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ACCESS NAVIGATOR

Access Navigator: a web-based tool
to guide alternative access assessments

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RERC on AAC   NiDILRR

Speaker Disclosure

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All speakers are employed within the grant-funded RERC on AAC, and receive salary support from that grant.

The funding agency is the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). This research does not necessarily represent the policy of NIDILRR, ACL, HHS, and you should not assume endorsement by the Federal Government.

Session Content Disclosure

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This presentation will focus primarily on the Access Navigator app. It may include limited information on other similar tools and resources.

Learning Objectives

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Use the Access Navigator app for alternative access assessments
Explain 6 steps of a systematic process for access assessment
Describe 3 benefits of using a systematic process for access assessment

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Session Evaluation and CEUs

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

CEUs
- ATIA 2025 education presentations are reviewed for ASHA, ACVREP, AOTA, CRC and IACET CEU eligibility. Not all sessions are approved for each specialty CEU. (I believe this one is.)
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  - In-person deadline to claim CEUs: February 28, 2025
  - Virtual Event deadline to claim CEUs: April 30, 2025
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ACVREP CEU Session Start Code

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If you do not plan to claim ACVREP CEUs (primarily for Vision Impairment Specialists), **you do not need to note these codes**.

Start Code: blue22

This session has been approved for ACVREP CEUs. If you plan to claim ACVREP CEUs, please note this code, **and** the end code that will be shown at the end of this session.

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Brief Introduction

- President of Koester Performance Research (KPR), Asheville, NC
- Mission to improve the way we design and deliver assistive technology
  - Specifically in the area of computing interfaces for people with physical disabilities
- Currently with the NIDILRR-funded RERC on AAC
- Previously: Rehabilitation Engineer at University of Michigan

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Overview

- Alternative access: what it is, why people use it
- How well do existing alternative access methods meet users' needs?
- What are some barriers that can affect how well existing methods meet users' needs?
- RERC Access Navigator project
  - to improve service provision and awareness for all involved
  - Research and development to date
- Demo of the Access Navigator app
- How you can participate

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Alternative access to electronic devices

- People want and need to use electronic devices, like computers, tablets, and smartphones, for all kinds of reasons:
  - Work tasks, schoolwork, social media, anything and everything
  - Some people also use AAC supports provided by specific AAC apps
- Using electronic devices easily and efficiently:
  - Usually involves fully coordinated and agile use of the fingers and hands (to type on keyboards), and may also involve speech input (to dictate text).
  - Can also require acute eyesight, problem solving, and other cognitive and perceptual abilities.

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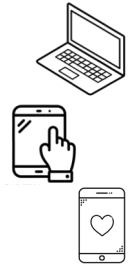
Alternative access to electronic devices

- People with physical disabilities, particularly those affecting the hands and fingers, may find it difficult or impossible to use the typical input methods of keyboards, touchscreens, mice, etc.

- Those individuals may require different or modified input methods to use electronic devices:
  - In some cases, to use them at all
  - In other cases, to use them more easily and efficiently
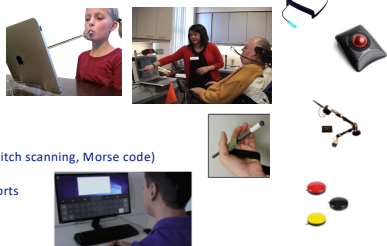
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Alternative access methods

- Help people with motor impairments control devices like computers, tablets, smartphones, SGDs
- Approaches that accommodate an individual's specific physical disability
- And ideally allow for efficient and comfortable use of any computing device

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What's available – many types of access solutions

- Built-in accessibility settings
- Alternative keyboards
- One-hand typing solutions
- Mouthstick or stylus
- Trackball, trackpad
- Hands-free mice
- Cursor on-screen keyboard
- Speech recognition
- Eye gaze
- Switch access (one- or two-switch scanning, Morse code)
- Brain-computer interface
- Positioning and physical supports

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What's available – a sampling of hands-free mice

Lip/chin joysticks   Target trackers   Face trackers

Wearable sensors   Eye trackers   Can control an on-screen keyboard

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How well do existing alternative access methods meet users' needs?

- Indicators of success are varied and include things like:
  - Typing speed (or communication rate), accuracy
  - Ergonomic comfort / low ergonomic stress
  - Satisfaction, psychosocial impact, goal attainment
  - Use / abandonment

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Typing Speed

- Perhaps the most common indicator in the research literature
- Can be an important metric for some individuals and as an engineering benchmark, but keep in mind it is only one relevant outcome
- We created a dataset representing about 500 individuals with physical disabilities, extracted from the research literature from 1986-2023 (see kpronline.com/atnode)

- Typing speeds in this dataset tend to be quite low:
  - Almost 40% of cases have a typing speed below 3 words per minute
  - 75% below 10 wpm
- The setup of the access method can be a significant limiting factor
  - Focused interventions can boost performance by a factor of 2 or more

- Interfaces may needlessly slow users down
- Avoidable!

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Abandonment

- General finding:
  - Up to seven in ten people abandon their assistive technology

- Another indicator there is room for improvement in the status quo

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So: how well do existing alternative access methods meet users' needs?

