Slide 1

Rehabilitation Engineering Research Center on Augmentative and Alternative Communication
RERC on AAC

RERC on AAC

NiDILRR

Slide 2

Acknowledgements

RERC on AAC

Slide 3

- Session Feedback Evaluation
  - Your feedback is very important to us. Please be sure to complete the session evaluation through the ATIA mobile app

- Learning Objectives
  - Describe 2 research projects of the RERC on AAC
  - Describe 2 development projects of the RERC on AAC
 - Describe 2 webcasts from the AAC Learning Center

3

Slide 4

The need

- More than 5 million Americans have severe disabilities resulting in complex communication needs
  - Developmental disabilities
  - Acquired conditions
  - Degenerative disabilities
- More than 97 million people worldwide

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Slide 5
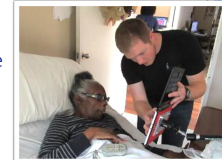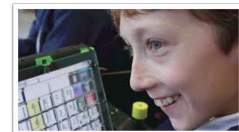
Augmentative and Alternative Communication

- AAC technologies offer the potential to
  - Enhance communication &
  - Increase participation

- Substantial advances in AAC over the past 40 years
  - But the potential has not been fully realized for many individuals with complex disabilities

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Slide 6
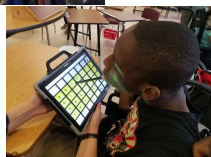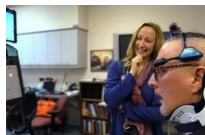
Barriers for individuals who require AAC

Many individuals with complex needs
- have only minimal movement and cannot reliably control technology
- are not literate and are excluded from the use of many technologies
- are overwhelmed by the substantial learning demands of many AAC technologies and choose not to use them
- face significant societal barriers, especially when communication partners are unfamiliar and untrained in AAC

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NIDILRR-funded RERC on AAC

- The **RERC on AAC** conducts
  - **Research** to advance knowledge & enhance participation
  - **Development** to improve AAC technology solutions
  - **Training** to increase the knowledge of consumers, service providers, researchers, technology developers & policy makers
  - **Dissemination** to reach all stakeholder groups and bridge the gap between research and practice
    - To expand "what is possible"
    - To ensure "what is possible" becomes "what is probable"
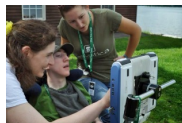

RERC on AAC
Research and Development Projects

- **Research Projects**
  - **R1 Video VSD Intervention**
  - **R2 AAC Literacy Decoding Technology**
  - R3 Motion in AAC User Interface Displays

- **Development Projects**
  - D1 **Access Navigator**
  - D2 Smart Predict
  - D3 **Partner mTraining**

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Training and Dissemination Projects

- **AAC Learning Center**
- **Consumer Forum**
- **AAC Doctoral Student Think Tank**
- **Future of AAC Research Summit**

How ableism impacts people who use AAC

Lateef McLeod

Future of AAC Research Summit, 2024
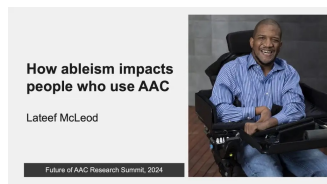
R1 Video Visual Scene Display (VSD) Intervention

David McNaughton, Janice Light, Erik Jakobs, Beth Frick Semmler, Rylie Mueller, Christine Holyfield, Sharon Redmon, Rebecca Woods

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Communication

- Speech will not meet communication needs of
  - 40% of adults with autism spectrum disorders
  - 50% of adults with Down syndrome

- Less than 10% of adults with developmental disabilities who **need** communication supports **receive** communication supports
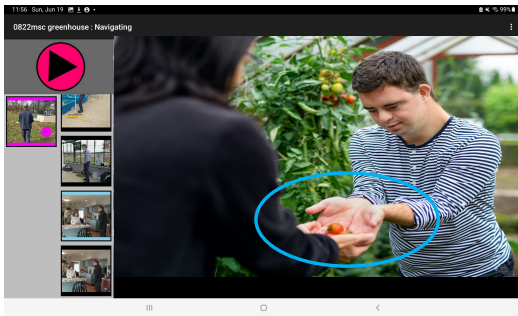

