The AAC-RERC Webcast Series

Duke University, Temple University, Penn State University, Children’s Hospital at Boston, University of Nebraska at Lincoln, Augmentative Communication Inc., State University of New York at Buffalo

Maximizing the Literacy Skills of Individuals Who Require AAC

Janice Light and David McNaughton
The Pennsylvania State University

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Penn State Literacy Team

- Megan Amrein
- Julia Birmingham
- Samantha Horochak
- Jennifer Jansen
- Lauren Karg
- Line Kristiansen
- Josh Mason
- Jennifer May
- Leora Miller
- Emily Quinn
- Christina Weaver
- Marissa Weyer
- April Yorke

Literacy skills are critically important for individuals who require AAC

- Education – learning and assessment
- Employment
- Social contact
- Daily living
- Organizational aids
- Internet access
- Self expression
- Communication – increased breadth, generative capacity
- Competence/ self esteem

Literacy outcomes for individuals who require AAC

- Currently, the majority of individuals who require AAC do not have functional literacy skills.
- Some individuals who require AAC do develop competencies in reading and writing.
  - A small number have high level literacy skills (Koppenhaver, Evans, & Yoder, 1991)
  - Many demonstrate difficulties with literacy (Kelford Smith, Thurston, Light, Parnes, & O’Keefe, 1989).
  - Many are “underachieving” in literacy skills (Berninger & Gans, 1986).

Importance of evidence-based instruction

One of the major factors that has contributed to poor literacy outcomes is the lack of evidence-based instruction adapted to meet the needs of individuals who require AAC
Goals of the webcast

- Share the results of a research study that evaluated the effects of adapted instruction on the literacy skills of individuals who use AAC
  - Describe the literacy instruction
  - Share case examples to illustrate intervention and outcomes
- Multiple baseline across participants
  - 8 participants (3 to 54 years old)

How can we better support literacy learning?

- Effective evidence-based instruction is required to enhance literacy skills of individuals who require AAC
  - Appropriate instructional content
  - Appropriate instructional procedures
  - Adaptations to allow active participation of individuals who cannot produce spoken responses

Instructional program

- Focuses on the transition to conventional literacy skills (reading and writing)
- Is grounded in literacy research in two areas
  - Literacy instruction for children at risk
    - E.g., The National Reading Panel, 2000
  - Adaptations for individuals who require AAC
    - E.g., Fallon et al., 2004; Millar et al., 2004; Light, McNaughton, et al., 2004

Appropriate instructional content

- Read interesting texts to the student
  - Regularly read to the student
  - Choose texts that are interesting
  - Establishes the motivation / meaningfulness of reading
  - Talk about the text with the student
    - Relate the story to the student’s experiences
  - Ensure the student has access to AAC
  - Encourage the student’s active participation
    - Talking about the story
    - Asking questions
    - Filling in lines
  - Build the student’s comprehension
  - Provide repeated readings to build competence

Appropriate instructional content

- Build language skills
  - Learning to read and write depends on a foundation of language skills
  - Need to build semantic and syntactic knowledge
    - Develop vocabulary
      - Not just functional vocabulary but also vocabulary used in books
    - Teach syntax and morphology
Appropriate instructional content

- Phonological awareness skills
  - Initial phoneme segmentation
  - Sound blending
- Letter-sound correspondences
- Early reading skills
  - Single word decoding
  - Decoding in context of shared reading
- Early writing skills
  - Dictating/telling stories
  - Writing stories
  - Sound spelling

Appropriate instructional procedures

- Instruction is based on principles of effective instruction (Ellis et al., 1994)
  - Provide direct, explicit instruction in basic skills
    - Model the skill for the student
    - Prompt the student
      - Provide guided practice, helping the student do the skill
    - Check the student’s performance
      - Provide opportunities for independent practice
      - Provide feedback

Appropriate instructional procedures

- Provide scaffolding support initially
  - Gradually fade support as student develops competencies
- Provide repeated opportunities for student to practice skills
  - Ensure active involvement

Appropriate instructional procedures

- Incorporate skills into meaningful literacy experiences
  - Use meaningful motivating materials
  - Have fun

