Using Technology to Support Skill Acquisition and Independence of Students with Autism Spectrum Disorders

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UMARC TALK

GULNOZA YAKUBOVA, PH.D.

CONTACT EMAIL: GULNOZA@UMD.EDU

Goal of this session

To leave this session with new ideas for using technology with your children or students with ASD

Background about my work

1. Instructional strategies while integrating technology to support students with autism spectrum disorders (ASD) transitioning from school to adult life
   1. video-based instructional strategies
   2. mobile technology
   3. virtual and augmented reality

Why focus on secondary school students:

➤ Most students with ASD (more than 50%) do not have any type of activity, especially, within the first two years of graduation from high school

➤ Being from ethnic minority and lower-income families = lower odds of having any job (part-time or full-time)

(Roux et al., 2013; Shattuck et al., 2012)

Why focus on secondary school students:

➢ Young adults with ASD do not have the supports they had while they were in K-12, e.g., IDEA and funding that comes with it, professional support, access to resources, etc.

➢ Most end up living at home or in residential settings without fully knowing how to navigate an adult life

Technology and Students with ASD

➢ Affinity with technology

➢ Keen to watch videos/movies and play video games

➢ Spend more time on activities presented via technology (4.5 h on average per day) than non-technology activities (2.8 h on average per day)

(Mazurek, Shattuck, Wagner, & Cooper, 2012)

Think about these images. How prevalent is technology in the lives of children?
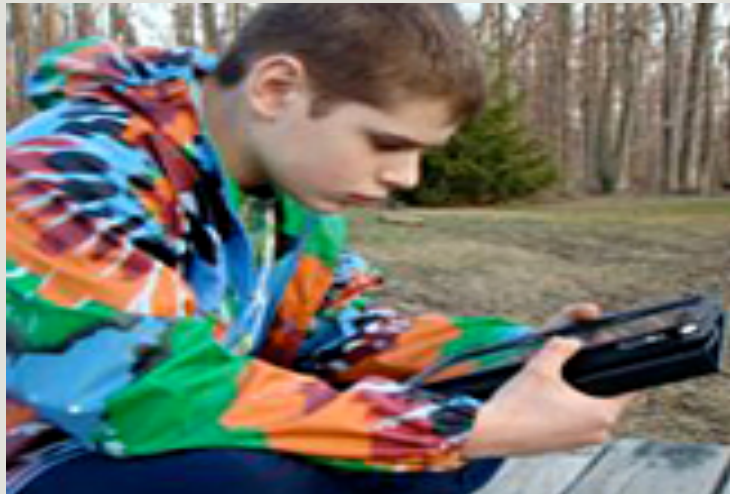
How about these images? Technology use among adults

Think about it for a minute

What would your life look like if you had to spend your typical day without a technology?

➢ What would be your biggest challenge?

➢ How does technology enhance your life?

Think about it for a minute

➤ What would the life look like for students with ASD without technology?

➤ How does technology enhance the lives of students with ASD?

Technology does not mean a mere physical device

Definition of technology:

1. The branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science.

2. The terminology of an art, science, etc.; technical nomenclature.

3. A technological process, invention, method.

*(*Merriam-Webster, 1994)
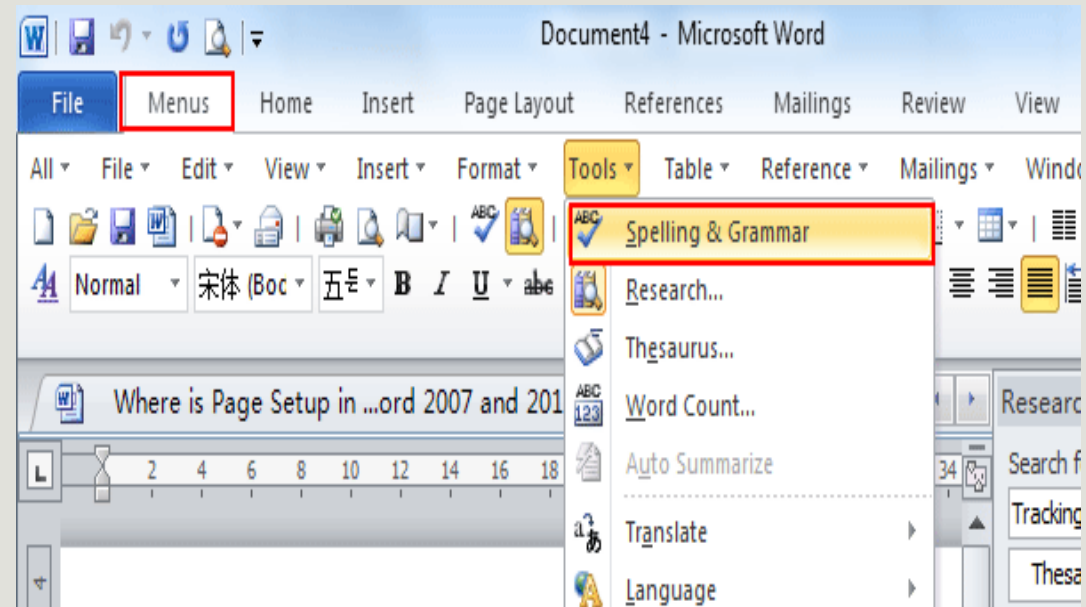
Assistive Technology

