Improving Literacy Outcomes for Students with Complex Communication Needs

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Importance of literacy skills

• Literacy skills
  – Enhance cognitive development & advance learning
  – Allow fuller participation in education
  – Increase access to employment opportunities
  – Facilitate use of technologies (e.g., Internet)
  – Support social relationships (e.g., email, texting)
  – Foster personal expression (e.g., blogs)
  – Allow access to enjoyable leisure pursuits

Students with complex communication needs

• Some students have complex communication needs (CCN) resulting in limited or no speech
  – E.g., students with autism spectrum disorders, cerebral palsy, developmental apraxia, Down syndrome, multiple disabilities
• For students with CCN, literacy skills assume even greater importance
  – Expand communication options significantly
  – Enhance self-esteem
  – Increase perceptions of competence
  – Provide a visual support for language learning
Literacy outcomes for students with CCN

- Unfortunately, many students who have CCN
  - do not have basic literacy skills or
  - are underachieving in literacy compared to their typically developing peers
- These poor outcomes result from
  - Low expectations for these students
  - Lack of appropriate evidence-based instruction adapted to meet the needs of individuals who have limited or no speech

Goals of presentation

- Share evidence-based intervention designed to enhance the literacy skills of individuals with complex communication needs / limited speech
  - Describe intervention
    - Target skills, instructional procedures, materials
    - Share case examples to illustrate intervention and outcomes
- Project is part of a large federally-funded research grant
  - Funded by the National Institute on Disability and Rehabilitation Research (NIDRR) as part of grant # H133E030018

Components of effective evidence-based literacy intervention

- Sufficient time allocated for instruction
- Appropriate instructional content
- Appropriate instructional procedures
- Adaptations to allow active participation of individuals with limited or no speech
- Positive rapport and motivating instruction
Sufficient time allocated for literacy instruction

- Current best practices recommend
  - All students in grades 1-3 receive at least 90 minutes of literacy instruction per day
  - At risk students should receive an additional 40-60 minutes of instruction per day
- Ensure sufficient time is allocated for literacy instruction for students with CCN
  - Start literacy instruction at early age
  - Ideally provide instruction on a daily basis
  - However, our research demonstrates that significant literacy gains can be achieved
    - Even if the amount of instruction is less than ideal
    - Even with older students

Appropriate instructional content

- Instructional content based on recommendations of National Reading Panel (2000)
  - Reading to students & talking about texts
  - Phonological awareness skills
    - Sound blending skills
    - Phoneme segmentation skills
  - Letter-sound correspondences
  - Decoding skills
  - Sight word recognition skills
  - Reading and understanding books / other texts
  - Early writing skills

Appropriate instructional procedures

- Instructional procedures /teaching methods based on recommendations of National Reading Panel (2000)
  - Direct instruction in basic skills
  - Frequent opportunities to apply these skills in the context of meaningful, motivating literacy activities
Appropriate instructional procedures
Direct instruction in basic skills

- Model
  - Instructor demonstrates the skill
- Guided practice
  - Instructor provides scaffolding support to help student perform skill successfully
  - Gradually fades scaffolding support
- Independent practice
  - Student performs skill independently
  - Instructor provides feedback

Appropriate instructional procedures
Direct instruction in basic skills

- Feedback
  - If student performs skill correctly
    - Instructor provides positive feedback
  - If student is incorrect
    - Instructor directs student’s attention to error
    - Models the correct response
    - Provides guided practice for student to ensure success
    - Provides additional opportunities for independent practice

Appropriate instructional procedures
Applying skills in meaningful literacy activities

- Provide frequent opportunities to apply skills in meaningful literacy activities
  - Demonstrate purpose of instruction
    - Establish that reading/writing are meaningful & fun
    - Increase motivation for learning to read & write
  - Enhance generalization of skills
    - Encourage generalization to new materials/contexts
    - Provide additional opportunities to practice skills
      - Build fluency in basic skills
      - Practice integration of skills required to read and write
Adaptations for students who have limited or no speech