Adapted instruction for individuals who require AAC

- Adapt procedures to accommodate unique needs of individuals who require AAC
  - Eliminate the need for spoken responses
  - Provide alternative response modes
    - e.g., point to AAC symbols, eye point to symbols, select symbols on SGD
  - Provide scaffolding support for the student
    - e.g., provide oral production/rehearsal for student, provide access to speech output
  - Provide systematic data collection
    - Use error analysis to identify specific difficulties

Literacy instruction - First steps

- Teach phonological awareness skills
  - Initial phoneme segmentation
  - Sound blending
- Teach letter-sound correspondences
- Also critical to
  - Read to student regularly
  - Continue to build language skills
    - Vocabulary and syntax
Phonological awareness
- An individual's understanding or awareness of the sound structure of language
  - the ability to notice, think about, and manipulate the phonemes of words
  - Torgesen, Wagner, & Rashotte, 1994
- Phonological awareness tasks include:
  - segmenting the sounds of words
  - blending individual sounds to form words
  - rhyming
  - etc.

Instruction in segmenting initial sounds
- Goal
  - The student will match a target phoneme presented orally to the correct picture of a word that starts with the target phoneme
- Task
  - Present 4 pictures & label orally
  - Say target phoneme in isolation e.g., /b/
  - Show letter (e.g., b) at the same time
  - Student must point to the picture that starts with the target phoneme

Specific instructional techniques
- Introduce task
- Model task for student
- Provide guided practice
  - Complete the task with the student
- Provide independent practice
  - If correct, confirm and provide encouragement
  - If incorrect, implement correction procedure
  - Model the correct answer for the student
  - Prompt the student
  - Re-check
- These instructional procedures are used across all skills

Example of instruction in segmenting initial phonemes
- Goal
  - The student will match the phoneme /t/ to the picture of the word that starts with /t/
- Task
  - Present four pictures to the student and label them
  - up, tag, net, pop
  - Say the target phoneme /t/ and show the letter t
  - The student must point to the picture that starts with /t/
  - tag

Example of instruction in segmenting initial phonemes
- Goal
  - The student will match the phoneme /t/ to the picture of the word that starts with /t/
- Task
  - Present four pictures to the student and label them
  - up, tag, net, pop
  - Say the target phoneme /t/ and show the letter t
  - The student must point to the picture that starts with /t/
  - tag
Instruction in blending sounds

Goal
- The student will blend 3 target phonemes presented orally in sequence (with each phoneme extended 1-2 seconds), determine the target word, and then point to the correct picture of the target word

Task
- Present 4 pictures & label orally
- Say the target word orally with each phoneme extended 1-2 seconds
- Student must blend the phonemes and point to the picture that starts with the target word

Example of instruction in blending sounds

Goal
- The student will listen to the phonemes /t o s/ with each phoneme extended 1-2 seconds, blend them to determine the word (toss), and then point to the picture of toss

Task
- Present four pictures and label them
  - top, toss, tap, boss
- Say the phonemes /t o s/ orally with each phoneme extended 1-2 seconds
- The student must blend the phonemes and point to the picture for toss

Example of instruction in blending sounds

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- Present four pictures and label them
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- Present four pictures and label them
  - top, toss, tap, boss
- Say the phonemes /t o s/ orally with each phoneme extended 1-2 seconds
- The student must blend the phonemes and point to the picture for toss

Letter-sound correspondences

An individual's understanding of
- The sounds that correspond to specific letters
- The letters that correspond to specific sounds

Involves
- phonological processing and
- orthographic processing

Instruction in letter-sound correspondences

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

Task
- Present 4 letters
- Say the target phoneme e.g., /b/
- Student must point to the letter that goes with the target phoneme
Example of instruction in letter-sound correspondences

- **Goal**
  - The student will match the phoneme /t/ (or /a/ or /s/) to the letter t (or a or s)

- **Task**
  - Present four letters to the student
  - Say the target phoneme /t/
  - The student must point to the letter t

