


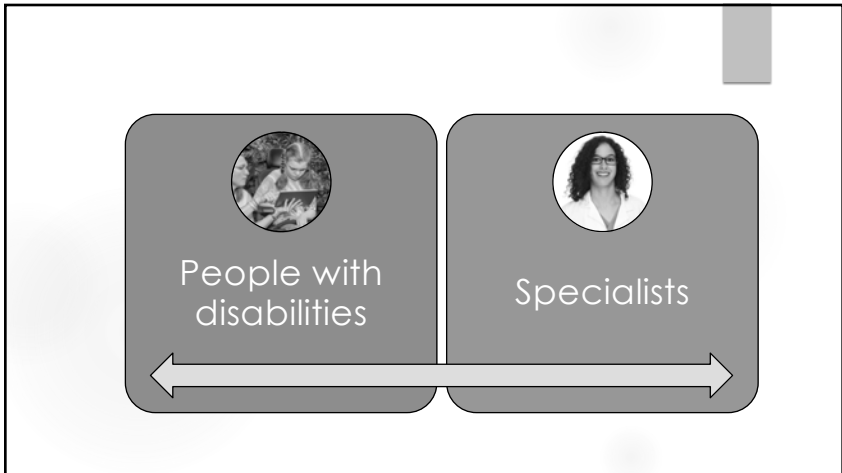
## Building Capacity in Assistive Technology: Innovative Strategies in Pre-Service and In-Service Education

DANIEL COCHRANE  
LYNN GITLOW  
DAVID JAFFE  
CAREN SAXE & MARCIA SCHERER  
THERESE WILKOMM  
DAVID MCNAUGHTON

## Challenge



Less than 1 in 10 adults with developmental disabilities have access to AAC

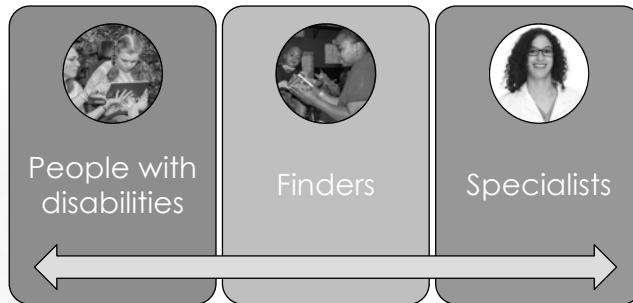


### Shortage of SLPs with competencies in AAC

- ▶ ~55% of SLPs in the schools serve children who need AAC
- ▶ ~85% of SLPs did not complete a single course focused on AAC

▶ Light et al (2014)

## Building Capacity in Assistive Technology



## Teaching tools without teaching products

DANIEL COCHRANE, MA, MS, ATP

UNIVERSITY OF ILLINOIS AT CHICAGO, AT CERTIFICATE PROGRAM

## Challenge

- ▶ School-based practitioners always ask "What's out there?"
  - ▶ Seeing actual products helps the beginner visualize what's possible
  - ▶ Many introductory AT workshops focus on names of apps and extensions
- ▶ Online course content takes a lot of time to develop
  - ▶ Instructional design industry rule of thumb: 40 hours of work for 1 hour of professionally designed content!
- ▶ Specific AT products change rapidly
  - ▶ E.g. Google extensions, iPad apps, subscription software, etc.
  - ▶ Course content goes out-of-date quickly!
- ▶ Challenge: Create "AT Tools in Education" course without having to update all the course content every year

## Obvious Solution

- ▶ Don't include specific products in course content!





### Generic features by task and function category

- ▶ Reading
  - ▶ Page fluffers
  - ▶ Positioning aids
  - ▶ Colored paper, overlay filters
  - ▶ Tracking aids
  - ▶ Portable dictionary with speech output
  - ▶ Handheld reading device
  - ▶ Device, software, or app
    - ▶ variable color text/background

