Assistive Technology and Virtual Reality—What VR Can Do For You

Jaclyn Wickham

Education Technology Specialist

Founder of AcclimateVR

www.CTDInstitute.org

Jaclyn Wickham

M.P.S., Human-Computer Interaction

Education Technology Specialist

Founder of AcclimateVR

www.acclimatevr.com

jaclyn@acclimatevr.com

@JacWickham

@AcclimateVR

Our Mission

Our mission is to leverage virtual reality technology to help students with autism and other developmental disabilities experience real-world situations and develop everyday living skills in a safe environment.

What We're Building

Our VR teaching tools are designed to help children and teens on the autism spectrum develop independent living skills, practice social skills, build safety awareness, and navigate challenging community locations.

DAILY LIVING SKILLS

SOCIAL SKILLS

SAFETY AWARENESS

EXECUTIVE FUNCTIONING

AcclimateVR

CTD

Agenda

- VR vs. AR: What's the difference?
- Types of VR
- Practical applications of VR (in the assistive technology space)
- AcclimateVR's approach
  - What we're building
  - What we're learning from pilot studies
- Practical applications of AR (in the assistive technology space)

Agenda

- VR vs. AR: What's the difference?

Poll: What is the difference between AR and VR?

Augmented Reality (AR) vs Virtual Reality (VR) infographic

Augmented Reality (AR)

AUGMENTED *means* improved (or) enhanced or expanded.

AR is the blending of virtual reality and real life, as developers create images within applications that blend in with contents in the real world.

AR is open and partly immersive.

Virtual Reality (VR)

VIRTUAL *means* not physically existing but made by software to appear so.

Virtual reality is all about the creation of a virtual world that users can interact with.

VR is closed and fully immersive.

Infographic by Earthly Mission

www.CTDInstitute.org

AR puts virtual things into users' real worlds, augmenting them.

25% Virtual + 75 % Real = AUGMENTED REALITY.

With AR, users continue to be in touch with the real world while interacting with virtual objects around them.

Where VR puts users inside virtual worlds, immersing them.

75% Virtual + 25 % Real = VIRTUAL REALITY.

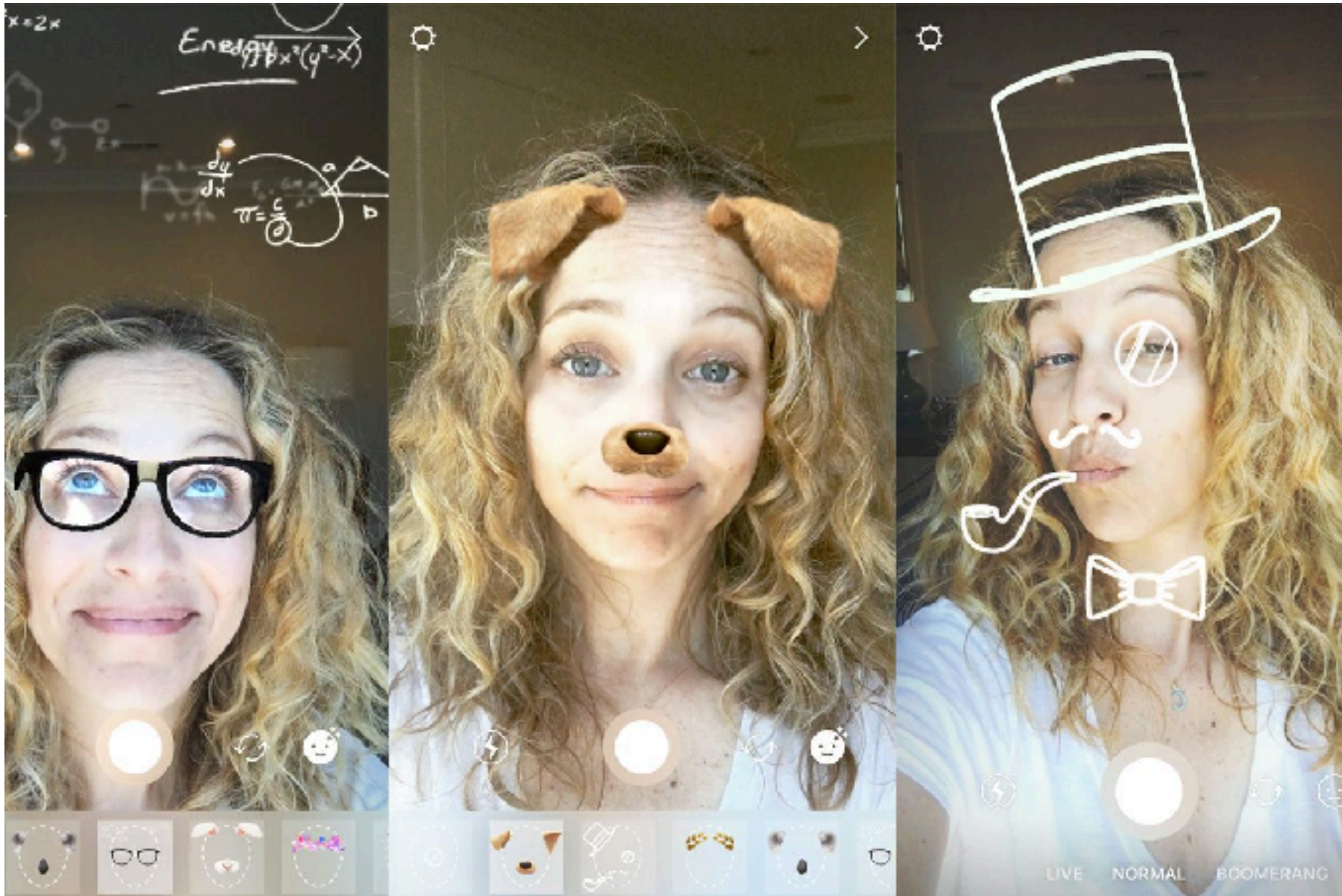With VR, the user is isolated from the real world while immersed in a world that is completely fabricated.