Example of instruction in letter-sound correspondences

- **Goal**
  - The student will match the phoneme /t/ (or /a/ or /s/) to the letter t (or a or s)

- **Task**
  - Present four letters to the student
  - Say the target phoneme /t/
  - The student must point to the letter t

Example of instruction in letter-sound correspondences

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  - The student will match the phoneme /t/ (or /a/ or /s/) to the letter t (or a or s)

- **Task**
  - Present four letters to the student
  - Say the target phoneme /t/
  - The student must point to the letter t

Progression of instruction

- Teach lower case letters first
  - Most words use lower case letters
- Teach letters that are used most frequently first
- Teach letters that are dissimilar first
  - a m t s I d r o g l h u c b n k v e w j p y (Carnine et al. 1997)
- Teach short vowels before long vowels
- Teach blends once most single letter-sound correspondences are mastered

Progression of instruction (continued)

- Introduce letters incrementally
  - As student masters a letter, introduce a new one
- Provide regular review of known letters
- Select foils carefully
  - Start with a small number of foils that are dissimilar
  - E.g., b, m
  - Once successful, include more foils and ones that require finer visual and auditory discriminations
  - E.g., b-d
- As student develops competence, may choose letter from keyboard (adapted to meet needs)

Literacy instruction – Next steps

- Once student
  - Is competent with sound blending
  - Knows approximately 6-7 letter-sound correspondences
- Teach single word decoding
  - Requires integration of knowledge of letter-sound correspondences and skills in sound blending
- Provide opportunities to use single word decoding skills in meaningful contexts
  - Shared reading activities
Literacy instruction – Next steps

- Continue to teach letter-sound correspondences
  - As student learns new letter-sound correspondences, include new words for decoding that use the new letter and old letters in combination
- Continue to practice phonological awareness skills
  - Build automaticity
- Continue to read to the student and build language skills

Instruction in reading single words

- Goal
  - The student will decode / read a single word presented in writing and match the word to the correct picture
- Task
  - Present 4 pictures
  - Present the target written word
  - Student must read the word and point to the picture of the target word

Error analysis

- Select foils carefully to allow systematic error analysis
  - One picture is target word (e.g., map)
  - One foil is an initial sound substitution (e.g., nap)
  - One foil is a medial vowel substitution (e.g., mop)
  - One foil is a final sound substitution (e.g., mat)

Error analysis

- Pattern of errors may identify areas for additional instruction. For example:
  - Difficulty with initial sounds
  - Difficulty with medial sounds
  - Difficulty with final sounds
  - Difficulty with vowels

Example of instruction in reading words

- Goal
  - The student will decode the written word pet and point to the picture of the pet
- Task
  - Present 4 pictures
    - pen, pat, pet, net
  - Present the written word pet
  - The student must read the word and point to the picture of the pet

Example of instruction in reading words

- Goal
  - The student will decode the written word pet and point to the picture of the pet
- Task
  - Present 4 pictures
    - pen, pat, pet, net
  - Present the written word pet
  - The student must read the word and point to the picture of the pet
Example of instruction in reading words

**Goal**
- The student will decode the written word *pan* and point to the picture of the pan

**Task**
- Present 4 pictures
  - *tan, pan, pin, pal*
- Present the written word *pan*
- The student must read the word and point to the picture of the pan

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Reading words in context

**Shared reading of books**

- Provide opportunities for students to use their decoding skills during shared reading
  - Highlight target words in the book for the student
    - *Hooray for *pig* (target cvc word)*
    - Read sentence out loud & track words with finger; pause at the highlighted target word
      - "Hooray for (pause)"
    - Student must decode highlighted target word and then select the picture of the target word from the communication display or SGD

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Example of shared reading

**Goal**
- The student will use his decoding skills to read written words during shared reading

**Task**
- Highlight the target word in the book
  - *I steal the ball*
- Read the sentence out loud tracking words with finger; pause at the target word
  - "I steal the (pause)"
- Student must read the word and point to the picture of *ball*

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Example of shared reading

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- The student will use his decoding skills to read written words during shared reading