Video visual scene display (VSDs)

- Capture video of events/ interests

- Pause at key moments
  - Create visual scene at these junctures
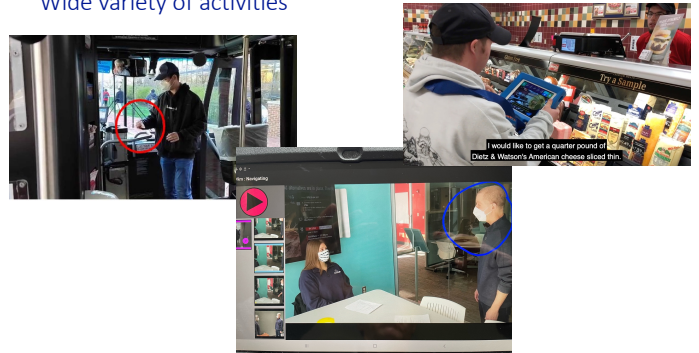 - Add hotspots with speech output

Video VSD - Greenhouse (19 steps)

Wide variety of activities

Research to date

- **Series of single-case experimental studies**
  - Improved outcomes in
    - Shopping *(Babb et al, 2021)*
    - Riding public transportation *(O'Neill et al, 2017)*
    - Working in a foodbank *(Babb et al, 2020)*
    - Working in a library *(Babb et al, 2019)*

- **RCT study (in progress)**
  - 19 adults with IDD (Study 1)
  - 14 autistic adults (Study 2)
  - Intervention developed by family/caregivers, community professionals
    - 24 adults with IDD or on autism spectrum (Study 3)

Video VSD

Studies 1 & 2

- Support **independent performance** of complex, multi-step skills in community settings
- **Easily learned and used** by autistic persons and persons with IDD
- Provide **communication assistance** as needed
- Make use of **highly portable, commonly available** technology

Study 3

- Investigate development for **individually selected goals** by typical support providers
  - family members, group home workers

Video visual scene display (VSD)

Expected outcomes

- Supports for development and delivery of Video VSD interventions
  - online training module

- Tech transfer to manufacturers to support iterative development of Video VSD app

ATIA 2025: Booth
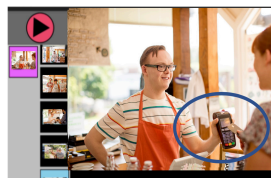
D1 Access Navigator Software to Improve Alternative Access Services

Heidi Koester, Susan Fager, Erik Jakobs,
Tabatha Sorenson, Jessica Gormley

Access Navigator – Problem statement

Jim is a farmer in a rural Midwestern state, diagnosed with ALS. Living 400 miles from an AAC assessment center, he relied on his local speech-language pathologist (SLP) to support his needs as his disease progressed. Trying to provide Jim with a sophisticated, high-tech access method, he eventually received an eye-tracking device but struggled to use it successfully. His SLP was frustrated with the lack of support she had to select, implement, and monitor this complicated access method with Jim and often wondered if she had made the right access decision.

Jim and his SLP needed support to make appropriate access decisions and ensure his full access to communication.

