Estimating Children’s Communication and Access Challenges in the Fast-Paced Classroom
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Setting the stage – today’s learners with hearing loss:
New data from Christi Yoshinaga-Itano (October, 2010)
- Studied language growth of 135 children age 4-7; cognitively normal from English speaking families with hearing parents
- Median age of identification – 3 months, early intervention start – 8 months, assessed 3-4 times from 48-84 months of age
- Both cochlear implant users and hearing aid users (mild – severe/profound)
- Results: children fell into one of 4 groups

Access is at the center of most of the struggles of the student with hearing loss
Access is so important that the IDEA statute (20 USC 1400(c)(5)(H)) specifies “supporting the development and use of technology, including assistive technology devices and assistive technology services, to maximize accessibility for children with disabilities.”

Classrooms are auditory-verbal environments
- Listening is the cornerstone of the educational system
- “Hearing speech” is not the same as hearing all of the sounds of all of the words.
- If a child cannot clearly hear and attend to spoken instruction, the entire premise of the educational system is undermined
- Classrooms can be noisy, reverberant learning environments

Average loudness
- Speech sounds occur in a 30 dB range of intensity (‘th’ in thaw vs ‘oo’ in through)
- Average loudness of teacher’s voice in a classroom is 50-60 dB HL
- This means her speech signal ranges from 35 – 65 or 45 – 75 dB HL
- Typical loudness of background noise in a classroom is 50 - 60 dB HL
- Adequate signal to noise level to be able to perceive the speech sound envelope is +15 S/N

Voice loudness and loudness of background noise are constantly CHANGING! Signal to noise level is not a constant in typical listening environments resulting in an inconsistent ability to perceive speech.

BEHAVIOR EFFECTS? not paying attention; daydreaming; distractibility; socially out of step

SPLograms show that speech and other sounds are being made loud enough to be heard NOT that we are ‘improving’ the child’s hearing levels. The SPLogram demonstrates how well the hearing aid is making the speech range louder to allow the child to hear soft, conversational and loud speech. SPLograms provide a truer picture of the dynamic range for audibility across the frequencies by indicating predicted or measured UCL levels as well as thresholds. (Refer to Pam Millett, Volta Voices, Nov/Dec 2010 & Jan/Feb 2011).

Refer to the SPLogram when the student reports problems Collaboration! It is critical for the clinical audiologist to share the SPLogram with the educational audiologist. If the educational audiologist is able to perform SPLograms the information should be shared with the teacher of the deaf/hard of hearing and/or speech language pathologist to help them understand speech perception issues. If there is a concern about hearing aid fitting, child behavior plus the results of the SPLogram should be considered.

AUDIBILITY (OPPORTUNITY) ≠ SPEECH UNDERSTANDING (FUNCTION) Understanding with limited audibility depends upon: Clarity of speech signal (hearing loss, noise); Attention / Motivation/ Ease of listening; Knowledge of topic; Language complexity to be able to guess from context. These factors all vary every day. Adults with 50% audibility may identify 70% of single words and 95% of sentences (Miller & Heise, 1951). Audibility is compromised by noise and reverb. Visual cues can help understanding which is why it is necessary to do a Functional Listening Evaluation.

How do typically hearing children perform in noise? Age 3-17, even at 35 dB HL at 0 S/N typical child performed at 90%+

Speech Audibility Audiogram for Classroom Listening was presented (downloadable from Supporting Success website).
Wepman’s Auditory Discrimination Test (ADT) also suggested as a way to quickly identify access; comparison to typical peer norms. (Western Psychological Services)

Obtaining the Student View of Challenging Classroom Listening - Listening Inventory For Education – REVISED!
- http://successforkidswithhearingloss.com/tests/new-listening-inventory-for-education-revised-life-r
- Self-report for students in Grade 3+
- Ten LIFE Classroom Listening Situations and Five Additional School Listening Situations
- Include media, a variety of listening challenges and easy listening situations.
- You can sum just the items for verbal instruction and class discussion situations. Total out of a possible 100 points.
- Ideal for Pretest/Post-test use for amplification trials
- Choices: Always easy, Mostly easy, Sometimes difficult, Mostly difficult, Always difficult.
- Before LIFE questions – listening setting
- LIFE questions about school listening situations
- After LIFE questions – self-advocacy strategies

Collaborate to improve student listening challenges: Hearing devices are one solution to classroom listening challenges. Share information from the Student LIFE-R with classroom teachers and specialists to develop student-specific accommodations. The SLP may view some responses in terms of language deficits to address. The teacher of the deaf/hard of hearing may view responses as a priority for working on self-advocacy skills.

After LIFE Questions – a measure of self awareness and self-advocacy
1. What do you do to let your teacher know that you didn’t hear or understand what s/he said?
2. What do you do if it is too noisy in your classroom, making it hard for you to understand what your teacher says?
3. What do you do when a student’s voice is too quiet for you to understand during a class discussion?
4. What do you do when you can’t hear or understand what your friends are saying when you’re hanging out?
5. What are the things you do when you are trying to communicate and it’s noisy?
6. What would you do if your listening technology is not working?

New e-version of LIFE-R generates reports! Accommodations, Self-Advocacy, Challenges! To be released in June 2012.

The ‘cost’ of challenged listening
Children with normal hearing do not have to look at a speaker to understand what was said, even if it is very noisy. A child with hearing loss with diminished audibility has to expend more energy to listen carefully to try to catch what is being said. This increased attention requires more energy which leaves fewer cognitive resources for understanding what was said. The effort causes fatigue that further affects the energy available to listen.

Slower pace = increasing learning gaps: Federal laws regarding grade-level content standards do not release students with disabilities from the need to demonstrate proficiency related to state and federal benchmarks (US Department of Education, 2004). To ‘keep up’, students must be able to access curriculum and instruction. Social/emotional concerns should be addressed.

Summary: Estimating Access is Essential

The ability to learn at the pace of peers depends on accurately receiving school communication.

1. Obtain the SPLogram (collaborate!)
2. Purposely estimate student ability to access classroom communication (audibility/FLE)
3. Identify specific listening challenges in the fast-paced learning setting (LIFE-R)
4. Plan for accommodations and supports TOGETHER with the school team.

Resources available:
http://successforkidswithhearingloss.com