**Task**
- Highlight the target word in the book
  - *I steal the ball*
- Read the sentence out loud tracking words with finger; pause at the target word
  - "I steal the (pause)"
- Student must read the word and point to the picture of *ball*

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Example of shared reading

**Goal**
- The student will use his decoding skills to read written words during shared reading

**Task**
- Highlight the target word in the book
  - *I steal the ball*
- Read the sentence out loud tracking words with finger; pause at the target word
  - "I steal the (pause)"
- Student must read the word and point to the picture of *pig*

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Instruction – Next steps

- Teach single word decoding
- Integrate decoding skills into shared reading contexts
  - Instructor reads book
    - Student decodes target words in book
- Continue to review / build automaticity
  - Phonological awareness skills
  - Letter-sound correspondences
- Continue to read & build language skills to ensure comprehension
  - Semantic and syntactic knowledge
- Use written language to build spoken language
  - Encourage speech production
**Example of instruction in reading words**

- **Goal**
  - The student will decode the written word *bed* and point to the picture of the bed

- **Task**
  - Present 4 pictures
    - red, beg, mad, bed
  - Present the written word *bed*
  - The student must read the word and point to the picture of the bed

**Example of instruction in reading words**

- **Goal**
  - The student will decode the written word *bed* and point to the picture of the bed

- **Task**
  - Present 4 pictures
    - red, beg, mad, bed
  - Present the written word *bed*
  - The student must read the word and point to the picture of the bed

**Example of instruction in reading words**

- **Goal**
  - The student will decode the written word *bed* and point to the picture of the bed

- **Task**
  - Present 4 pictures
    - red, beg, mad, bed
  - Present the written word *bed*
  - The student must read the word and point to the picture of the bed

**Transition to book reading**

- Important to infuse new decoding skills into meaningful reading experiences
  - E.g.,
    - Reading *I Spy* books
    - Shared reading of books

**Reading *I Spy* books**

- **Goal**
  - The student will decode a single cvc word presented in writing and match the word to the correct picture in an *I Spy* book

- **Task**
  - Present the written phrase, ending with the target word
    - *I spy a _______ (target cvc word)*
  - Read out loud "I spy a (pause)"
  - Student must read target word and then point to the picture of the target word from the array of pictures in the *I Spy* book

**Example of reading *I Spy* books**

- **Goal**
  - The student will decode the word *pin* and point to the picture of a pin in an *I Spy* book

- **Task**
  - Highlight the target word in the book
    - *I spy a pin*
  - Read the sentence out loud tracking words with finger; pause at the target word
    - *I spy a (pause)*
  - Student must read the word and point to the picture of pin
Example of reading *I Spy* books

- **Goal**
  - The student will decode the word *pin* and point to the picture of a pin in an *I Spy* book

- **Task**
  - Highlight the target word in the book
    - *I spy a pin*
  - Read the sentence out loud tracking words with finger; pause at the target word
    - *I spy a (pause)*
  - Student must read the word and point to the picture of pin

Example of instruction in reading words

- **Goal**
  - The student will decode the written word *hum* and point to the picture of hum

- **Task**
  - Present 4 pictures
    - *ham, hum, hug, yum*
  - Present the written word *hum*
  - The student must read the word and point to the picture of hum

Example of instruction in reading words

- **Goal**
  - The student will decode the written word *hum* and point to the picture of hum

- **Task**
  - Present 4 pictures
    - *ham, hum, hug, yum*
  - Present the written word *hum*
  - The student must read the word and point to the picture of hum

Shared reading of story books

- **Goal**
  - The student will decode single cvc words presented in the context of a story and will say the word or match the word to the correct picture on a communication board or SGD

- **Materials**
  - Simple books of interest to student
  - Highlight cvc words that student can read
  - Adapt text as required to include additional cvc words
Shared reading of story books

- **Task**
  - Introduce the book to the student
  - Present the written text with target words highlighted 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 then say the word or select the picture of the target word from AAC system

Example of instruction in reading words

- **Goal**
  - The student will read written words and then match them to the correct picture