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Challenges with Alternative Access

- Alternative access methods help people with motor impairments control technology
- But people don't always get methods that are the best fit for their needs
- Why not?
  - AT providers may not have needed knowledge and skills
  - Difficulty carrying out systematic, evidence-based assessment process
- Existing assessment tools may be cumbersome, time-consuming, or incomplete
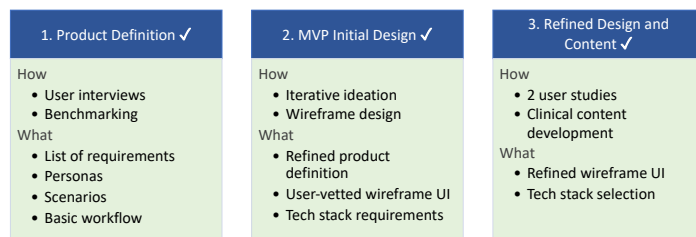

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Access Navigator – Proposed solution

- Develop Access Navigator software
- Web-based tool to guide access assessments
- Improves the quality of the assessment process:
  - Leads teams through a repeatable, systematic process
  - Incorporates performance measurements for evidence-based decision-making

- Will be freely available

Complete initial assessment
↓
Specify initial access solution(s)
↓
Identify candidate products
↓
Run trials with candidate products
↓
Select and implement solution
↓
Follow-up and monitor progress

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Access Navigator – User-centered design timeline

1. Product Definition ✓

How
- User interviews
- Benchmarking

What
- List of requirements
- Personas
- Scenarios
- Basic workflow

2. MVP Initial Design ✓

How
- Iterative ideation
- Wireframe design

What
- Refined product definition
- User-vetted wireframe UI
- Tech stack requirements

3. Refined Design and Content ✓

How
- 2 user studies
- Clinical content development

What
- Refined wireframe UI
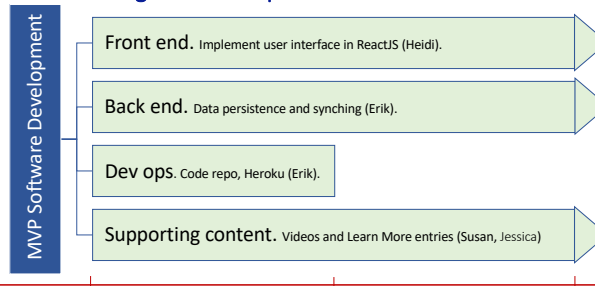- Tech stack selection

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Access Navigator – highlights of user-centered design phase

- Interviews with 11 people
  - 46 themes and corresponding requirements for the app

  - Practitioner anxiety can be intense: *"I should know this, but I don't."*

  - Design the app to take the worry out of assessments – welcoming, reassuring, fun, exploring.

- UI Feedback from 12 practitioners
  - Balsamiq wireframe design
  - High agreement that:
    - They'll use Access Navigator with their clients
    - It's easy to use
    - It covers the important aspects of the assessment process
    - Basic workflow is sound
  - *"Yeah, I would use this. I can't wait to use this!"*

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Access Navigator development

MVP Software Development

- **Front end.** Implement user interface in ReactJS (Heidi).
- **Back end.** Data persistence and synching (Erik).
- **Dev ops.** Code repo, Heroku (Erik).
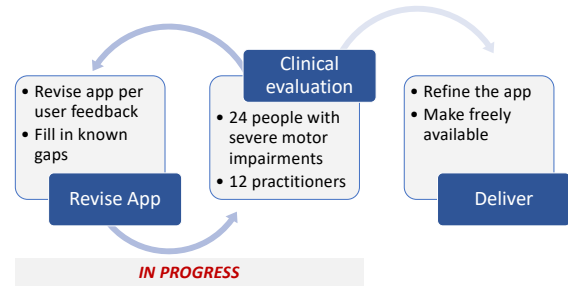- **Supporting content.** Videos and Learn More entries (Susan, Jessica)

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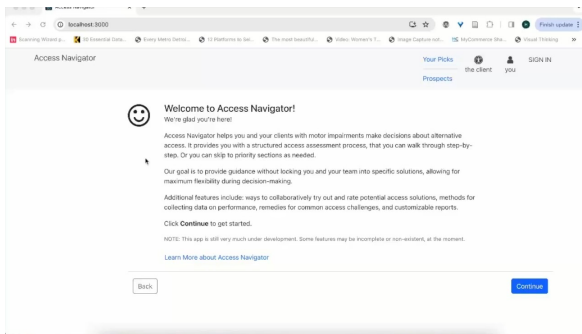## User feedback study on MVP (early version of the app)