A. Area and Sample Instructional Targets	B. Standard Classroom Materials	C. Accommodations/Modifications/Strategies	D. Assistive Technology Solutions
<b>Spelling</b> <ul style="list-style-type: none"> <li>◦ Identify correctly spelled word</li> <li>◦ Write spelling words from dictation</li> <li>◦ Spell words orally</li> <li>◦ Use correct homonym</li> <li>◦ Look up words</li> <li>◦ Complete writing tasks with correct spelling</li> </ul>	<ul style="list-style-type: none"> <li>• Alphabet strip</li> <li>• Computer/tablet/board processor</li> <li>• Dictionary, grammar and/or spell checker</li> <li>• Document camera</li> <li>• Flashcards</li> <li>• Interactive whiteboard</li> </ul>	<ul style="list-style-type: none"> <li>• Pencil/brush avoidance</li> <li>• Personal dictionary</li> <li>• Provision of vocabulary</li> <li>• Use synonyms</li> <li>• Word wall/box</li> </ul>	<ul style="list-style-type: none"> <li>• Photo printer</li> <li>• Portable spell checker with or without auditory output</li> <li>• Device, software or app                             <ul style="list-style-type: none"> <li>◦ spell and grammar checker</li> <li>◦ word prediction</li> <li>◦ word processor</li> <li>◦ picture-based</li> <li>◦ text-to-speech</li> <li>◦ speech recognition</li> <li>◦ screen enlargement</li> <li>◦ advanced reading and writing aid software that includes:                                     <ul style="list-style-type: none"> <li>• Optical Character Recognition</li> <li>• text-to-speech with highlighting</li> <li>• study tools</li> <li>• dictionary</li> <li>• word prediction</li> </ul> </li> </ul> </li> </ul>
<b>Reading</b> <ul style="list-style-type: none"> <li>◦ Fluency reading material</li> <li>◦ Identify illustrations</li> <li>◦ Recognized name</li> <li>◦ Document camera</li> <li>◦ Electronic texts</li> <li>◦ Read content at high frequency</li> <li>◦ Read words by sight</li> <li>◦ Read words, sentences and/or longer passages</li> <li>◦ Comprehend and/or summarize reading materials                             <ul style="list-style-type: none"> <li>◦ Literal meaning</li> <li>◦ Inferential meaning</li> <li>◦ Main idea</li> </ul> </li> <li>◦ Summarize key points</li> <li>◦ Read stories with key details in correct sequence</li> </ul>	<ul style="list-style-type: none"> <li>• Computer/tablet/board processor</li> <li>• Document camera</li> <li>• Electronic texts</li> <li>• Interactive whiteboard</li> <li>• Projected information</li> <li>• Supplemental texts</li> <li>• Tapes</li> <li>• Textbooks</li> <li>• Whiteboard</li> <li>• Worksheets</li> </ul>	<ul style="list-style-type: none"> <li>• Change complexity of material</li> <li>• Custom modification list</li> <li>• Decrease assignment length</li> <li>• High interest, low reading level materials</li> <li>• Highlight to emphasize key points</li> <li>• Increase print size</li> <li>• Increase time</li> <li>• Optimal student seating</li> <li>• appropriate lighting level</li> <li>• facing glass or in shadow</li> <li>• using their own device</li> <li>• noise</li> <li>• clear proximity to the teacher (distanced)</li> </ul>	<ul style="list-style-type: none"> <li>• Page fluffers</li> <li>• Positioning aids (ident float/book holders for handwriting board)</li> <li>• Colored paper, overlay filters or lens</li> <li>• Tracking aids</li> <li>• Portable dictionary with speech output</li> <li>• Handheld reading device</li> <li>• Specialized format books                             <ul style="list-style-type: none"> <li>◦ large print</li> <li>◦ audio</li> <li>◦ electronic (softcopy)</li> <li>◦ braille</li> </ul> </li> <li>• adapted books                             <ul style="list-style-type: none"> <li>◦ device, software or app</li> <li>◦ variable color text/background combinations</li> <li>◦ word prediction</li> </ul> </li> </ul>

### Product-specific learning project

- ▶ Activity category (from GPAT guide)
- ▶ Specific task-demand within the activity category
- ▶ AT feature that augments or replaces the task-demand
  
- ▶ Example:
  - ▶ Category: Hearing and listening
  - ▶ Task-demand: Attentional and auditory processing demands of isolating teacher's voice from background noise in the classroom
  - ▶ AT feature: Sound field voice amplification system

### Product-specific learning project (continued)

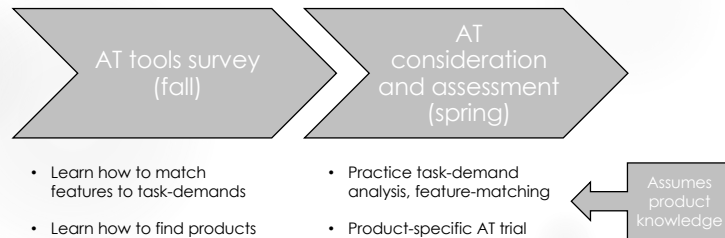
- ▶ Find 2 products that contain the specific AT feature
- ▶ Describe and evaluate the product using vendor website and online reviews
  - ▶ Product name, image and URL
  - ▶ Manufacturer name and contact info
  - ▶ Cost
  - ▶ Manufacturer support and training
  - ▶ Reliability analysis
  - ▶ Safety analysis
  - ▶ Performance analysis
  - ▶ Ergonomics, practicality, compatibility analysis
  - ▶ Personal acceptance (estimated)
  - ▶ Cost effectiveness
- ▶ Overall evaluation - which product would you choose to trial?

