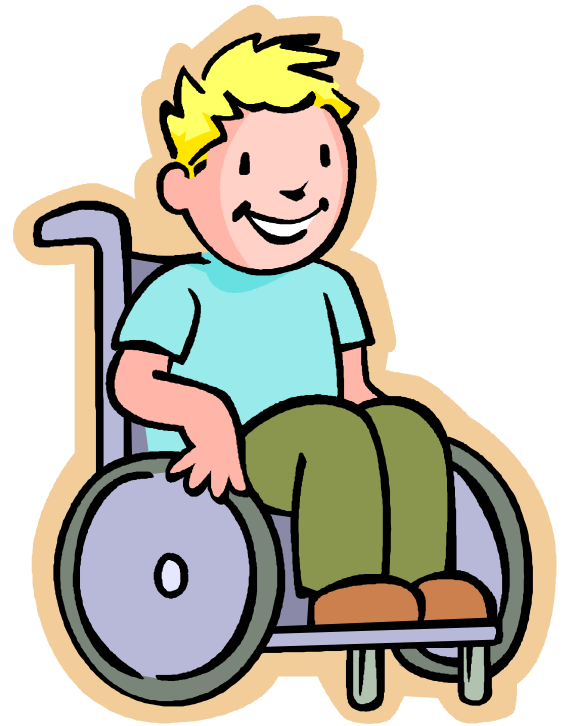


# Using Evidence to Strengthen Education Investments

- ESEA requires “at least one study” to provide *strong evidence, moderate evidence, or promising evidence*.
- SEAs and LEAs should look for interventions supported by *strong evidence or moderate evidence in a similar setting and/or population to the ones being served*.
- What Works Clearinghouse now accepts single subject design studies.

# Critical Issues in the Use of AT with Students with Severe Disabilities

- Readiness/prerequisite skills
- Interference with acquisition of skills
- Justification of expense



# AT can improve Quality of Life

- AT has the potential to improve the quality of life for individuals with severe disabilities
- Both low tech and high tech:
  - e.g., slant board, pencil grips, positioning equipment
  - e.g., laptop, iPad, voice-output devices

– Reichle, (2011).

# AT Critical for Students with Severe Disabilities

- Evidence about AT often woven into more general research about teaching/learning;
- There is research evidence to support broad application of AT for this population;
- The largest body of research is on the application of AAC to quality-of-life improvements; and
- Research supports teaching both low- and high-tech AAC.

– Browder, Wood, Thompson, Ribuffo, (2014).

# Much research on AAC

Evidence based practices for teaching AAC to students with severe disabilities, includes

- using naturalistic teaching,
- using a system of least prompts,
- training peers and teachers to use the devices,
- teaching multiple modes of AAC,
- teaching a single symbol for a variety of purposes, and
- introducing the use of communication devices early in a child's life.

-Calculator & Black, (2009)

# Research supports AAC use

- Literature reviews suggest strong evidence for the use of AAC for students with severe disabilities
  - Calculator & Black, (2009); Johnston, Reichle, & Evans, (2004); Reichle, (2011).
- **Disproved** belief that persons with significant levels of cognitive disabilities could not benefit enough from communication devices to justify the cost
  - (Light, Roberts, Dimarco, & Greiner, 1998; McNaughton, Light, & Arnold, 2002; Ronski & Sevcik, 1997; Ronski & Sevcik, 2000).

# Voice output does **not** decrease other communicative behaviors

1. Study investigated the potential for use of AAC to decrease other communication behaviors such as gestures, vocalizations and words.
2. There was no evidence that use of a VOCA decreased the frequency of gestures, vocalizations or word use.
3. Increases were seen for all children for one or more of the other communicative responses when they had access to a VOCA.

– Schepis, Reid, Behrmann, & Sutton, (1998)

# Use of AAC of any type does not prevent development of speech

- A thorough meta-analysis of the literature;
- Speech production before, during, and after introduction of AAC;
- Determined AAC use did not slow or prevent the development of spoken language;
- In fact speech production increased in 89% of the subjects.

– Millar, Light, and Schlosser (2006)



# Use of AAC to develop speech

- AAC Intervention with young children with developmental delay actually facilitates the development of speech better than spoken language intervention alone.
  - 68 toddlers with DD randomly assigned
  - AC-input, AC-output, Spoken Language only
    - Ronski, Sevcik, Adamson, Cheslock, Smith, Barker, & Bekeman (2010)

# And more....

- Augmented input and output using SGD resulted in increases in the child's communication attempts and the development of a few spoken words.
  - Sevcik, Momski, & Adamson (2004)
- Training to use an SGD improved comprehension skills for 2 young children with severe intellectual disabilities
  - Brady (2000)

# Website resources for AAC

- <https://smartysymbols.com/wil-aac-hinder-speech-separating-truths-from-myths/>
- <https://speechdudes.wordpress.com/freebies/articles-and-abstracts/>

# Greatest AAC Challenge: Communication Partners

Communication partner tendencies:

- Dominating interactions;
- Asking predominantly yes/no questions;
- Taking the majority of conversational turns;
- Providing few opportunities for client initiation or response;
- Interrupting communicative attempts; and
- Focusing disproportionately on the technology
  - Binger et al., (2010); Kent-Walsh et al., (2010) Cumley & Beukelman, (1992); Light, Collier, & Parnes, (1985)

# Focus on Communication Partners

- Need to:
  - Model effective AAC use;
  - Use an “expectant delay” (wait for the student to process, plan, and complete a response);
  - Ask “Wh—” questions (to prompt higher level expression)
  - Use verbal prompting (specify what to do);
  - Reinforce communicative attempts.
    - Kent-Walsh & Binger (2013)  
[https://www.researchgate.net/publication/260124160\\_Fundamentals\\_of\\_the\\_ImpAACT\\_Program](https://www.researchgate.net/publication/260124160_Fundamentals_of_the_ImpAACT_Program)

# Technology Mediated Self-Prompting for Daily Living Skills

- Meets standards for EBP for adolescents and adults with disabilities.
  - Most targeted buying, preparing, and consuming food.
  - Some focused on managing personal finances, managing a household, and buying and caring for clothing.
  - No studies reported on:
    - caring for personal needs,
    - Demonstrating relationship responsibilities,
    - Exhibiting responsible citizenship,
    - utilizing recreational facilities, and
    - engaging in leisure.
- Cullen & Alber-Morgan (2015)

# AT for Self-Management

- Picture cues presented on Palmtop more effective than pictures presented manually on cards.
  - Lancioni, O'Reilly, Seedhouse, Furniss, & Cunha, (2000); Lancioni, Vanden Hof, Boelens, Rocha, & Seedhouse, (1998); Lancioni, Van den Hof, et. al., (1999).
- Personal computer system with auditory prompts and text more effective than traditional written schedule
  - Davies, Stock, and Wehmeyer, (2002a)
- AT is effective as a self-management tool.
  - Mechling, (2007).

# Other Tech

- Use of adapted robots increased social and language skills in children with cerebral palsy,
- And resulted in an increased attention span in academic tasks.

– Cook, Adams, Volden, Harbottle & Harbottle (2011)



# Impact of Power Mobility

- For young children who are not learning to walk at the same age as peers, power mobility affords opportunities to engage in more independent exploration of their environment, as compared with focusing exclusively on remediation of limited mobility, which can delay independent exploration

# Importance of Exploration

- Spatial searching
- Spatial problem solving
- Social and exploratory behaviors
- Visual tracking
  - Gustafson, (1984); Yan, Thomas, & Downing, (1998).

# Power mobility does not prevent walking

- None of the research has substantiated a commonly held fear that children will regress in motor skills due to use of power mobility
  - Bottos, Bolcati, Sciuto, Ruggeri, & Feliciangeli, (2000); Jones, McEwen, & Hansen, (2003).

# When to begin?

- It depends!
- Multiple studies have demonstrated that children less than 2 years of age can learn to use power mobility

-Butler, Okamoto, & McKay, 1984; Jones, McEwen, & Hansen, 2003; Kangas, 1997; Zazula & Foulds, 1983)



# Readiness for Power Mobility

- Different opinions exist about how to assess a child's readiness for and to provide training in the use of a power mobility device.
- No tool currently exists for determining readiness.
- Kangas (1997) recommended considering all children who can't ambulate by the time typically developing peers are walking as candidates for powered mobility.
- Practice in familiar, natural environments, meaningful activities and familiar routines promotes child learning better than block practice in an unfamiliar setting
  - (Kangas, 1997).

# Parent's Perspectives on Power Mobility

- Parents reported: increased child independence and personal control, increased child engagement in meaningful life experiences, and positive effect on others' attitudes toward the child
  - (Berry, McLaurin, & Sparling, 1996; Wiart, Darrah, Cook, Hollis, & May, 2003).
- Also that the use of the power wheelchair increased their child's confidence, motivation, and happiness and reduced frustration
  - (Home & Ham, 2003).

# Research supports AT Use

- For students with severe disabilities, AT can support:
  - Mobility,
  - Positioning,
  - Daily living,
  - Hearing,
  - Vision,
  - Communication, and
  - Instruction
    - Spooner, Browder, & Mims, (2011b).



**Access to technology is critical for people with Intellectual Disabilities to fully engage in the everyday life of our society.**

– *Report to the President: Leveling the Playing Field: Improving Technology Access and Design for People with Intellectual Disabilities (2015)*



# AT in the Workplace

- AT was successful for increasing work performance of individuals with ID in respect to productivity, navigation, time management, and task completion -Morash-Macneil, Johnson, & Ryan (2017)
- Prompting by AT more effective than low tech methods- Cullen, Alber-Morgen, & Sheila (2015)
- AT results in increases in accuracy, independence, and generalization  
– Sauer, Parks, & Heyn. (2010)

# Survey of AT Use

- Majority of clients were not using AT devices to support their needs in identified areas of living (home living, community living, life-long learning, employment, health & safety, social, protection & advocacy) . In four of the seven areas, at least 60% of clients were not using AT devices as part of their support system.

– Bryant, Seok, Ok, & Bryant, (2012).

# What lies ahead?

- Virtual Reality
- Robotics
- Brain-Computer interface



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