- 5 practitioners in a think-aloud protocol with their chose use-case scenario
- Data:
  - User think-aloud comments
  - 'Critical incidents'
  - SUS responses (usability score)
  - Responses to open-ended questions
- All participants conducted a mock session correctly and successfully (avg 42 minutes)
- Very high usability (avg SUS of 86)
- 6 key issues in the UI accounted for the 21 major usability problems observed
- Revised design has address all 6 of those areas

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Access Navigator – Current and Future Work

- Revise app per user feedback
- Fill in known gaps

Revise App

Clinical evaluation
- 24 people with severe motor impairments
- 12 practitioners

- Refine the app
- Make freely available

Deliver

IN PROGRESS

A short demo of Access Navigator

ACCESS NAVIGATOR

Access Navigator next steps:

- Would you like to try Access Navigator as a beta tester?
- Maybe participate in our evaluation study?
- Would you consider letting others know about Access Navigator as a resource?

- Please contact Heidi Koester, hhk@kpronline.com
- Thank you!

Scan for more info

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ACCESS NAVIGATOR

D3 – mTraining in AAC for Communication Partners

Erik Jakobs, Janice Light, Susan Fager, Jessica Gormley, Christine Holyfield, David McNaughton, Tara McCarty, Dawn Sowers, Savanna Brittlebank, Kristina Exton, Emily Laubscher, & Kelsey Steffen

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Partner mTraining

The problem

- People who rely on AAC interact with numerous communication partners in home, school, work, community & healthcare settings
- Communication partners are often untrained in AAC
  - They preempt opportunities to communicate
- As a result, people who rely on AAC are unable to communicate and participate successfully
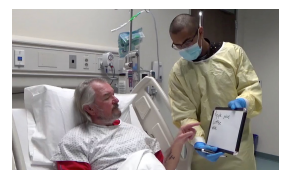
Partner mTraining

Proposed Solution
- Develop a user-friendly app to create partner mTrainings that can be deployed "just-in-time" to teach partners AAC strategies
  - **INSTRUCT app**
- The app includes
  - Description of strategy & benefits
  - Step-by-step instructions
  - Checklist of steps
  - Video models of each step
- Trainings may be
  - Generalized to meet the needs of a number of individuals who need or use AAC
  - Personalized to meet the needs of a specific AAC user and / or communication partner

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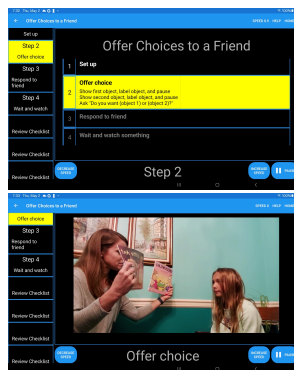
Partner mTraining
Evaluation of the App

- **Usability studies**
  - Continuous feedback from end-users on usability
  - Iterative design and testing

- **Numerous studies to evaluate effectiveness of generalized & personalized trainings**
  - Impact on communication partners including
    - Healthcare providers, educational professionals, members of community, families, peers
  - Resulting impact on communication of individuals who need or use AAC

Teaching peers to interact with students with multiple disabilities including CVI (McCarty & Light, 2025)

- Pretest/Posttest Control Group Design
  - Students with multiple disabilities and CVI who are intentional, presymbolic communicators
  - Nondisabled peers (3rd & 4th grade)

- INSTRUCT app taught peers how to structure opportunities to offer choices
  - Training completed independently by peers in pairs
  - Role plays to practice in collaborative learning pairs