Infographic by Earthly Mission

www.CTDInstitute.org

www.CTDInstitute.org

Virtual Reality

www.CTDInstitute.org

Poll: Have you tried VR, and if so, which headset did you try? What did you experience?

Agenda

- VR vs. AR: What's the difference?
- Types of VR

Computer-Generated VR

www.CTDInstitute.org

Computer-Generated VR

360-Degree Spherical Content

Samsung Gear 360 fisheye video to equirectangular video

Agenda

- VR vs. AR: What's the difference?
- Types of VR
- **Practical applications of VR (in the assistive technology space)**

Why Consider VR for Autism?

- A safe, controlled environment

- Accessible practice and unlimited repetition

- Emphasis on visual and auditory cues

- Individualized experience

- Preference for computer interaction

- Nonverbal interaction possibilities

What does the research say?

- http://www.virtualgalen.com/virtualhealing/autism.htm

- http://www.do2learn.com/aboutus/research/briefreport.htm

- https://network.autism.org.uk/good-practice/evidence-base/potential-virtual-reality-technologies-autistic-people

What does the research say?

The immersive nature of VR raises some important questions:

1) Can individuals with ASD interact successfully with VR tools?

2) Do they suffer any negative sensory effects?

3) Are the individuals able to transfer, or generalize, the skills learned in the virtual environment to real world settings?
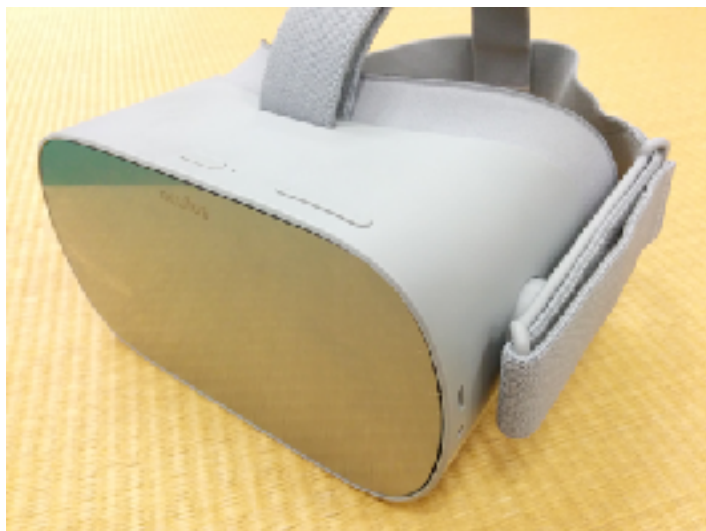
Interested to Learn More?

Safety and efficacy of virtual reality for teaching life skills to children with autism

AcclimateVR

Subscribe to AcclimateVR Blog and Download our Research Roundup:

www.acclimatevr.com/research

Then Vs. Now

CTD

VR Applications in the Assistive Tech Space

- [Join attention skills](#)
- Sensory-Based Experiences
- Exposure Therapy (Reduce Anxiety)
- Social Stories
- Community-Based Instruction

- Social Skills
- Executive Functioning
- Daily and Independent Living Skills
- Safety Awareness
- Social Modeling

Crossing the road.

When I want to cross the road I need to stop and wait on the footpath.
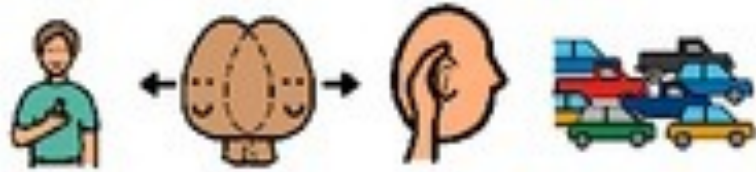
I need to look both ways and listen for any moving cars.

When there are no moving cars it is safe to cross the road.

A Social Story:
I Can Cross the Road Safely!

STOP

Agenda

- VR vs. AR: What's the difference?

- Types of VR

- Practical applications of VR (in the assistive technology space)

- AcclimateVR's approach

  - What we're building

  - What we're learning from pilot studies

What We're Building

Our VR teaching tools are designed to help children and teens on the autism spectrum develop independent living skills, practice social skills, build safety awareness, and navigate challenging community locations.