### Authentic perspective

- ▶ Project simulates real-life AT specialist/coordinator job task
  - ▶ Jumps over the AT assessment to the required tool feature
  - ▶ Find a product on the market that will fit the task-demands, be reliable, and maybe appeal to typical personal factors
- ▶ Weekly product reviews are posted to a Google site at the end
  - ▶ Capacity-building focus of ATP in schools

## Course sequence

Fall tools survey course prepares students for spring assessment course



## Draw-backs

- ▶ Labor intensive for students
  - ▶ Homework passes?
- ▶ Difficult for inexperienced students to find products
  - ▶ We provided a folder of vendor resources
  - ▶ We also did include a few specific products for illustrative purposes

## Building Capacity in Assistive Technology: Innovative Strategies in Pre-Service and In-Service Education-

Lynn Gitlow

## Challenge

- ▶ The development of innovative solutions to solve human problems is a team endeavor.
- ▶ This case presents OT students working in interprofessional teams in an assistive technology graduate course has challenges that must be overcome to foster innovation.
- ▶ These challenges can apply to students in any AT programs

## Challenge

- ▶ Accreditation standards
- ▶ CoA-RATE
- ▶ ACOTE

## Accreditation Standards- CoA-RATE

- ▶ Collaborate as needed with other team members.
- ▶ Principles of Design, Development and Application
  - ▶ 1) Universal design concepts
  - ▶ 2) Architectural accessibility (E.g., community, home, school, workplace, social, transportation, etc.)
  - ▶ 3) Environmental considerations
  - ▶ 4) Factors which contribute to the cost of devices
  - ▶ 5) Factors which contribute to usability in particular or multiple environments 6) Relationship of material and design to function
  - ▶ 7) Properties and strength of materials
  - ▶ 8) Electrical circuits, systems and components (e.g., batteries, chargers, fuses, microprocessors, etc.)
  - ▶ 9) Responsibilities, limitations, and violation of warranty
  - ▶ 10) Preventative maintenance and repair schedules for mechanical, electric, and electronic equipment
  - ▶ 11) Tools and their purpose and use (i.e., which tools perform which functions).
  - ▶ 12) Ergonomic functions

## Accreditation Standards- ACOTE

- ▶ Demonstrate knowledge of the principles of interprofessional team dynamics to perform effectively in different team roles to plan, deliver, and evaluate patient- and population-centered care as well as population health programs and policies that are safe, timely, efficient, effective, and equitable.
- ▶ Assess the need for and demonstrate the ability to design, fabricate, apply, fit, and train in assistive technologies and devices (e.g., electronic aids to daily living, seating and positioning systems) used to enhance occupational performance and foster participation and well-being.

## Institutional challenges

- ▶ OT graduate program in a private liberal arts college
- ▶ Solutions collaborate with Cornell- lost contact person
- ▶ Collaborate with physics students
- ▶ Collaborate with local resources

## Prototyping Project

- ▶ For this project, students will design and create solutions for people or individuals. Working in a group, students will research existing options, synthesis this research with the information presented in class, and prototype a solution for the chosen task. (An example from previous classes include the creation of a device to help cognitively challenged consumers weigh package contents understand how much weight to add or take away to get the correct amount).

## Where do we get the problems?

- ▶ Clinical Practice- compression sock donner
- ▶ On Campus- Office for students with disabilities – Privacy dividers for testing
- ▶ Student fieldwork experiences- adaptive marker holder
- ▶ Local clinicians- Bubble bike
- ▶ Local consumers- child seat for wheelchair user

## Project Checklist: Prototyping

### 1. What is the problem? Describe your project

- Assemble your team. Who was on your team? If you collaborated with the 3-D students and/or the Generator what did you learn from them? What did they contribute to your team? How did this help you achieve your final goal?
- Research and document all the background work that you did
- Prototype your solutions. Include your drawings or plans as evidence of how your project developed.
- Test your prototype or present your solution as it develops and update your solutions. Document this process
- Final prototype at presentation

## Team members

- ▶ Physics students in a design and entrepreneurship class
- ▶ Local maker space- Ithaca Generator
- ▶ Friends

## Final Projects- Innovations



## Ongoing Challenges

- ▶ Timing
- ▶ Liability issues
- ▶ Entrepreneurial considerations

## Questions

- ▶ Suggestions ?