- Results
  - Peers who completed the training demonstrated significant gains in strategy use
    - +4.9 sub steps from a 10-step checklist
  - Students with multiple disabilities communicated successfully in 84% of the opportunities provided by peers after training
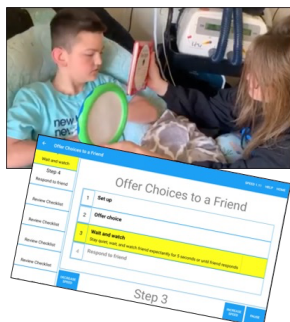

Teaching educational staff to interact with students who use eye gaze AAC technology (Sowers et al., 2025)

- Pretest/Posttest Control Group Design
  - Students with motor impairments who use eye gaze to control AAC technologies
  - Educational staff in the school setting

- INSTRUCT app taught staff how to offer opportunities for communication, wait for responses, and respond appropriately

- Results
  - Staff who completed the training demonstrated significant gains in strategy use
  - Students who used eye gaze showed improved communication
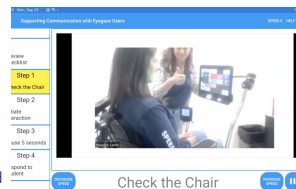

Teaching healthcare professionals (Gormley & Fager, in progress)

- Pretest/Posttest Control Group Design
  - Acute care healthcare workers (nurses, certified nursing assistants)
  - Adults with a new onset communication challenges (e.g., aphasia, intubation)

- INSTRUCT app targets "3 Quick Steps for Successful Bedside Communication"

- Data collection in progress
  - Pre/post communicative interaction performance
  - Experiences of patients & staff after each interaction
 - Staff feedback on the INSTRUCT training

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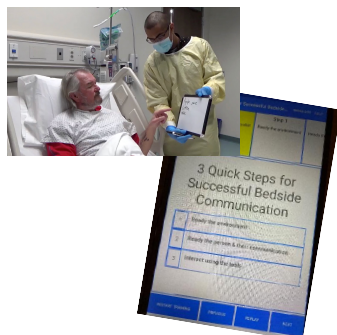
Additional INSTRUCT trainings

- Teach group home staff to interact with adults with severe autism (Sowers et al., 2025)
- Teach aided AAC modeling (Laubscher et al.)
- Teach preservice students
  - To design & use VSDs with beginning communicators (Exton et al.)
  - To provide instruction in decoding (Brittlebank, in progress)
- Evaluate personalized training developed by adult with autism to teach partners to interact (Steffan et al., in progress)
- Evaluate personalized trainings to support individuals with primary progressive aphasia (Sowers, Fager, & Gormley, in progress)

Slide 1
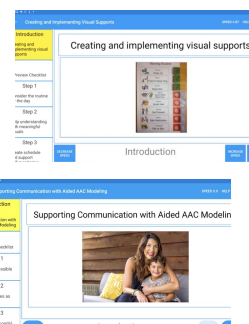
Library of INSTRUCT trainings to be made freely available


Slide 2
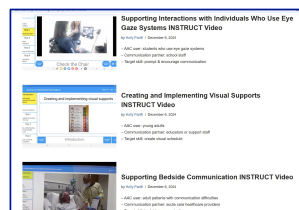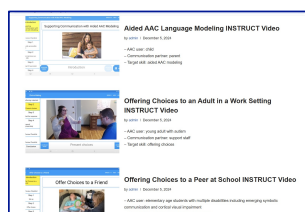
R2 - AAC Literacy Decoding Technology

Christine Holyfield, Janice Light, Erik Jakobs, Beth Frick Semmler, David McNaughton, Savanna Brittlebank, Tim Deluca, Lauramarie Pope, & Rylie Mueller

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Slide 3

R2: AAC Literacy Decoding Technology

- **The problem**
  - Literacy skills are essential to full participation in today's society
  - More than 90% of individuals with complex communication needs enter adulthood without literacy skills
  - Individuals with complex needs who are not literate rely on pictures
  - Current AAC technologies do not support the transition from picture symbols to literacy

