

Classroom Amplification

Dr Carol Flexer PhD



Dr Carol Flexer received a Ph.D. in Audiology from Kent State University in 1982. She has been at the University of Akron for 21 years where she is a professor of Audiology in the School of Speech-Language Pathology and Audiology. Special areas of expertise include pediatric and educational audiology. She has lectured internationally and authored more than 100 publications. Carol has co-edited three books: **How the Student with Hearing Loss Can Succeed in College**, first and second editions, and **Sound-Field FM Amplification: Theory and Practical Applications**. She has authored fourth and fifth books, titled, **Facilitating Hearing and Listening in Young Children** - first and second editions. The second edition was published in 1999. She is a past president of the Educational Audiology Association, a past Board member of Auditory-Verbal International, and a past president of the American Academy of Audiology.

Q. *You have been writing and speaking about classroom amplification for the better part of two decades, what is classroom amplification and why are you so passionate about it?*

A. Well, classroom amplification is pretty simple. A teacher wears a mic and his/her voice is transmitted to a receiver that amplifies and evenly distributes the voice throughout the room via loudspeakers, allowing all students to clearly hear spoken instruction. The purpose of the sound system is to improve the overall intelligibility of the teacher's speech by improving the signal-to-noise ratio, especially in the higher frequencies.

Q. *How does higher frequency sounds effect intelligibility?*

A. In order for learning to occur, children have to be able to hear all of the spoken instruction. The loudest sounds in speech are low frequency vowel sounds and they are easy to hear. On the other hand, 90% of the intelligibility of speech is in the higher frequencies. These soft consonant sounds are difficult, if not impossible to project loudly. In order to deliver intelligible speech, we need to boost the softer sounds and reduce the energy in low frequency sounds a bit.

Q. *Is classroom amplification designed for students with hearing loss or for general education classes?*

A. The initial studies on sound field were not about children with hearing loss, they were about being able to enhance academic performance in inclusive settings. Over time soundfield systems became associated as a treatment for hearing loss. As a result, sound systems were relegated more to the special ed arena, when in fact they were initially intended for general education use. Research is compelling, all students benefit from appropriate installation and use of sound systems.

Q. *What can you tell me about the research on classroom amplification?*

A. 60+ studies have been conducted over the past 20 years. Although sound field research has had various study targets such as reading, teacher vocal abuse, time on task, transition time, behavior compliance, etc., every study has shown an advantage in whatever domain they were evaluating. Sound field use in every instance has been shown to deliver positive results.

Q. *What's the problem with today's classrooms?*

A. The classroom is an auditory-verbal environment. There are several issues with today's classrooms that can hinder a child's ability to hear spoken instruction.

- Often there are more children in a room
- Multiple activities, sub groups and teams
- Different teaching styles and student seating configurations
- More information is to be delivered... faster and at younger student ages
- Many more students do not speak English at home
- Heating and ventilation systems are often noisy and distracting
- More computers and instructional delivery equipment adds noise

For learning to take place, children need a quieter setting and a louder signal than adults require. Classroom amplification helps overcome the noise and creates a better learning environment.

Q. *What age group receives the most benefits from this type of technology and why?*

A. We know that up through grade three children are listening to learn and more specifically, listening to learn to read. By fourth grade children are reading to learn. So classroom amplification is critical in pre-school through third grade as these children are developing the auditory-linguistic foundation that is essential for success in the years that follow. On the other hand, we don't take lights away after third grade. We keep the lights on. We realize visual detail is necessary in any learning environment and so acoustic detail is also necessary in any learning environment.

Q. *What about kids hearing kids?*

A. Every class, in my opinion, ought to have two microphones; one for the primary teacher and a second mic for team teaching or student use. Children need to hear their own voices for many reasons; for acoustic self monitoring to create their auditory feedback loop so they can correct their verbal productions, and when they read out loud to enhance their reading fluency, because reading fluency is a key component of literacy development. Not only do pupils need to hear teachers, they need to hear other pupils and they need to hear themselves, and that takes two microphones.

Q. What's the connection between classroom amplification and literacy?

A. A primary component of literacy is phonemic awareness - the knowledge of the sound structure of language focusing on auditory distinctions. So the clearer those auditory distinctions are to the child, the better will be their opportunity to learn to read. Studies show that literacy has been positively impacted in classrooms that use sound field systems.

Q. Can classroom amplification help schools achieve the No Child Left Behind mandates and AYP goals?

A. I'll quote a friend of mine, Dr. Mark Ross, "Hearing is the primary channel for learning. The more children hear, the better they learn." I'm sure there are several valid approaches designed to raise academic achievement. What classroom amplification offers is proven results without changing curricula or teaching methodology. Sound systems help to level the playing field, allowing every child an opportunity to clearly hear spoken instruction.

Q. Are there basic student rights that should be considered regarding acoustic access?

A. Every child should be able to hear the entirety of spoken instruction. Having access to clear instruction is not an extra, it's not above and beyond, but rather it's the basic foundation for education and is therefore a reasonable and appropriate expectation. Sound systems provide the minimum necessary acoustic access that should be in every classroom.

Q. What's the number one positive (and negative) regarding classroom amplification?

A. The biggest positive that leads to all other positive out comes is that by improving the signal-to-noise ratio, sound systems promote an auditory focus. A key issue for children is their focus. What a sound systems does, by improving the signal to noise ratio, is to create an auditory focus which is critical to learning. The negative aspect of sound field occurs only when the system is not used correctly. If it's too loud it produces feed-back, if the mic is worn wrong the voice will not be picked up. It's like driving a Corvette; it's a great machine and it will get you from zero to sixty in style, but only if you know how to shift out of first gear.

Q. If classroom amplification offers so many great benefits, backed by research, why isn't it in every classroom?

A. I think it seems too simple. Sometimes the simplest concepts are the most powerful. People have trouble believing how powerful an improved signal-to-noise ratio and auditory focus is for literacy and learning. When most people think of hearing they think of hearing loss, they don't realize that typical children have substantial hearing limitations as well. Acoustics for many school boards and planners is not on their radar screen. Hearing is invisible. The process of listening is invisible. It's the adults who determine appropriate listening environments, and since adults have developed compensation skills to deal with poor acoustic environments, noise issues often are overlooked.