Definition of assistive technology:

"...products, devices or equipment, whether acquired commercially, modified or customized, that are used to maintain, increase or improve the functional capabilities of individuals with disabilities".

Technology that General Public Uses
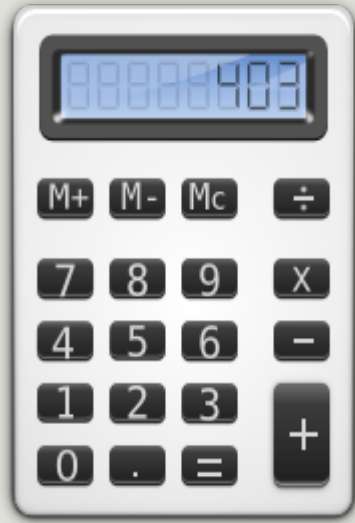
Technology that General Public Uses

Assistive Technology in Special Education

Used for:

➢Communication purposes, such as Augmentative and Alternative Communication supports

➢Learning/skill acquisition and increasing independence

A National Survey of Assistive Technology Use among Secondary School Students with Disabilities

➢Only 7% of secondary school students with disabilities reported receiving assistive technology

➢Students with low-incidence disabilities were more likely to receive assistive technology than students with high-incidence disabilities

➢Only two disability categories had more than 50% of students receiving assistive technology: students with visual impairments and students who are deaf-blind

(Bouck, 2016)

A National Survey of Assistive Technology Use among Secondary School Students with Disabilities

➤ The most common types of assistive technology used in the schools were:
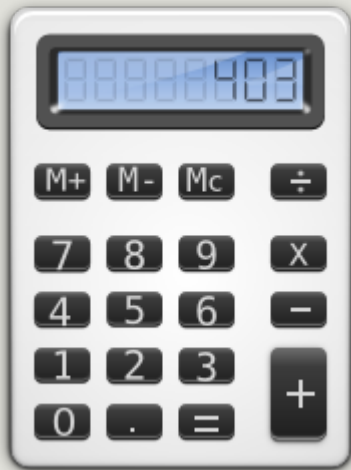
(Bouck, 2016)

Some of the current technology that general public uses

Virtual and Augmented Reality, initially, developed for gaming

How can you repurpose the following technology and make it assistive technology?

1. Portable devices or tablets, e.g., iPad
2. Plain cell phones or smartphones
3. VR and AR, initially, developed for gaming
4. Facebook
5. Instagram
6. Youtube

Repurposing technology to be assistive technology

1. Transportable

Can be used in multiple settings (home, school, community)

2. Available

Online, in schools, or stores

3. Practical

Easy to use, does not require technical expertise

4. Engaging

Interactive, non-stigmatizing, used by general public and not just disability specific

(Bouck et al., 2012)

Examples of repurposing technology: VR and AR

Example of repurposing technology

Virtual Reality to teach driving skills to students with ASD

https://news.vanderbilt.edu/2016/07/21/using-virtual-reality-to-help-teenagers-with-autism-learn-how-to-drive/

Considerations in Using Assistive Technology

Use of assistive technology according to IDEA, 2004:

➢ IEP team needs to consider the need for the use of assistive technology

➢ However, IDEA does not clearly specify what assistive technology is, given that it can range from no-tech to high-tech

CSESA Framework for Technology

CSESA – The Center on Secondary Education for Students with Autism Spectrum Disorders

"An electronic item/equipment, application, or virtual network that is used to intentionally increase, maintain, and/or improve daily living, work/productivity, and recreation/leisure capabilities of adolescents with autism spectrum disorders" (CSESA Technology Group 2013).