David L. Jaffe, Stanford University



- ▶ Challenge:

Offer a course that is academically appropriate and interesting for students from various disciplines and years who have varying skills, backgrounds, available credit hours, and expectations.





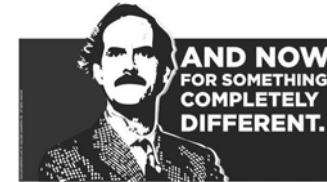
## Strategies

- ▶ Create a flexible course enrollment structure, including an independent study option
- ▶ Employ excellent guest lecturers who address interesting topics
- ▶ Don't bother with tests, quizzes, exams - focus on promoting / practicing important professional career skills
- ▶ Offer a wide variety of candidate student team projects suggested by local community members who are older adults or who have a disability
- ▶ Utilize available shop resources: equipment and teaching assistants
- ▶ Schedule non-classroom sessions: film screening, field trips, Assistive Technology Faire
- ▶ Get student feedback: evaluate guest lecturers, project team presentations, and their course and project experiences
- ▶ Invite community members (including older adults and individual with disabilities) to sit in on lectures
- ▶ Coach assistive technology projects in other courses
- ▶ Promote RESNA Student Design Competition



## What could go wrong?

- ▶ You are trying to achieve something completely different
- ▶ You do not have the desire or flexibility to organize a course in this manner
- ▶ You may not think your students have the interest or capability
- ▶ You experience a lack of resources:
  - ▶ suitable projects with community members
  - ▶ \$ and lab space
  - ▶ excellent guest lecturers



## Comments from students



ENGR110 is a very unique course, unlike any other I've taken. The variety of topics, field trips, lecturers, and to be able to work with community members is really one of a kind.

ENGR110 is a really unique class in the ME department in that it explores a whole different field of engineering applications compared to the conventional automotive and aerospace industries. You get the opportunity to engage with people with a vast array of disabilities, and as its name suggests, the course presents really eye-opening perspectives on how people manage physical and mental impairments. I highly recommend taking on a project with a community member because they're all so friendly and open to working with students in finding solutions.

TAKE THIS CLASS. Honestly, this was one of the best, and one of the most life-changing classes I have ever taken. It was my first, and probably my only opportunity to make something that actually improves someone's life while here at Stanford. Guest lecturers were extremely interesting.

## Online and F2F graduate courses in assistive technology

CAREN SAX & MARCIA SCHERER

## SDSU description

- ▶ Challenge: Addressing a range of student knowledge, experience, and comfort level in both online and F2F graduate courses in assistive technology.
- ▶ Innovations: Using various instructional strategies with individual and group projects, i.e., "Exploring Technology" as an introduction to A.T., ADA Accessibility Surveys; bringing in former students to present their experiences & Tech Team projects; meeting A.T. users to learn first-hand experience; visiting local AT sites

## Caren Sax & Marcia Scherer San Diego State University

### Challenge

Addressing the breadth of AT in a course for non-AT specialists, including vocational rehabilitation counselors, special education transition teachers, community college/university disability counselors & instructors.



## Pedagogical Strategies

### F2F Instruction

- ▶ *Exploring Technology* activity
- ▶ Guest presenters include AT users, rehabilitation engineers, former students who successfully completed projects; each present case scenarios for the students to brainstorm solutions (DB after each presenter for reflections); book & MPT author (via distance)
- ▶ Completion of ADA Accessibility Survey in local establishments
- ▶ Class visits to local AT centers
- ▶ Tech Team projects, including MPT assessments
- ▶ Poster session of final projects

### Online Instruction

- ▶ *Exploring Technology* activity
- ▶ Guest presenters record narrated PPT; videos of some guest presenters
- ▶ Completion of ADA Accessibility Survey in local establishments
- ▶ DB on community site visit to share resources
- ▶ MPT assessments with PPT presentations of analysis
- ▶ Short PPT presentation of final Tech Team projects posted for all to see/peer evals & comments from students

## Discussion Forum prompts

### F2F Instruction

- ▶ Reflections on guest speakers – thoughts, reactions, understanding from presentations, relationship to book/other readings
- ▶ Reflections on visits to local A.T. centers
- ▶ Questions, comments, feedback on MPT and *Living in the State of Stuck* to Dr. Scherer

### Online Instruction

- ▶ Student Q & A forum
- ▶ Background with A.T.; goals, reactions to intro PPTs
- ▶ Results of *Exploring Technology* assignment
- ▶ Addressing specific prompts based on readings, videos
- ▶ Reflections on community A.T. site visit

