



STEM & Disability Virtual Symposium

February 22-25, 2021

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Supporting Students with Autism in STEM

Speaker: Recent University of Toronto Graduate Jennifer Sinclair

Barriers for Students with Autism in STEM Labs and Classrooms:

- Lab equipment that makes sudden and/or loud noises
- Sensitivity to bright lights, flashing lights, chemical smells, gloves, temperature, etc.
- Difficulty Reproducing Visual Notes and Images (fine motor skills)
- Time Limits on Laboratory Work and other Tasks (anxiety)
- Planning and Sequencing an Experiment
- Running Multiple Experiments at Once
- Setting up Lab Equipment (motor skills)
- Tight Lab Spaces (personal space, clumsiness)
- Isolation, Perfection, Mental Health
- Competition in Science, especially in higher grades/university may limit cooperation and motivation of peers to engage in inclusive communication practices
- Working in groups:
 - Knowing when and how to Interrupt or Join a Conversation
 - Speaking Out Loud and Initiating Speech
 - Time constraints to process information before responding
 - Non-Verbal Communication in a Group: Peers who have not been taught or lack the skills to include a peer who communicates non-verbally or with the need for additional processing time
 - Auditory Processing Issues
 - Turn Taking

- Lack of explicit training around social skills
- Flexibility to changing social or classroom rules/norms
- Lack of clear structure or learning objectives
- Auditory processing issues
- Lack of student engagement:
 - Many students on the spectrum have specific areas of interest and may be fixated or gravitate towards those areas of interest
 - Many students on the spectrum are highly intelligent and may find material too easy

Barriers for Students with Autism in Online Learning

The “chat” function in online classrooms: For some students a distraction but for others it may facilitate non-verbal communication

Lack of captions

Changes in volume when a different person speaks or a video is shown, especially without warning

Transitions

Background noise when students are not muted

Anxiety around learning new software and virtual exams, especially when students cannot change their answers or revisit a question/answer

Visually distracting video or speaker backgrounds

Lessons that are not recorded and cannot be accessed later

Accommodations to Support Students with Autism in STEM

Teach the hidden curriculum of the STEM lab and classroom:

Teach social skills or classroom norms of interacting to all students (how to interrupt, how to give a certain amount of wait time when responding to group members, how to interact with someone whose preference is not verbal communication, how to signal the need to speak, how to communicate to someone they need to finish their thought and allow someone else to speak)

Allow students to find a quiet place during a lab if they need a break (especially from sensory stimuli such as loud lab equipment, noise, bright lights, a lot of group interaction etc.)

Have a private discussion with the student about an upcoming lab about the possible challenges and make a plan for how to address them. This could include giving students a pre-tour of the lab, or

showing them photos of equipment ahead of time. Allow students additional time to learn to set up and manipulate lab equipment.

Allow students the option of verbally describing a sketch or image rather than sketching it themselves. Provide images to students rather than or in addition to having the students who struggle with motor skills sketch the images themselves.

Provide notes. Provide laboratory procedures ahead of time.

Minimize background noise if possible: Virtually, encourage students to be muted, find a quiet space for group work, etc.

Assist students with chunking activities and labs.

Give students additional physical space in the lab

Allow extra time to complete labs

Allow flexibility to students in demonstrating their skills in assessment and evaluation: provide alternatives to group work if the curriculum expectation being evaluated is not working with others

Some students may wish to communicate with you through writing: allow flexibility in communication modality

Provide support in forming groups so that no one feels they are always the last chosen or do not end up in a group of students who do not have the training and practice of inclusive communication practices

Ideas for Assistive Technology

Computer and Printer to type in class lab reports and assignments instead of hand writing as fine motor skills can be challenging for some students with autism

Text to Speech Software: support for students who may experience anxiety or difficulty otherwise speaking out-loud

Task Management apps: Example Habitica

Captions support students with auditory processing challenges