- **Task**
  - Present 6-8 pictures /AAC symbols
  - Present written words one at a time
  - E.g., dog, cat, mom
  - The student must read the word and match it with the correct picture

Example of instruction in reading words

- **Goal**
  - The student will read written words and then match them to the correct picture

- **Task**
  - Present 6-8 pictures /AAC symbols
  - Present written words one at a time
  - E.g., dog, cat, mom
  - The student must read the word and match it with the correct picture

Example of shared reading of story books

- **Goal**
  - The student will use his decoding skills to read written words during shared reading

- **Task**
  - Highlight the target words in the book
    - Can baby bear sit on daddy’s lap?
    - Oh no, daddy bear fell!
    - Will he get wet?
  - Read the sentence out loud tracking words with finger; pause at the target word
    - E.g., Oh no, daddy bear (pause)
  - Student must read the word
Example of instruction in reading words

- **Goal**
  - The student will read written words and then match them to the correct picture

- **Task**
  - Present 6-8 pictures / AAC symbols
  - Present written words one at a time
    - E.g., dog, cat, mom
  - The student must read the word and match it with the correct picture

Example of shared reading using personalized stories

- **Goal**
  - The student will use her decoding skills to read written words during shared reading of stories about her experiences

- **Task**
  - Develop short stories using photographs of the student’s experiences
  - Highlight target words in the book
    - E.g., dad, ball, mom, me, on
  - Read the sentence out loud tracking words with finger; pause at the target words
  - Student reads the word & signs

Example of shared reading using personalized stories

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  - The student will use her decoding skills to read written words during shared reading of stories about her experiences

- **Task**
  - Develop short stories using photographs of the student’s experiences
  - Highlight target words in the book
    - E.g., dad, ball, mom, me, on
  - Read the sentence out loud tracking words with finger; pause at the target words
  - Student reads the word & signs

Literacy instruction

- **First steps**
  - Read, read, read!!
  - Build language skills
    - Vocabulary
    - Syntax/ morphology
  - Teach phonological awareness skills
    - Sound blending
    - Phoneme segmentation
  - Teach letter sound correspondences

Writing instruction

- **Engage student in interesting experiences**
  - Build world knowledge
  - Ensure student has something to write about

- **Provide opportunities to engage in meaningful writing activities**
  - Telling stories to adults
  - Patterned story telling
  - Writer’s workshop
  - Publishing books
    - Use the books for reading activities
    - Share books with others
Ensure access to writing tools
- Ensure access to writing materials
  - May require adaptations
- Ensure access to letters and sounds
  - AAC systems
  - Output should be phonemes not letter names
- Provide access to word banks

Writing instruction – First steps
Patterned story writing
- Read familiar stories with repeated pattern
  - E.g., Brown Bear, Brown Bear
- Build new story with student following familiar pattern
  - Model writing for the student
  - Provide slots for the student to “write”
    - Maximal scaffolding support
  - Allow the student to choose content
  - Publish the story
  - Scan the story into the student’s AAC system
  - Provide opportunities for repeated readings

Example of patterned story writing
- Read the book Brown Bear Brown Bear with the child
- Have the student build a new story following the pattern of Brown Bear
  - Model writing the first line of the story
  - Encourage the child to use AAC to choose the next animal
    - E.g., zebra
  - Encourage the child to use AAC to choose the color
    - E.g., pink zebra
  - Continue until the child finishes “writing” the story
  - Publish the story and provide opportunities for repeated readings

Writing instruction – Next steps
Writing with familiar story schema
- Read familiar story books
  - E.g., PJ Funny Bunny
- Build new story with student following the familiar story schema
  - Model writing for the student
  - Provide scaffolding support for story writing
    - Student has opportunity to develop parts of the story
  - Allow the student to choose content
  - Publish the story
  - Scan the story into the student’s AAC system
  - Provide opportunities for repeated readings

