

Access to Audio in 21st Century Classrooms

The 21st century classroom is abundant with technologies such as, computers, iPad, and interactive whiteboards. While these are wonderful tools to support learning, you may not realize that curriculum content delivered through these technologies becomes inaccessible, or less accessible, to your deaf/hard of hearing student.

Real-time Captioning with Streamer

Many schools have a significant investment in FM/DM systems, and the Streamer™ web-based software has recently become much more accurate with input from a wide variety microphone systems. If you have a student that could benefit from real-time captioning and is currently receiving good benefit from using their FM/DM system, then yes, you can and should use your FM/DM system as the microphone for Streamer.



To do this, simply add an additional receiver to your FM/DM system, as both the student and the media device connected to your Streamer website require a receiver. For example, if you are currently using a Phonak FM system, then obtain a Roger MyLink receiver which will be synced into the Phonak network and also physically connected to your computer's USB port. Below are some common examples.



Computer with a USB port

Additionally, Streamer can receive the teacher's audio signal from other classroom accommodations, such as classroom amplification systems. For Streamer, it doesn't matter whether the computer / media device that is connected to your Streamer website is receiving the teacher's audio signal directly from the teacher's microphone or subsequently from the audio-out jack on another classroom accommodation.

Computer Labs

If you have entered a computer lab, you are probably already aware of the high-level background noise present. Not only do computer labs have the same normal noise sources as other classrooms (kids, chairs, antsy feet, lights, HVAC, and general school ambient noises) there are also 20-30 computer towers – each one with its own cooling fan(s), monitors, keys clicking, computer mouses clicking, chairs rolling around, and maybe the humming of a server rack or two. A computer lab probably has double the noise sources as a non-IT classroom.

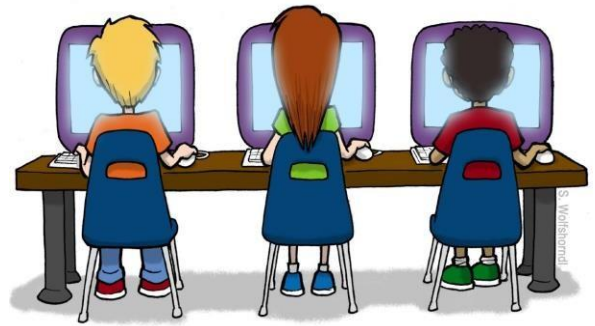
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This environment alone makes listening and learning extremely fatiguing and challenging for your deaf/hard of hearing student.

Strategies for Computer Labs

Personal FM/DM System

- Be sure to use your student's personal FM/DM system for all instructional periods.
- This will put your voice in front of the high levels of background noise.



Pre-exposure to Vocabulary

- Provide curricular content to your student in advance of each class so that they can familiarize themselves with unfamiliar vocabulary.
- This will reduce the likelihood of mis-hearing and facilitate comprehension.

Providing Notes in Advance

- Provide notes to your student in advance of each class.
- This will allow them to keep their eyes on you (speech-reading).

Use of Visuals

- Write instructions, keywords, and draw images on the board.
- Visuals provide a reference to auditory information that may have been mis-heard.
- Read more about the negative impact that background noise has on the deaf/hard of hearing learner, and strategies to improve classroom acoustics.

Computers/iPads

Not only are hearing aids/cochlear implants your student's doorway to their brain, but they provide important safety information their surroundings. As a result, students who use hearing aids or cochlear implants cannot be expected to remove their hearing devices in favor of earphones. It is extremely common for students to use earphones, such as being plugged into laptops and iPads. How can deaf/hard of hearing students participate in the audio portion of these activities?

FM/DM Systems

- All FM/DM systems can be plugged into a computer or any device that has a headphone symbol.
- This will allow the audio content of the computer/iPad to be sent directly to their hearing aids/cochlear implants, providing appropriate auditory access to activities such as computer-based teaching, listening centers, MP3 players, iPad, etc.
- They will need the audio cord that comes with each system.

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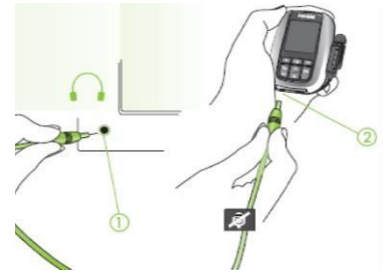
- Be sure that the FM/DM microphone is muted so that your student doesn't hear the extraneous



sounds around them.
3.5-3.5 audio cord



micro USB audio cord



plugging into a computer

Bluetooth Streamers

Some hearing aids come with a Bluetooth streamer which provides a communication link between wireless technology in the hearing aids and any Bluetooth-enabled device. More recently, Apple has [patented a specific Bluetooth connectivity](#) (Made for iPhone™) that allows certain hearing aids to communicate directly with the iOS platform that runs iPhone, iPad and iPod Touch devices. While these are viable options, the use of personal FM/DM systems are still recommended in educational settings due to their more stable connection.

Video Content and Interactive Whiteboards



Interactive whiteboards (e.g. Smartboards, Promethean Boards) are now common place in today's classrooms.

The audio portions of lessons displayed on interactive whiteboards are typically projected through speakers that send the audio signal to all of the students.

Students who are deaf/hard of hearing notoriously report the understanding of video content to be **extremely** challenging. This is primarily because their hearing aids/cochlear implants are not close enough to the classroom speakers.

For younger students, videos are often animated, which means the child cannot read the lips of the characters.

For older students, videos are often narrated off-screen, again removing speech-reading opportunities. Additionally, teachers may talk over the video content or students may be required to take notes during a video.



Strategies for Video Content

Preview Videos

Watching videos prior to in-class presentation will provide your hard of hearing student with opportunities to pause, repeat and clarify unfamiliar vocabulary and concepts. Teachers can save upcoming videos on a USB stick, email the links or share links on web-based share sites (e.g. Google Classroom).

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Closed Captioning

Select the closed captioning or subtitle feature during videos and movies. This is a universal strategy for all students however for your hard of hearing student, it supplements understanding of the spoken or narrated information through the visual representation of the words. Be aware that YouTube videos are captioned using speech-to text technology which can be inaccurate. Previewing will be necessary.



Patching of the FM/DM System

This will require consultation between the Educational Audiologist and school district facilities/assistive technology to identify the most appropriate connection. Some students report poor sound quality. It therefore should be noted that this strategy needs to be verified and monitored carefully and does not result in equal access.

Integrating PERSONAL FM/DM and CLASSROOM AUDIO DISTRIBUTION technology is **ONLY** recommended for auxiliary audio listening activities (i.e. video content). **Students' personal amplification should NOT be interfaced with classroom audio distribution systems during teacher instruction** unless specified by an Educational Audiologist.

Phonak Roger Audio Hub

If your student makes use of a Phonak Roger Inspiro or Touchscreen, an additional piece of technology can be purchased, which allows the audio from the teacher's computer to be sent directly to their hearing aids/cochlear implants while simultaneously being sent to the whole class. Please contact your Educational Audiologist for more information.