## Using technology to support learning

Blackboard/Canvas LMS features:

- ▶ Mediasite: captures live presentations for viewing in distance courses; automatically transcribes audio that's recorded to the cloud
- ▶ PlayPosit: Build in pauses in video to ask questions about content; offers analytics to determine student participation, understanding
- ▶ Ally: Checks course materials for accessibility; provides alternative formats (audio, electronic Braille); 'fixes' some materials for increased accessibility, or identifies what needs to be done



- ▶ The *Applications of Rehabilitation Technology* course is designed to address CORE/CACREP accreditation standards, including assessment, professional counseling orientation & ethical practice, along with career development.
- ▶ Many of these are consistent with AT standards adopted by RESNA & CAAHEP related to assessment, intervention strategies, evaluation, professional conduct, and use of EBP.

Building Capacity in Assistive Technology:  
Innovative Strategies in Pre-Service and In-Service Education

THERESE WILLKOMM, PHD, ATP

Graduate Certificate in Assistive Technology

Mandatory AT Courses for OTs and SLPs

Inservice AT Training

### Assistive Technology Course Work for Pre-Service for OTs and SLP

- ▶ In 2008 - a 5 credit mandatory AT course for OT students
- ▶ In 2017 Mandatory 4 credit course in AAC required for SLP students

### Graduate Certificate in Assistive Technology

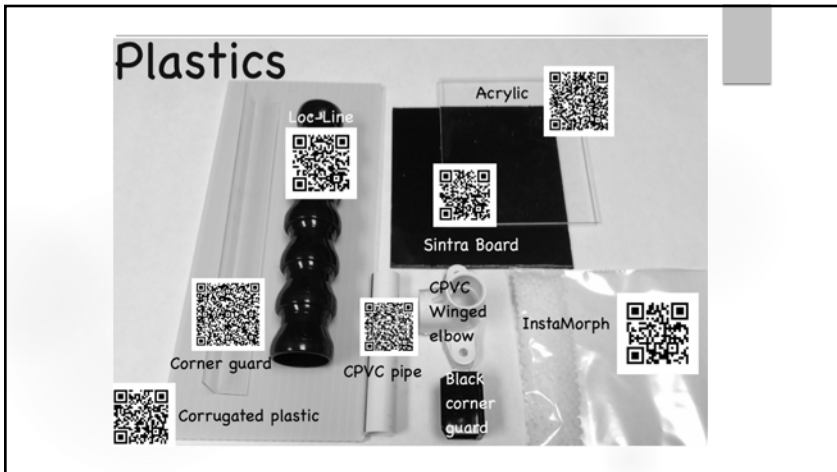
- ▶ Started in 1998 - 21 years
- ▶ 15 Credit Program - over 400 students enrolled over 20 years
- ▶ 2018 - On-Line/Hybrid

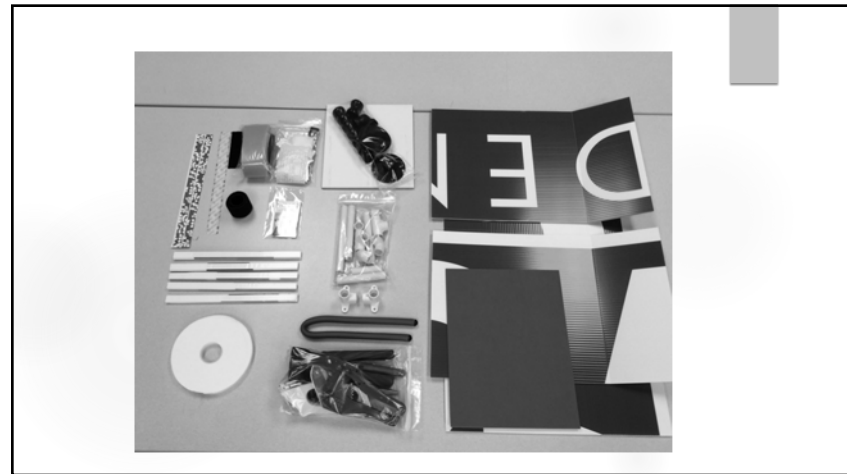
### Courses are 50% Video Demonstrations and Lectures and 50% Hands-On AT Learning

- ▶ Intro to AT
- ▶ Fabrication/Modification Methods, Materials, Tools and Techniques
- ▶ AT for Vision and Hearing
- ▶ AT for Communication and Cognitive Impairments
- ▶ AT for EADLs for Phys Dis and Switch Access
- ▶ AT and Seating and Mobility, Home, Worksite, Recreation, and Vehicle Mods
- ▶ iPads and Children with Disabilities
- ▶ Capstone course- critical evaluation /reflective process and presentation