DAILY LIVING SKILLS

SOCIAL SKILLS

SAFETY AWARENESS

EXECUTIVE FUNCTIONING

AcclimateVR

CTD

COMMUNITY-BASED INSTRUCTION

Percentage									
	50	50	50	50	50	50	50	50	
	40	40	40	40	40	40	40	40	
	30	30	30	30	30	30	30	30	
	20	20	20	20	20	20	20	20	
	10	10	10	10	10	10	10	10	
	0	0	0	0	0	0	0	0	
Date:									
Initials:									

1. Make grocery list	I	
2. Walk into grocery store	I	
3. Get shopping basket	GP	
4. Take out grocery list	GP to pocket	
5. Locate grocery store section for food item	I	
6. Pick up item from shelf	I	
7. Walk to cashier line "Where do you go next?"	I	
8. Wait in line	I	

CHALLENGES

(1) ACCESS

CHALLENGES

1 ACCESS

2 TIME

> " We have **thirty minute** OT sessions throughout the day. Many of our students have specific goals in their IEPs to be able to go to the grocery store and pick out ingredients for a recipe, but it's not always an option time-wise for us to take them there.
>
> -Occupational Therapist, MCC

CTD

CHALLENGES

1. ACCESS
2. TIME
3. SAFETY

> " What we try to do for one of our students is stand 15 feet back [when we are in the store practicing] so that he feels he's alone. But we have to worry about safety.
>
> -Occupational Therapist, MCC

1 **ORGANIZATION**

2 **TIME**

3 **ACCESS**

4 **LOGISTICS**

Guidelines:
1. Permission forms must be obtained prior to participating in any activity.
2. Permission forms must be taken on all CBI trips.
3. Community-based instruction must be tied to IEP goals.
4. Students must have some form of identification with them.
5. Student Locator form submitted to school office prior to leaving grounds.
6. Submit reimbursement form as soon as possible.
7. CBI trips are NOT field trips. CBI is a way to reinforce what is being taught in the classroom.
8. **Each domain** should be addressed at least once per school year.
9. CBI trips should be individualized. It may not be appropriate for all students to participate in all activities.
10. All students must have appropriate supervision whether they're staying at school or participating in CBI trip.
11. CBI may only take place within Anderson School District 5.
12. Trip is cancelled if having inclement weather.
13. Trip is cancelled if teacher cannot participate.
14. Contact coordinator **IMMEDIATELY** if CBI trip is to be cancelled.
15. May attend only one location during trip.
16. ALL transportation issues **must** go through coordinator such as scheduling, canceling, questions...) teachers/parapros should not contact transportation.
17. CBI times 10:30-12:30. Any request for variation on time(s) should be submitted with initial schedule submission.
18. Adhere strictly to times – just because you leave late does not mean you can stay late!

www.CTDInstitute.org

DESIGN AND DEVELOPMENT PROCESS

COLLABORATIVE DESIGN
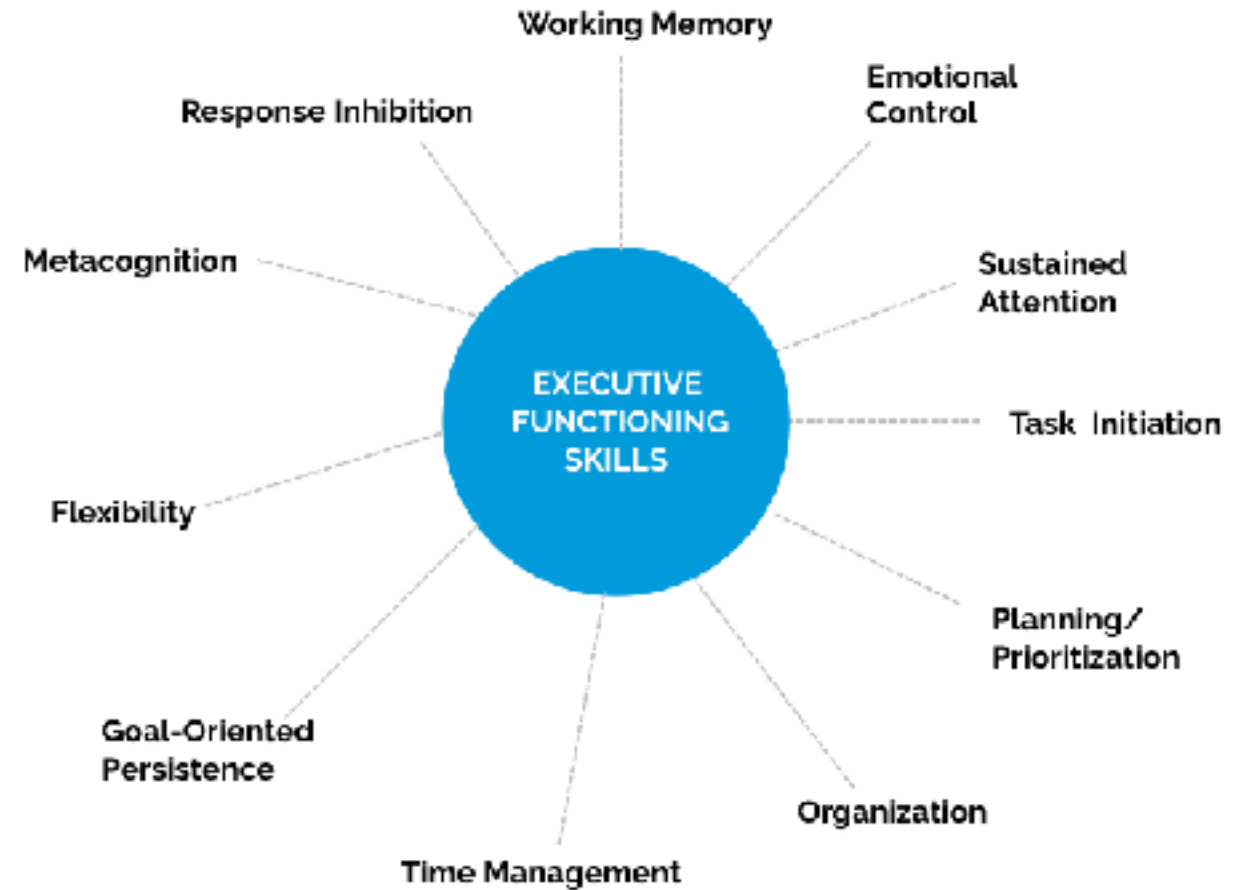
INSTRUCTIONAL DESIGN