Slide 4
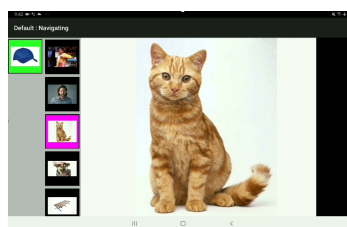
AAC Literacy Decoding Technology Evaluation

- Series of single case experimental design studies
  - Effect of T2L decoding technology (VSD or grid) – models of decoding
  - No additional instruction or feedback
- Over 50 study participants, including over 40 individuals with developmental disabilities who use or require AAC have participated
  - Participants with developmental disabilities ranged from 4 to 27 years old
  - Participant diagnoses include autism, Down syndrome, cerebral palsy

Slide 5

AAC Literacy Decoding Technology Evaluation

- 88% of participants who have completed exposure to the technology to date showed clear increases in foundational literacy skills such as:
  - Decoding familiar and novel words
  - Encoding familiar and novel words
  - Letter sound correspondence
  - Initial phoneme segmentation
  - Print awareness
  - Engagement in literacy activities

Slide 6

Training and Dissemination
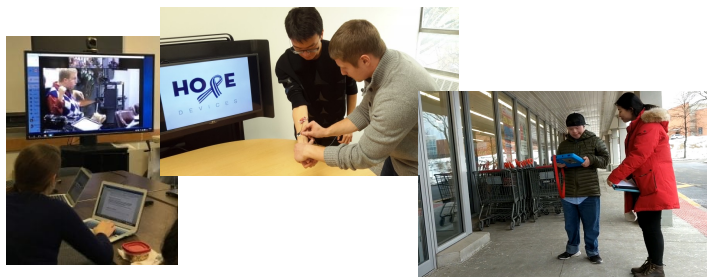
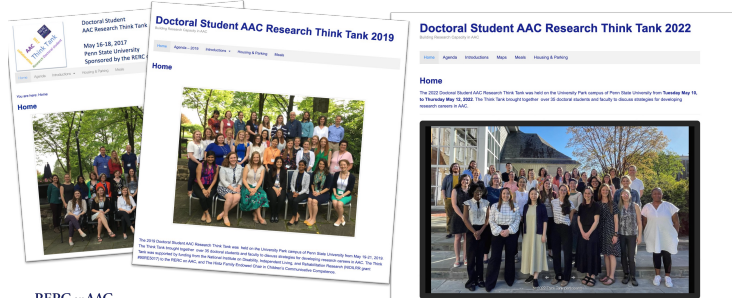Tracy Rackensperger, David McNaughton, & Lance McClemore

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Challenge
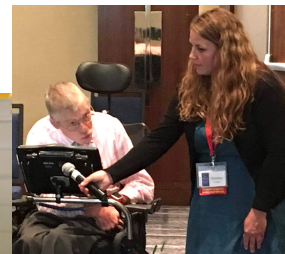
T-1, 2, & 3: Mentored Research and Lab Experiences

T-4 Doctoral Student AAC R&D Think Tank

Doctoral Student AAC Research Think Tank 2019

Doctoral Student AAC Research Think Tank 2022

Planned topics (May 6-8, 2025)

- Developing research partnerships with people who need or use AAC

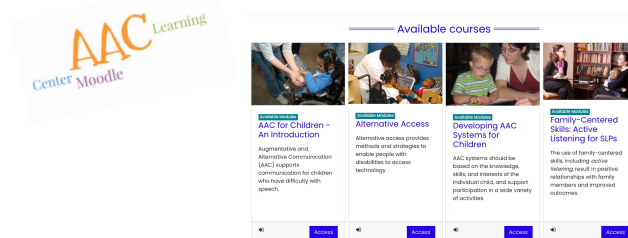- Establishing and maintaining collaborations with other researchers and community partners

"Recognizing experience as expertise":

Supporting the participation of people who use AAC in pre-service training for SLPs and teachers using video teleconference technology

Tracy Rackensperger, David Chapple, Lance McLemore, & David McNaughton

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T-5 AAC Webcasts and Instructional Materials

AAC Learning Center Moodle

Available courses

AAC for Children – An Introduction

Augmentative and Alternative Communication (AAC) supports communication for children who have difficulty with speech.