- Alternative access methods can help a lot, but there's room for improvement in how well they meet users' needs

- Using a less-than-optimal access method can negatively impact communication, schoolwork, employment options, and other opportunities for full participation

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Six main barriers that can affect outcomes   (Howard, 2020)

- Design and function
  - Of the access method and/or device being accessed
- Information and awareness
  - On the part of all stakeholders
- Service provision
  - Especially lack of user-centered process
- Psychological attitudes
- Support network (family, carers, peers)
- Societal attitudes and policies

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Improve service provision / information & awareness

- **More effectively leverage the alternative access technology that is already available**
- Improve the service provision process – how people choose the alternative access method(s) that are the best fit for their needs
- Raise awareness of what's possible

- Many resources and frameworks for alternative access assessment already exist
- Practitioners may not use these existing processes, instead using their own highly personal, internal framework
- Yet (limited) research suggests that following a systematic assessment process is beneficial:
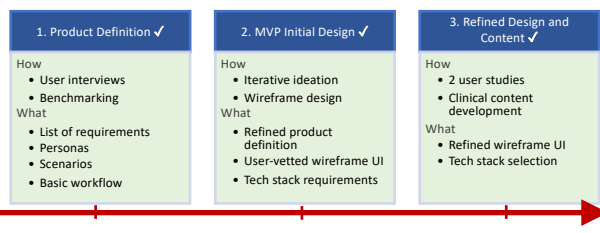 - Reduces abandonment and increases satisfaction

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Access Navigator – RERC project

- 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
- *WE NEED YOUR FEEDBACK!!*

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 process

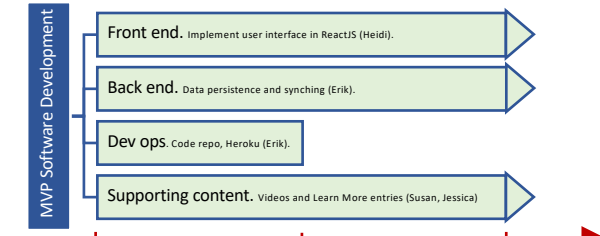| 1. Product Definition ✓	2. MVP Initial Design ✓	3. Refined Design and Content ✓
How • User interviews • Benchmarking What • List of requirements • Personas • Scenarios • Basic workflow	How • Iterative ideation • Wireframe design What • Refined product definition • User-vetted wireframe UI • Tech stack requirements	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)
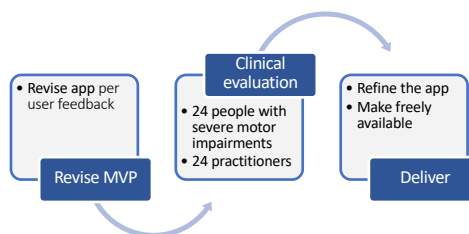
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User feedback study on the MVP

- 5 practitioners in a think-aloud protocol with their chosen use-case scenario
- Data:
  - User think-aloud comments
  - 'Critical incidents'
  - SUS responses
  - 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 that were observed across all participants
- Revised design has addressed those 6 areas

Access Navigator – Current and Future Work

- Revise app per user feedback

Revise MVP

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

- Refine the app
- Make freely available

Deliver

Access Navigator demo – review our goals

- Support all stakeholders in moving past just so-so to seeking an optimal, or at least better, solution
- Make it easier for practitioners / teams to use the processes that have been shown to be effective, especially processes that center on the user and their needs
- Support effective, evidence-based decision-making
- Take some of the worry out of assessments – welcoming, reassuring, exploring, fun

Access Navigator demo

- Gather information
- Evaluate abilities
- Test-drive solutions
- Make informed decisions

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

Questions

Thanks for being here!

To try out Access Navigator, or share with others:
Contact Heidi Koester at bhk@kpronline.com

- This research was supported by grant #90REGE0014 to the Rehabilitation Engineering Research Center on Augmentative and Alternative Communication (The RERC on AAC) from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). This research does not necessarily represent the policy of NIDILRR, ACL, HHS, and you should not assume endorsement by the Federal Government.
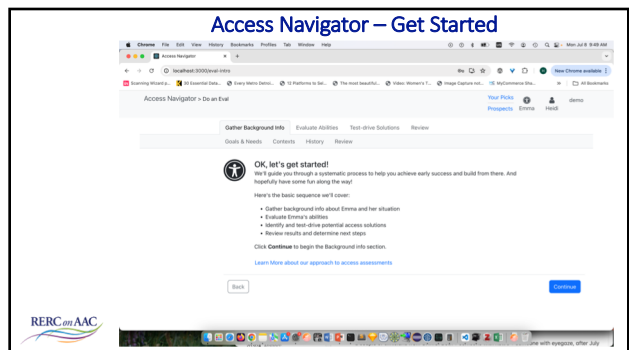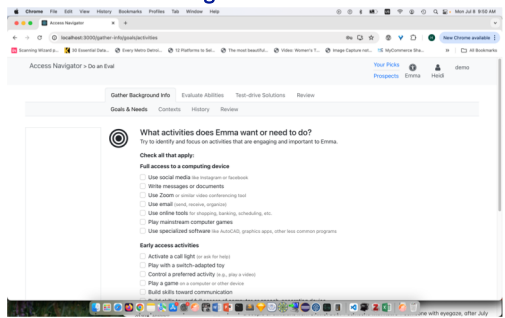- For more information on the RERC, **please visit rerc-aac.psu.edu**

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Screenshots from Access Navigator app

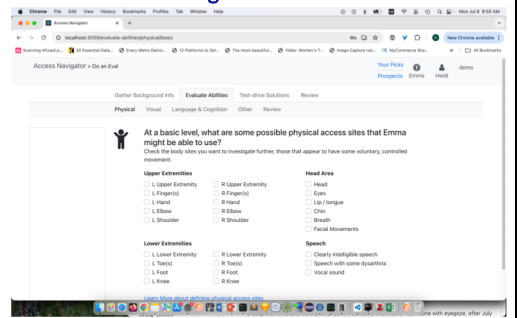- These screenshots will only be shown in the presentation if the live demo fails for some reason

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Access Navigator – Get Started

Access Navigator – Gather Info

Access Navigator – Evaluate Abilities

Access Navigator – Test-drive Solutions

Access Navigator – Test-drive Solutions

Access Navigator – Select Solution(s)