INTERACTION DESIGN

PRODUCTION
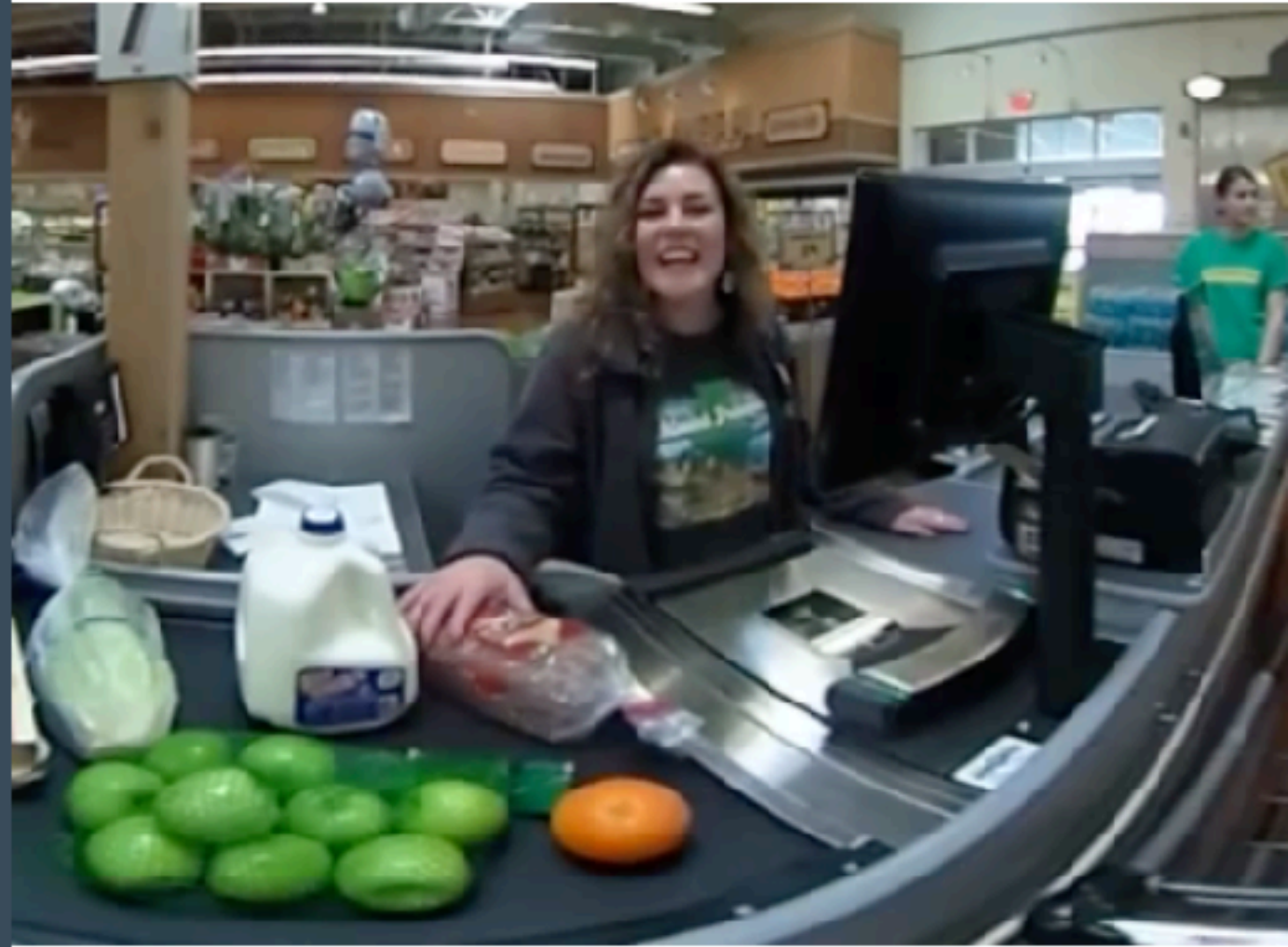
ITERATIVE PROTOTYPING

USER TESTING

Initial Prototype: Grocery Store

Working Memory

Emotional Control

Response Inhibition

Sustained Attention

Metacognition

EXECUTIVE FUNCTIONING SKILLS

Task Initiation

Flexibility