Alternative Access

Alternative access provides methods and strategies to enable people with disabilities to access technology.

Developing AAC Systems for Children

AAC systems should be based on the knowledge, skills, and interests of the individual child, and support participation in a wide variety of activities.

Family-Centered Skills: Active Listening for SLPs

The use of family-centered skills, including active listening, result in positive relationships with family members and improved outcomes.

Chris Klein: Building Relationships through the Tools of Communication

Family-Centered Services: 5 Key Principles (Armendariz, et al, 2023)

Personalized AAC to increase participation and communication for an adult with Down syndrome (Babb et al., 2021)

Child-parent-provider interactions in an inpatient rehabilitation facility (Gormley & Light, 2021)

Supporting communication and participation in shared storybook reading using VSDs (Bhana, 2020)

Tracy Rackensperger (Ph.D)

- Co-Leader of Training and Dissemination Team for the RERC on AAC
- University of Georgia

AAC Consumer & Technology Forums (2021-2025)

Supporting Patient-Provider Communication (Stroschein et al, 2021)

P Prepare for the visit

A Ask questions
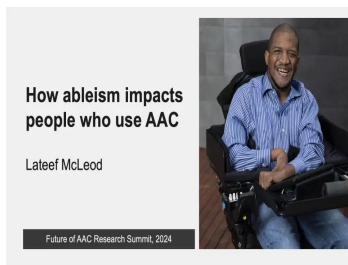
C Create a plan
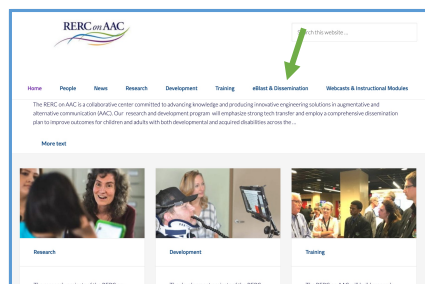
T Take away material

AI & AAC
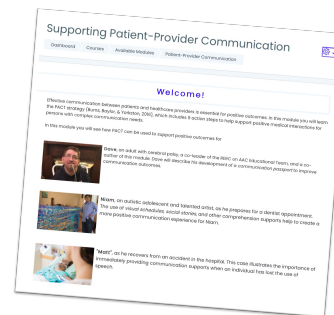
Future of AAC Research Summit (May 6-7, 2024)

Future of AAC Research Summit (May 6-7, 2024)

How ableism impacts people who use AAC

Lateef McLeod

Future of AAC Research Summit, 2024

Future of AAC Research Summit (May 6-7, 2024)
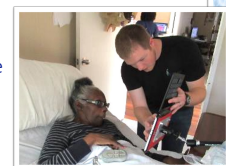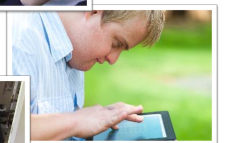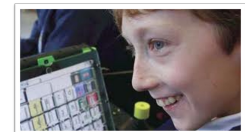

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The need

- More than 5 million Americans have severe disabilities resulting in complex communication needs
  - Developmental disabilities
  - Acquired conditions
  - Degenerative disabilities
- More than 97 million people worldwide

The work all of us do, I believe, must increasingly come down to pursuing, and attempting to secure, fundamental fairness. Envisaging and creating knowledge and ways in which we can better express ourselves, be heard, and live in community with all others.

For true community is not a dot on a map. It is a way a way of belonging. The right to community and communication are the life blood of one another.
Bob Williams (2024)

Questions?