Example of writing using familiar story schema
- Read the book PJ Funny Bunny with the child
- Have the student build a new story following the story schema of PJ Funny Bunny
  - Model writing the first line of the story
  - Encourage the child to use AAC to decide what animal PJ goes to live with
    - E.g., horse
  - Encourage the child to use AAC to explain why PJ does not like the horses
    - E.g., They were too fast
  - Continue until the child finishes “writing” the story
  - Publish the story and provide opportunities for repeated readings
Example of writing using familiar story schema

- Read the book *PJ Funny Bunny* with the child
- Have the student build a new story following the story schema of *PJ Funny Bunny*
  - Model writing the first line of the story
  - Encourage the child to use AAC to decide what animal PJ goes to live with
    - E.g., horse
  - Encourage the child to use AAC to explain why PJ does not like the horses
    - E.g., They were too fast
  - Continue until the child finishes “writing” the story
  - Publish the story and provide opportunities for repeated readings

Example of expanding writing experiences

- Use photos, student experiences, pictures as prompts
- Encourage student to write stories
  - Model writing process for student
  - Encourage student to write using letters and sounds
    - Accept sound spelling
  - Provide word bank for student
  - Relevant sight words, difficult words
  - Provide opportunities to revise
  - Publish the story
    - Scan the story into the student’s AAC system
  - Provide opportunities for repeated readings

Writing instruction – Next steps

- Expand writing experiences
- Use photos, student experiences, pictures as prompts
- Encourage student to write stories
  - Model writing process for student
  - Encourage student to write using letters and sounds
    - Accept sound spelling
  - Provide word bank for student
  - Relevant sight words, difficult words
  - Provide opportunities to revise
  - Publish the story
    - Scan the story into the student’s AAC system
  - Provide opportunities for repeated readings

Example of expanding writing experiences

- Use pictures of a witch as a story prompt at Halloween
- Have the student write a story
  - Model writing the first line of the story using an alphabet board
  - Encourage the student to write using letters and sounds
    - Accept sound spellings
  - Provide a word bank for the child
    - E.g., witch
  - Publish the story and provide opportunities for repeated readings

Baseline prior to instruction

- Recognizes her name in print
- Knows many letter sound correspondences
  - Most consonants
  - Difficulty with short vowels
- Phonological awareness skills
  - 45% accuracy with initial phoneme segmentation tasks
  - 75% accuracy with sound blending tasks
- Does not decode words
Example of instruction in reading words

Goal
- The student will decode the written word cap and point to the picture of cap

Task
- Present 4 pictures
  - nap, cup, cat, cap
- Present the written word cap
- The student must read the word and point to the picture of cap

Example of instruction in reading words

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Example of shared reading of story books

Goal
- The student will use her decoding skills to read written words during shared reading

Task
- Highlight the target words in the book
  - The Cat Sat on the Mat
- Read the sentence out loud tracking words with finger; pause at the target word
- Student must read the word

Example of shared reading of story books

Goal
- The student will use her decoding skills to read written words during shared reading

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- Highlight the target words in the book
  - The Cat Sat on the Mat
- Read the sentence out loud tracking words with finger; pause at the target word
- Student must read the word

Research to practice

Students who require AAC can acquire literacy skills when provided with effective instruction to teach
- Phonological awareness skills
- Letter sound correspondences
- Decoding skills
- Shared reading activities
- Writing skills

Research is available to guide in planning & implementing literacy instruction
The Art and Science of Literacy Intervention

- The science
  - Implementation of evidence-based instructional procedures
  - Monitoring effectiveness
  - Evaluating results

The science

- Implementation of evidence-based instructional procedures
- Monitoring effectiveness
- Evaluating results

The art

- The art
  - the belief and the commitment to the right of all individuals to express themselves fully and seek their full potential

The art

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  - the belief and the commitment to the right of all individuals to express themselves fully and seek their full potential

The commitment to literacy intervention

- The belief and the commitment to the right of all individuals to express themselves fully and seek their full potential

The commitment to literacy intervention

- The belief and the commitment to the right of all individuals to express themselves fully and seek their full potential

Teaching literacy skills is the single most empowering thing that we can do for individuals who require AAC

(Lindsay, 1990)
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For more information
http://www.aac-rerc.org
Janice Light JCL4@psu.edu

Selected References


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