Planning/ Prioritization

Goal-Oriented Persistence

Organization

Time Management
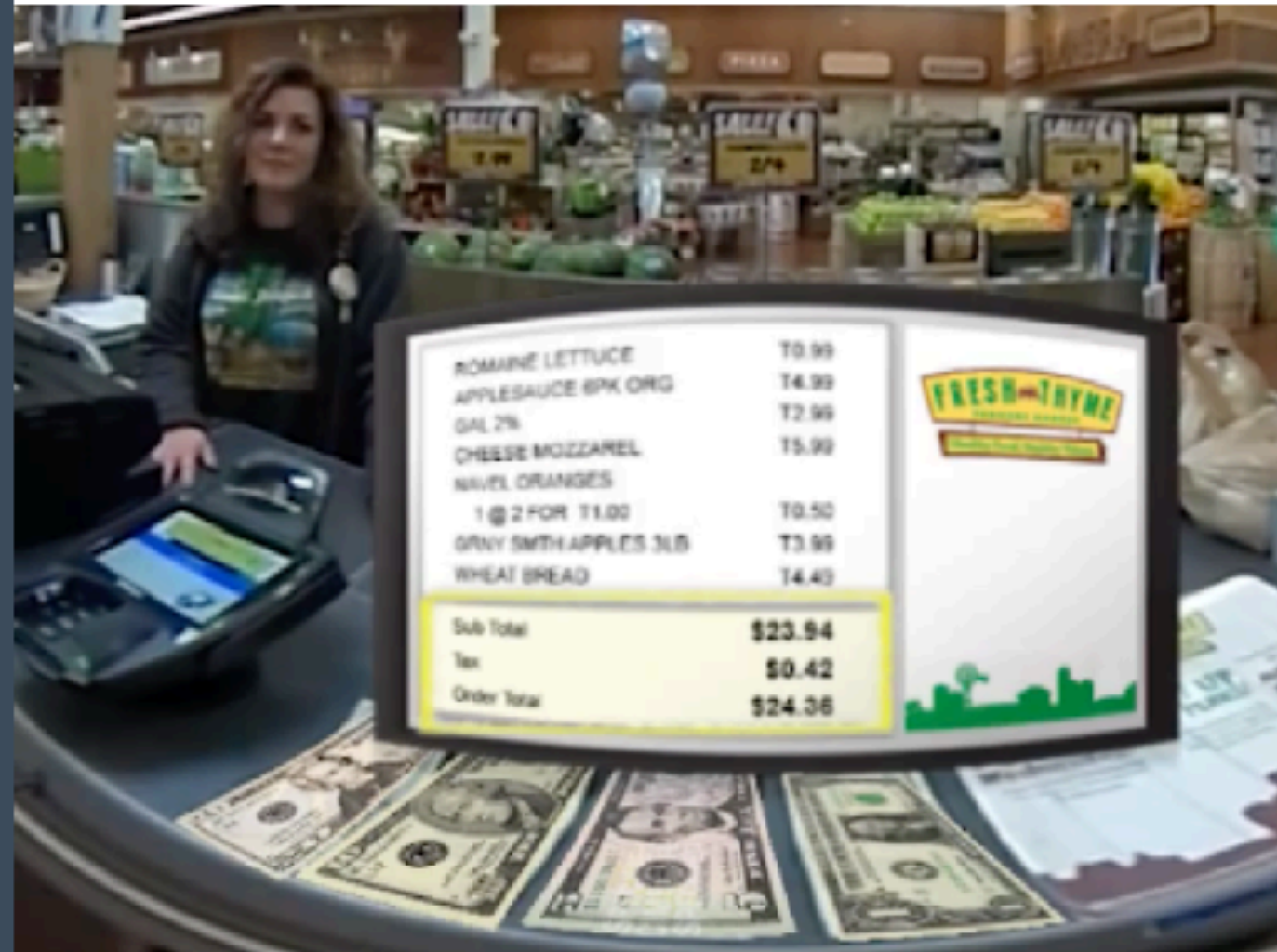
Real people, real places.
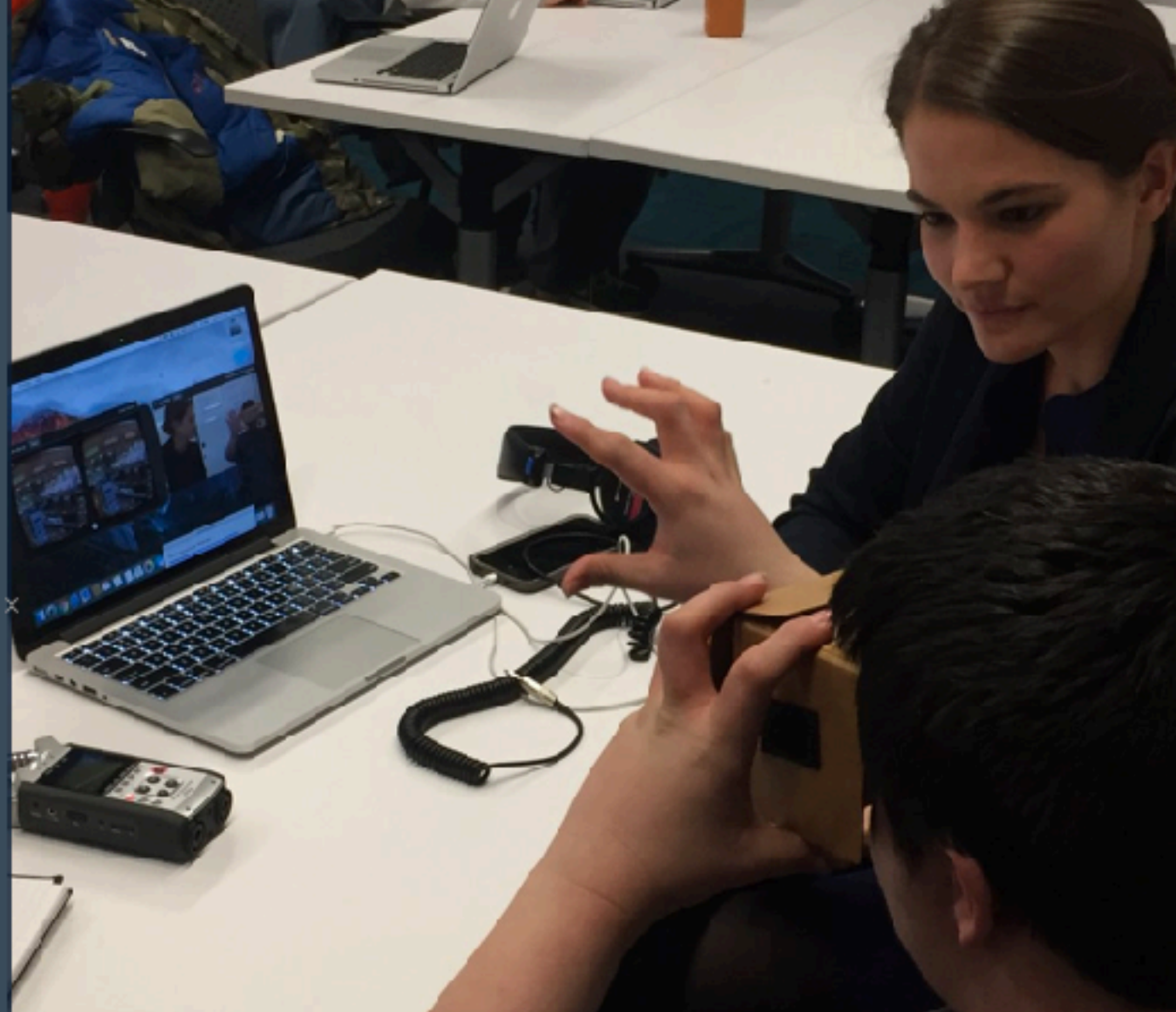
- Immersive Video-Modeling
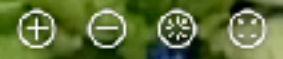
Students should be actively participating.