CSESA Framework for Technology
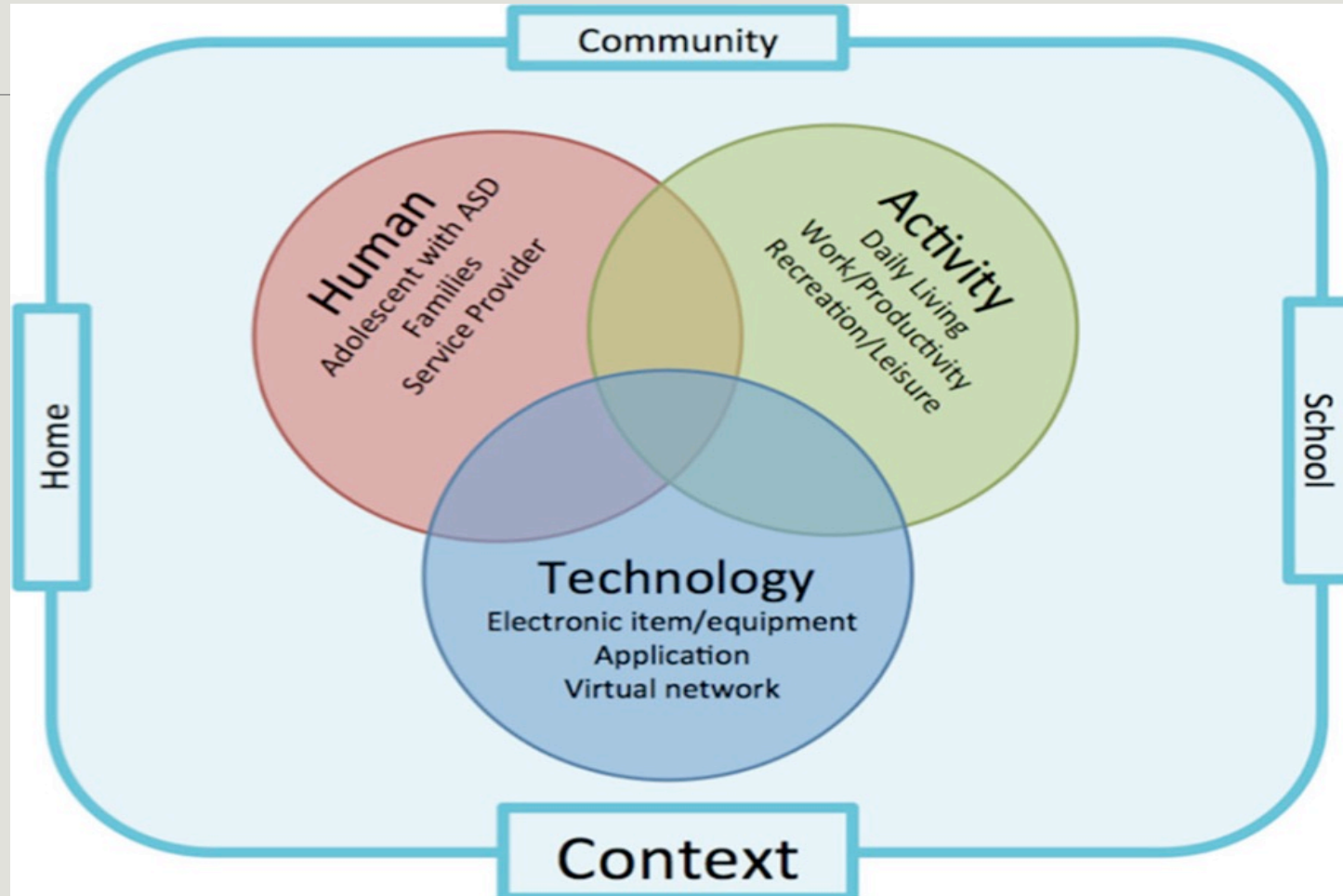
(Odom et al., 2014)

Evidence-based practices for technology-based interventions

- Video-based interventions:
  - Video modeling
  - Video prompting
  - Video self-modeling
  - Point-of-view video modeling
- Computer-assisted instruction
- Audio coaching
- Self-operated auditory prompting

* These practices have sufficient research evidence to be considered as evidence-based practice

What is a video-based intervention?

➢ Video-tape of a competent adult or peer performing the desired skills

➢ Video modeling = video recording others

➢ Video self-modeling = video recording the student (may require significant editing)

➢ Point of view video modeling = filmed from the student's visual point of view

➢ Video prompting = presented to student in segments for practice of sequence of behaviors

# Video-based interventions used in the schools

1. Increase appropriate social interactions

2. Improve conversation skills

3. Improve daily living skills
   - Cleaning
   - Cooking
   - Self-care

4. Improve play skills

5. Reduce problem behaviors

Video-based interventions in the schools

1. Academic skills:
   - There is limited research on teaching academic skills to students with ASD (with or without technology)
   - More research on teaching literacy skills than mathematics and science