- Adapt procedures to accommodate unique needs of individuals who have limited or no speech
  - Eliminate the need for spoken responses
  - Modify tasks
    - Provide alternative response modes
      - pictures, letters, words, signs as response options
  - Provide insight into areas of difficulty to support instructional decisions
    - Systematic foils and error analysis
- Compensate for lack of oral production/rehearsal
  - Model oral production/rehearsal for student
  - Encourage internal subvocal rehearsal – “say it in your head”

Positive rapport & motivating instruction

- Build intrinsic motivation for learning
- Ensure rapport is positive & instruction is motivating
  - Build on student strengths
  - Capitalize on student interests
  - Develop positive relationship
    - Focus on instruction/ignore extraneous behavior
    - Celebrate student success

First steps in literacy intervention

- Target the following skills
  - Read interesting, motivating books to the student & talk about the books
  - Teach phonological awareness skills
    - Sound blending skills
    - Phoneme segmentation skills
  - Teach letter sound correspondences
**Instruction in sound blending**

- **Goal**
  - The student will blend phonemes presented orally in sequence & determine the target word

- **Task**
  - Present 4 or more AAC symbols & label orally
  - Say the target word orally with each phoneme extended 1-2 seconds
  - Student must blend the phonemes & point to the AAC symbol or say/sign the word

**Instruction in phoneme segmentation**

- **Goal**
  - The student will match a target phoneme presented orally to the AAC symbol that starts with the phoneme

- **Task**
  - Present 4 or more AAC symbols & label orally
  - Say target phoneme e.g., /b/
  - Show letter (e.g., b) at the same time
  - Student must point to the AAC symbol of the word that starts with the target phoneme or say/sign the word

**Instruction in letter sound correspondences**

- **Goal**
  - The student will match a target phoneme presented orally to the correct letter

- **Task**
  - Present 4 or more letters
  - Say the target phoneme e.g., /b/
  - Student must point to the letter that represents the target phoneme

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Progression of instruction in letter-sound correspondences

- Teach letter sounds, NOT letter names
- Introduce letters/sounds incrementally in the following sequence:
  - a, m, t, p, o, n, c, d, u, g, h, f, i, s, b, l, e, r, w, k, x, v, y, z, q
  - Teach lower case letters first
  - Teach letters that are used most frequently first
  - Separate letters that are similar
  - Teach short vowels before long vowels
  - Teach clusters/blends once most single letter-sound correspondences are mastered
  - Teach upper case once lower case is mastered

Next steps in literacy instruction

- Once student
  - Is competent with sound blending and
  - Knows approximately 6-7 letter-sound correspondences
- Teach
  - single word decoding
  - shared reading activities
  - sight word recognition skills
- Continue to
  - Teach new letter sound correspondences; review known ones
    - As student learns new letters and sounds, introduce new decoding words
  - Practice phonological awareness skills; build fluency
  - Read to the student & talk about the text

Instruction in single word decoding

- Goal
  - The student will decode a written word & match it to the correct AAC symbol or say/sign the word
- Task
  - Present 4 or more AAC symbols
  - Present the target written word
  - Student must read the word and point to the AAC symbol of the target word or say/sign the word
Instruction in shared reading

- Provide opportunities for students to apply decoding skills during shared reading
  - Highlight target words in the text for the student
  - Read sentence out loud and track words with finger; pause at the highlighted target word
  - Student must decode highlighted target word and
  - Select the AAC symbol of the target word from communication display or SGD
- Say or sign the word
- Gradually increase the number of target words until students are reading full sentences

Instruction in sight word recognition

- Teach sight word recognition
  - Highly motivating words that are too complex to decode
  - Irregular words that are frequently occurring
- Goal / task
  - Present 4 or more written words
  - Say the target sight word
  - Student must select the correct written word
  - Use this task if sight words are not easily imaged