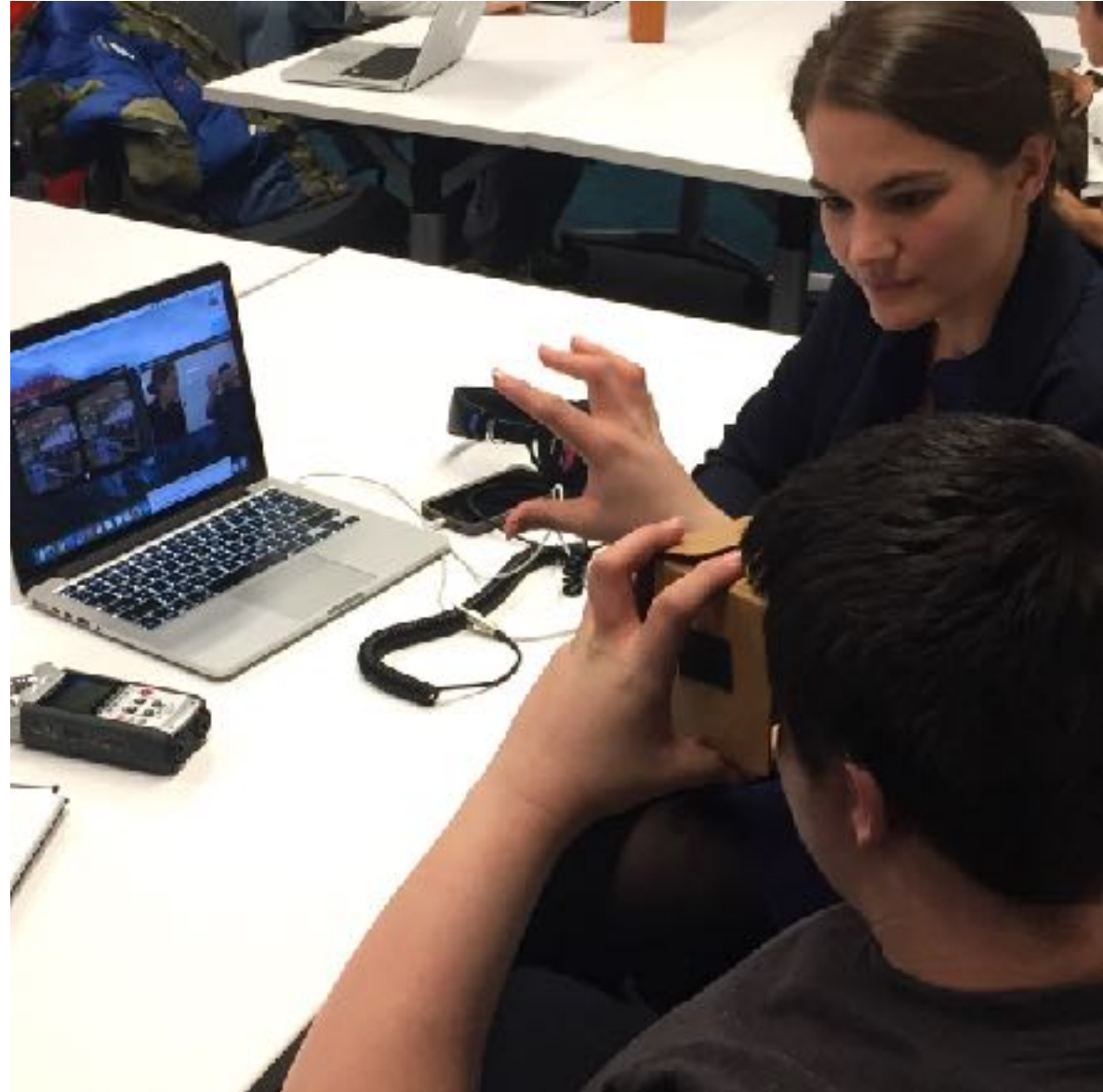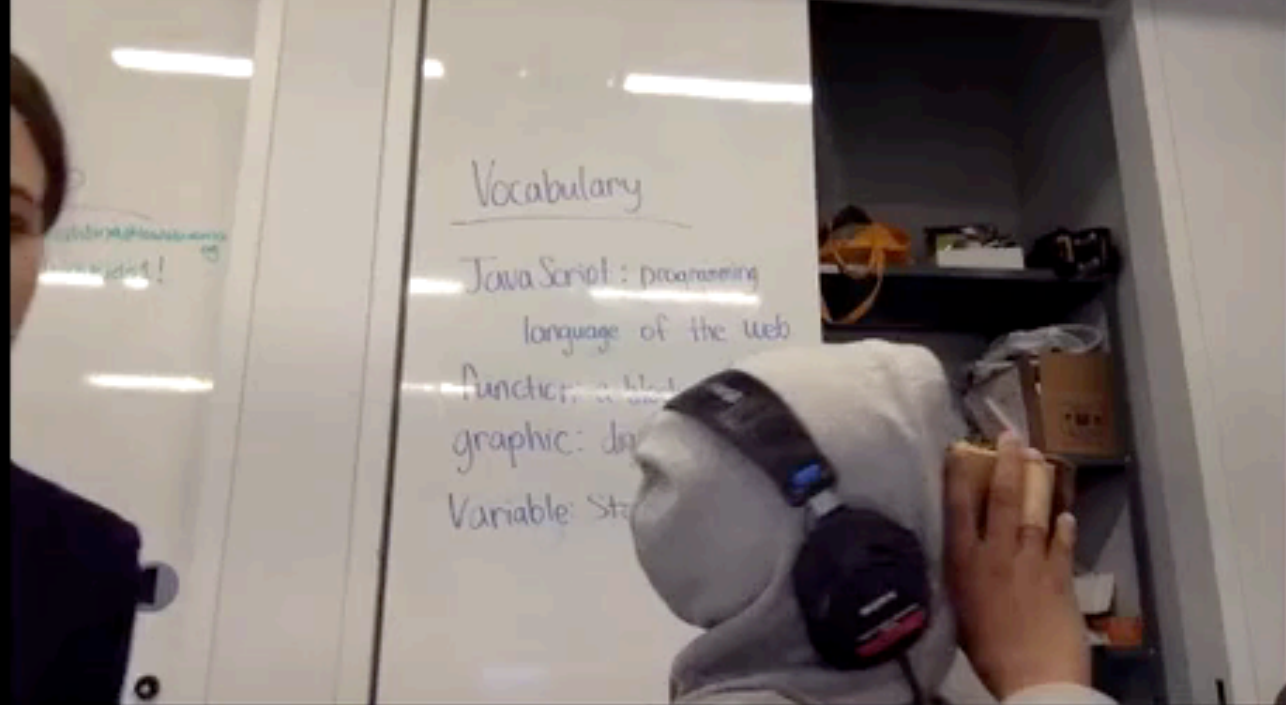- Embedded assessments with real-time feedback