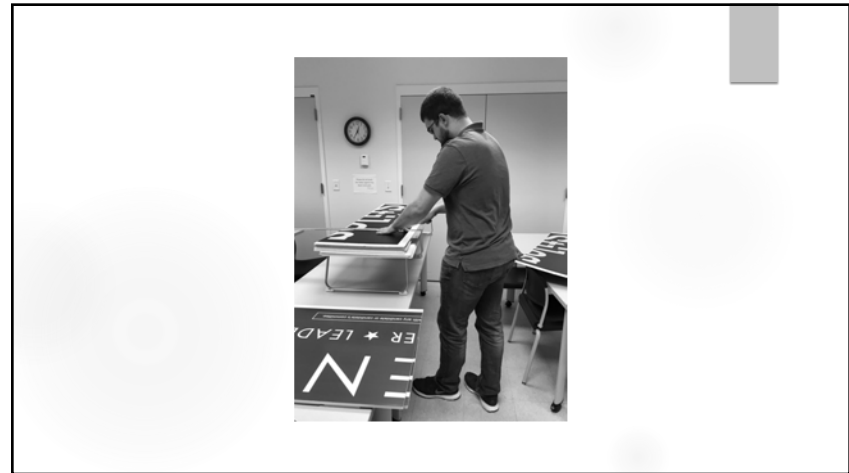


### 30 AT Inservice Training Events Each Year

- ▶ AT Maker Workshops
- ▶ After School Workshops
- ▶ Caregiver Workshops
- ▶ Webinars
- ▶ Piggyback Workshops
- ▶ IPAD workshop










# The AAC Learning Center(s): Online Supports for Pre-service Instruction

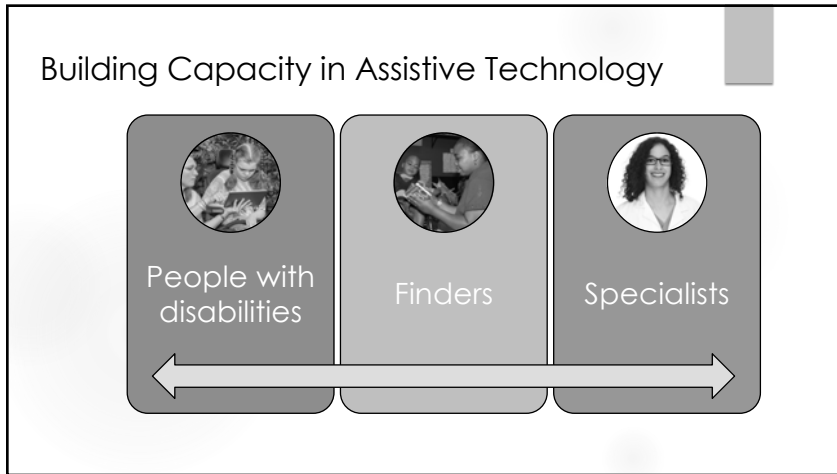
DAVID MCNAUGHTON



# Challenge



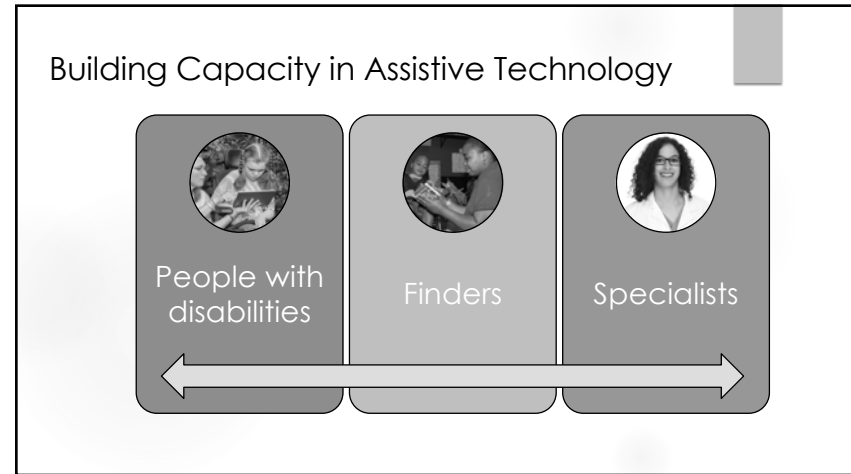
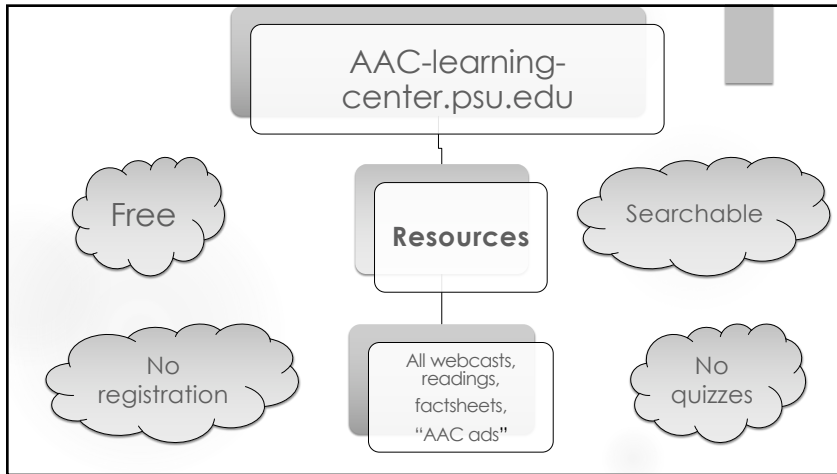
Less than 1 in 10 adults with developmental disabilities have access to AAC