Video-based interventions in the schools
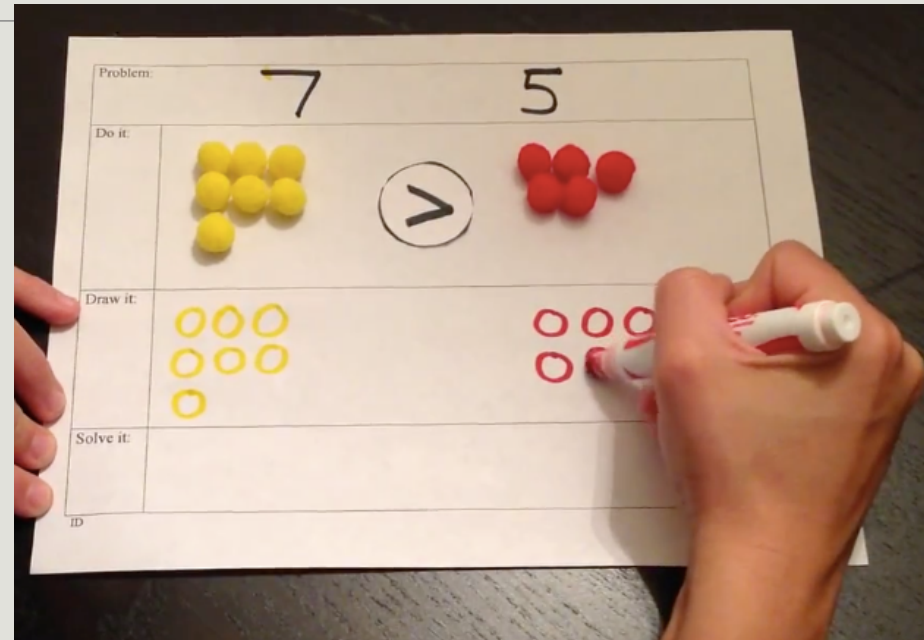
Technology in the Community

For example, cell phones are used to teach safety skills

➢ Secondary school students with intellectual disability and ASD are taught to report their location when in the community:

➢ The authors used video modeling and video prompting instruction to teach students use their cell phone to take a picture of their surrounding and message the picture to their teacher's phone number

➢ In the community, participants were intentionally separated from their group and tested on whether they would be able to report their location to their teacher

(Bassette et al., 2016)

Technology in the Community

➢ Most of the children have a cell phone, so how can you repurpose cell phone into an assistive technology for your child or student with ASD?

➢ What other purposes can you use cell phones or smartphones when teaching students with ASD in home, school, and community settings?

Technology at Home

Researchers have used video prompting via iPods to teach cooking skills

➤ A student with ASD can watch each step of the task, e.g., cooking, and complete that step

➤ Then, a student watches the next sequence in the cooking process, and completes that step

➤ The procedures continues until the student completes the entire task sequence

Technology at Home

This strategy:

➤ Decreases the need for constant adult prompting and supervision

➤ Enables the student to both learn the skill and complete daily living tasks independently

➤ Enables the student to repeat the instruction without having to wait for an adult to come and help them

Why do video modeling and video-based interventions work?

1. Restricts irrelevant stimuli and helps them focus on the task

2. Preference for visual stimuli and visually cued instruction

3. Avoidance of face-to-face interactions

4. Ability to process visual information more readily than verbal information

5. The option of pausing, repeating the instruction, and carrying the instruction across multiple locations (if on a portable device)

Steps to make video modeling

➢ Can be made with any device that has a video camera, e.g., cell phone, smartphone, tablets

➢ Identify & clearly define target behavior

➢ Get baseline assessment

➢ Write a script of the instruction/task analysis steps

➢ Select the type of video modeling: is that adult video modeling? Peer video modeling? Video-self modeling? Or Point-of-view video modeling?

Steps to make video modeling

➢ Create the video – may need to zoom the device to focus on the task/instruction

➢ Keep the length of the video short – no more than 3 minutes. If longer than 3 minutes, it might help to turn the video modeling into video prompting

➢ Instruct the student how to access the video on the device

➢ Have the student watch the video and then complete the task

➢ Review data, troubleshoot as needed

➢ Gradually fade the video modeling

Steps to make video prompting

➤The same steps as for video modeling and the following:

➤Video record each step of the task as a separate file and combine them into a single file

➤Student pauses after playing each step of the task and completes the step OR

➤Pause between each step of the task to allow sufficient time for a student to complete that step

➤On iPad, videotote application allows for making video prompts easily without manually having to record each step separately and combining them into a single file

Steps to make auditory prompting

➢Similar procedures as video modeling and video prompting except that it includes only audio instructions

➢Can be played on any device that does or does not support video files

General themes of using technology:

1. Increase independence
2. Help with organization
3. Teach safety – both safety when using technology, e.g., internet, and safety by using technology
4. Reduce anxiety and stress, e.g, music, educational games
5. Functional skills
6. Social skills
7. Academic skills