Next steps in literacy instruction

- Continue to expand decoding skills
  - Gradually increase breadth of vocabulary
    - Introduce longer words
      - Regular cvcc words (e.g., wind, fast)
      - Regular ccvc words (e.g., stop, flag)
  - Introduce simple decoding rules
    - Silent e / long vowel
- Continue to expand sight word recognition skills
  - High interest words that are difficult to decode
  - High frequency words that are irregular / difficult to decode
- Provide opportunities to apply decoding & sight word skills during shared reading
  - Gradually increase the number of target words until students are reading full sentences
Building reading comprehension

• Reading comprehension is complex
  -- track through sentence from left to right
  -- decode or recognize by sight each word in sequence
  -- access meaning of words
  -- process all words in sequence to derive meaning of sentence (or longer text)
  -- relate meaning to prior knowledge /experience to comprehend text

• Introduce reading comprehension strategies
  -- E.g., Summarization strategy
  -- Generating questions
  -- Answering questions

Ensure basic comprehension skills

• Goal
  -- Student will
    • decode or recognize by sight each word in sentence in sequence
    • access meaning of words
    • process all words in sequence to derive meaning of sentence (or longer text)

• Task
  -- Present 3 or more pictures /illustrations
    • Choose foils carefully
  -- Present the written text
  -- Student must read the sentence and point to / select the correct picture

• Alternative Task
  -- Student summarizes text using speech, sign, or AAC symbols/pictures
    • Who? What happened?

Answering reading comprehension questions

• Student reads the text
  -- Initially student reads one page; answers question
    • Reduce working memory demands
  -- Later reads several pages; then answers questions

• Instructor asks appropriate questions
  -- Start with simple factual questions
  -- Later introduce more complex inference questions

• Student may respond via
  • Speech
  • Signs
  • Pointing to pictures or written choices /multiple choice questions
  • Typing answers /using letter cards
Building writing skills

- Writing skills are critical in today’s society
  - Increased importance with advent of technology
- Writing should be an integral part of literacy instruction
  - Often neglected
  - Teach writing skills in parallel to reading skills
- Learning to write is more difficult than learning to read
  - Writing imposes additional working memory demands
    - Requires learner to dynamically encode (Ehri, 2000)

Skilled writing

- Skilled writing requires integration of
  - Skills in narrative, expository, persuasive or other genres
  - Semantic, syntactic, & morphological skills
  - Phoneme segmentation
  - Letter sound correspondences
  - Sight word skills/spelling of irregular words
  - Keyboard knowledge (or handwriting skills)
  - Knowledge of conventions of writing
    - e.g., capitalization, punctuation

Writing instruction

- Teach basic skills
  - Phoneme segmentation skills
  - Letter-sound correspondences
  - Keyboard knowledge
  - Encoding skills – single words
- Provide opportunities to apply skills in meaningful writing activities
  - Telling stories
    - Use photos or pictures as visual supports
    - Start with familiar motivating experiences
  - Publishing books
    - Use the books for reading activities
    - Share books with others
The art and science of literacy intervention

• The science of literacy intervention
  – Implement effective evidence-based instruction
    • Sufficient time allocated for instruction
    • Appropriate instructional content / skills
    • Effective instructional procedures
    • Adaptations to allow active participation of individuals with autism who have limited speech
    • Monitor effectiveness with each student
    • Adapt as required to ensure individual success

• The science alone is not enough
• The “art” of literacy intervention is critical
  – the belief and the commitment to the right of all individuals to have the opportunity to learn & seek their full potential

Additional resources

• Websites
  – Light, J. & McNaughton, D. Literacy instruction for learners with autism, cerebral palsy, Down syndrome and other disabilities. http://aacliteracy.psu.edu
  – AAC at Penn State http://aac.psu.edu

• Webcasts

• Publications
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