Teacher/Therapist View

- Observe and monitor student's VR experience on a separate device.

Usability Testing

Differentiating the VR Experience by Controlling Sensory Inputs

- [ ] Video (movement and people in scenes)
- [ ] Still photo (no movement)
- [ ] No background noise
- [ ] Background noise (atmospheric sounds)
- [ ] List with pictures
- [ ] List without pictures
- [ ] No Visual Cues
- [ ] Visual Cues
- [ ] No Verbal Prompting
- [ ] Narrator Prompting

What We're Learning from Pilot Studies

Wildwood Schools

- Wildwood schools works with individuals and their families from over 65 districts in eastern NYS

- Student that come to Wildwood have either autism or other neurologically-based disabilities.

- Wildwood services run from a school-based setting all the way to adult homes and everything in between.

- Focus is on academic, social, employment, and functional skills in a team effort with the individual and their family.

TEAMS/AREAS OF FOCUS

1 PEDESTRIAN SAFETY

2 PLAY SKILLS

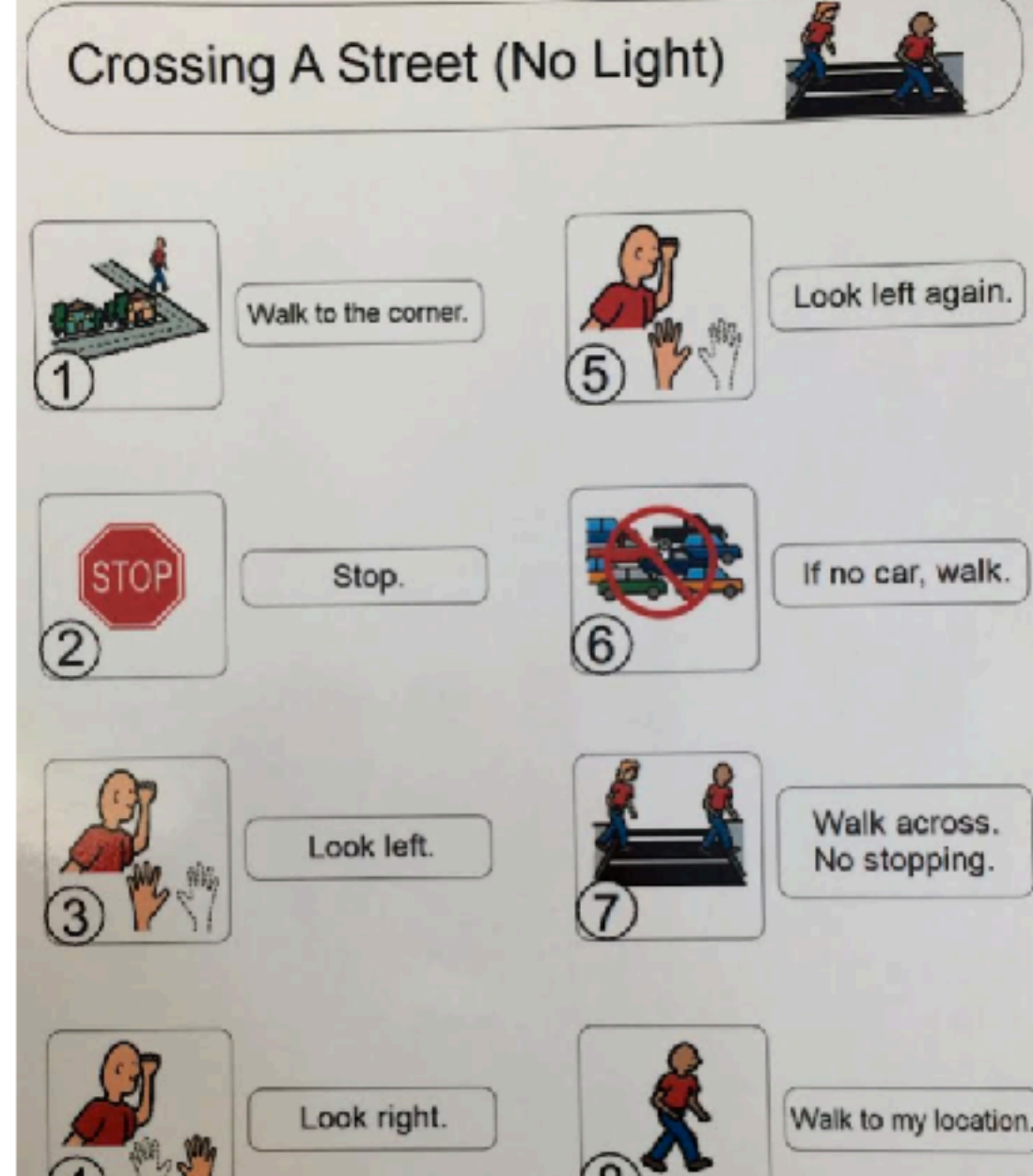**3** COMMUNITY OUTINGS

4 WORK SKILLS

1 PEDESTRIAN SAFETY

Objective:
To provide a safe way for students to practice navigating crosswalks as well as pedestrian signs in order to cross streets and pedestrian traffic areas.

Rationale: Why VR?
Can't always safely teach this given unpredictable nature and sometimes lack of spaces.

Crossing A Street (No Light)

① Walk to the corner.

② Stop.

③ Look left.

④ Look right.

⑤ Look left again.

⑥ If no car, walk.

⑦ Walk across. No stopping.

Walk to my location.

2 PLAY SKILLS

Objective:
Teach appropriate play skills and how to play a game with peers in a controlled and distraction free environment.

Why VR?
Often times it is challenging to do this without outside distractions from the environment.