### Spreading awareness of AAC

- ▶ Who?
  - ▶ General public
  - ▶ Pre-service professionals
  - ▶ Education professionals, SLPs, OTs





### Preservice training

- ▶ 18-35% of preservice programs do not offer any coursework at all in AAC
- ▶ Many of the programs that offer training in AAC, do so on a limited basis
  - ▶ 1-4 hours of AAC content
- ▶ 64% of programs report that **faculty who are not experts in AAC typically teach the AAC courses**

▶ Light et al (2014)

### AAC-Learning-Center-Moodle.psu.edu

The screenshot shows the Moodle interface for the AAC Learning Center. It includes a navigation menu, a welcome message, and a list of available courses such as 'AAC and Literacy' and 'Alternative Access'. There are also icons for accessibility and a search bar.

**Funding for AAC for Children and Young Adults**

Dashboard > My courses > Funding.AAC.Children

**Introduction**

This course provides information on funding for AAC devices (focusing on speech generating devices, or SGD) for school-age children and young adults. The course contains 2 modules

- Funding for AAC in Schools
- Writing SGD Funding Requests

Each module can be completed independently and can result in a certificate of completion. Learners must successfully complete *Funding for AAC in Schools* before beginning *Writing SGD Funding Requests*

**Funding for AAC in Schools**

This seven-lesson module describes the funding process for SGDs, including funding options, and the roles and responsibilities of speech-language pathologists, educators, and family members.

**Activities**

- Certificates
- Lessons
- Quizzes

**Upcoming events**

- Web-based Supports for Pre-Service and In-Service Education in AAC (ISAAC Webinar) Tuesday, 3 October, 7:00 PM - 8:00 PM

## Courses

### 1b) What are the school's responsibilities for AAC?

**School's Responsibilities:**

If it is determined that a child would benefit from AAC, including the use of a SGD, the school is responsible for insuring that the student has access to an appropriate AAC system. This means that the school must both:

- provide the child with an appropriate AAC system ( which may include a SGD); and
- provide the supports needed for the child to learn how to use the SGD (this may include services for the child, and supports for the team working with the child).

This does not mean that the school has to pay for the SGD; there are a variety of funding options to help the child obtain the use of a SGD.

The school's responsibility for providing AAC services (including SGDs) is based on

The diagram shows a central box: "The school's responsibility for providing AAC services (including SGDs) is based on". To the left is a circle labeled "IDEA Individuals with Disabilities Education Act". To the right is a circle labeled "ADA Americans with Disabilities Act". Below these is a circle labeled "State Education Standards". Arrows point from each of these three circles towards the central box.

- ▶ Quizzes
  - ▶ Multiple-choice, fill-in-the-blank
- ▶ Certificates
- ▶ Badges

What, Why, How

What word refers to a device program that will produce text for people with limited hearing and vision?

Answer: \_\_\_\_\_

What American legislation guarantees that students with a disability are provided with Free Appropriate Public Education (FAPE), including that individualized support?

Answer: IDEA

**AAC and Literacy**

Teaching letter-sound correspondences

## Individual User Accounts

**Stewart Tottenham**

Course overview

Timeline Courses

- Funding for AAC for Children
- Resource Center: Webcasts with optional quizzes

Latest badges

- AAC Intervention for hearing language (LPI)
- The Dual Challenges of Aided Communication and Accessibility

Private files

- Manage private files...

Topic	Target date
<b>Funding</b> - Overview - Submitting a funding request	Available
<b>Alternative Access</b>	Available
<b>Literacy</b> - Instruction in early reading skills	Available
<b>Family centered practices</b> - Active listening	• pilot 9/1/2019 November 1, 2019
<b>Transition</b> - Building Community	July 15, 2020

### What do the students say? Literacy course (Summer 18)

Learning how to teach literacy skills to a child who has difficulty with speech is important for me in my future work as a professional	strongly agree	agree	no opinion	disagree	strongly disagree
	24	6	1	0	1
	73%	18%	3%	0%	3%
Completing this module ___ my skills in teaching letter sound correspondences to a child with complex communication needs	strongly improved	improved	did not change	worsened	strongly worsened
	16	15	2	0	0
	48%	45%	6%	0%	0%
Would you recommend this module to another person who wants to participate in an online learning module on this topic?	strongly recommend	recommend	no opinion	not recommend	strongly not recommend
	19	13	0	0	1
	58%	39%	0%	0%	3%
The methods used to teach in this on-line lesson were effective for me	strongly agree	agree	no opinion	disagree	strongly disagree
	17	12	3	0	1
	52%	36%	9%	0%	3%

### What does the research say? Adapted literacy instruction Caron et al (2018)

aac.psu.edu

### Faculty area

- ▶ Share resources
  - ▶ Discussion starters
  - ▶ In-class practice activities
- ▶ Feedback on courses
  - ▶ Strengths
  - ▶ Areas for growth

**What's coming next?**  
 We will be looking for feedback on the pilot course and materials and your development, and when this will be possible for you we will let you know.

Check with your supervisor about the possibility for 100% and working with a graduate supervisor for your final year.

Research, methods and under development  
 Research, methods and under development  
 What are resources would you like to see?

**What do people say?**  
 What do students and practitioners say about the currently available resources and material?

Research for practitioners - what has been your experience with the material?  
 Research for practitioners - what has been your experience with the material?

**Additional Materials**  
 These include practice activities, resources related to AAC that are not "research", but have been identified as useful activities.

Experiences of parents who use AAC  
 Research for practitioners of parents who use AAC?  
 Experiences of family members  
 Research for practitioners of family members

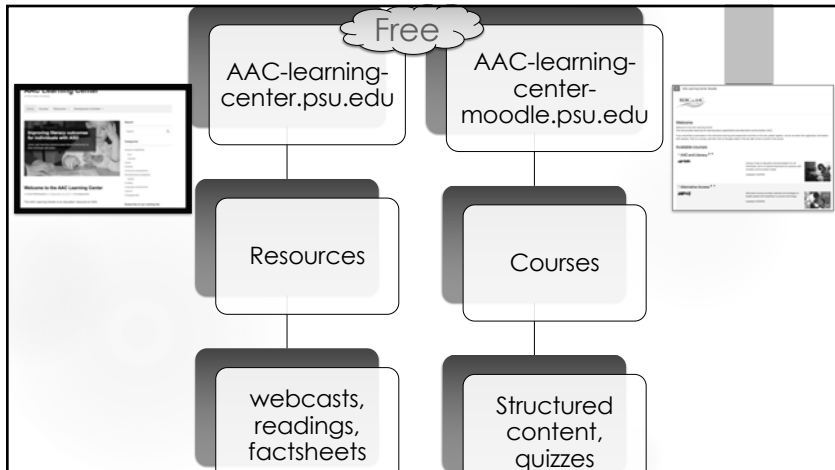
## Discussion Boards

- ▶ Q&A with Guest Speaker
  - ▶ Threaded discussion
- ▶ Open to all persons who have obtained passing score on quiz
- ▶ Scheduled and time-limited
  - ▶ 3 times per year?
- ▶ Archived

## Interactions with Guest Speakers

### ▶ Chris Klein

- ▶ "Community Participation and Persons who use AAC"
- ▶ Participation on "Blog"
  - ▶ Answer posted questions from all students who had completed Course and quiz activities
  - ▶ Available to any student, anywhere
    - ▶ "blend" into other classes



## Online Supports for Pre-service Instruction



## RERC-AAC.ORG

- ▶ The contents of this presentation were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number #90RE5017) to the Rehabilitation Engineering Research Center on Augmentative and Alternative Communication (RERC on AAC).
- ▶ NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this presentation do not necessarily represent the policy of NIDILRR, ACL, HHS, and you should not assume endorsement by the Federal Government.



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