VR will also allow students to practice this more frequently without needing to set up actual play scenarios over and over. As mentioned above, can hone in on a certain individuals needs/deficits and start there.

Sometimes my friends are playing a game without me.

I want to play too but I shouldn't just go and start playing.

I can walk over and ask, "Can I play too?" I need to wait for them to answer.

If they say yes - I say "thanks" and start playing. If they say no - I say "no problem, maybe next time."

My friends are happy when I ask if I can play. We can have fun!

CID

Objective:
To provide a way to teach the skills necessary to gain employment in a retail setting from customer interactions to register training.

Rationale: Why VR?
Fills that very necessary void between training and practice. Can hone in on very specific targeted deficits.

CTD

Usability Testing

AR as Assistive Technology

Agenda

- VR vs. AR: What's the difference?
- Types of VR
- Practical applications of VR (in the assistive technology space)
- AcclimateVR's approach
  - What we're building
  - What we're learning from pilot studies
- **Practical applications of AR (in the assistive technology space)**

- Abstract Language

- Emotions

- Social Pragmatics

COLOR BLACK MOMENT

Craig Smith: AR KIT

- Visual Schedules
- Emotional Regulation
- Social Modeling
- AR AAC
- Visual Focus
- Bravery Tool
- Sensory Customization
- Life gamification

- Annotate Others
- Annotate Ourselves
- Curiosity Tool

We want to hear from you!

At the end of the webinar,
please fill out the brief survey
www.surveymonkey.com/s/CTDCafeEvents

When you complete your survey,
visit the link provided to get your
Certificate of Participation.

"Assistive and Instructional Technology Supporting Learners with Disabilities"

The Center on Technology and Disability is funded by the U.S. Department of Education, Office of Special Education Programs (OSEP) under award #H327F130003 – 13A.