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Sound idea: Students

Research shows amplifying teacher's voice boosts grades and cuts disruptive behavior

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In classrooms around the country, students are straining to hear. Desks squeak, children chatter, computers hum, heaters blow. Ear infections muffle the teacher's words for some youngsters. Others are hampered by a slight hearing loss that hasn't been diagnosed. Even children who hear well can miss out because of poor acoustics.

"You can have chalk, books and paper, but if the kids are not able to hear, they are not learning at 100 percent," said Verlette Straub, a third-grade teacher at Rolling Hills Elementary School in Holland, Pa.

And so Straub and many of her colleagues are now wired for sound, leading classes through small public-address systems that broadcast their words to every corner of the room.

Experts cite a growing body of research indicating that academic achievement goes up and inappropriate behavior goes down in amplified teaching areas. As a result, parents and educators from New Jersey to Florida are mobilizing to treat sound in the classroom with the same regard that they give lights and books.

The Oakland Intermediate School District in Waterford, Mich., which serves 28 local school districts, is a quarter of the way toward its goal of amplifying all elementary classrooms.

In Sarasota, Fla., the Wilkinson Elementary School budgets for several new systems every year, bringing its total to 12 out of 40 classrooms. The teachers initially pushed for the systems to save their voices, said Principal Bill Muth, and student behavior has improved as a result.

The John Hydock Elementary School in Mansfield Township, Pa., introduced its first sound system about six years ago. Eight classrooms are now amplified, and child study team director Phyllis Trobman said the systems have helped a range of students, from children who have trouble concentrating in noisy environments to quiet youngsters who learn to appreciate the sound of their voices.

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should be able to hear

Like Rolling Hills, in the Council Rock School District, most of these schools are installing small public-address systems that allow all children to hear no matter where they are in the classroom or what they are doing. Typically, the system includes a cordless headset-microphone, amplifier and several speakers. The system raises a teacher's voice above the background din.

"Every kid will benefit to one degree or another," said Joseph Smaldino, a professor of audiology at the University of Northern Iowa and co-author of a textbook on sound-field amplification. "The research is showing that more and more kids who we didn't think were at risk are actually at risk" of missing what is being said in class.

Smaldino's research suggests that even in the best acoustical environments, children should be within 6 feet of a teacher to fully hear what is being said. Large class sizes make staying within that distance virtually impossible.

The idea of putting amplification systems into classes arose about 20 years ago when researchers discovered that they helped the academic performance of children who had minimal hearing loss — and at a lower cost than pulling them out of a classroom for special tutoring. Since then, studies indicate these systems also benefit children who have learning disabilities, students learning English as a second language, and those who have no documented hearing problem.

A study of 120 first- and second-graders at Rolling Hills, scheduled for publication in the educational journal "Media & Methods," showed a 45 percent improvement on a test that required students to identify the first letter of a word — M for "match," for example, or H for "hood" — when they had loudspeakers in class. The results spurred the school to set a goal of amplifying every classroom.

"As soon as one system is placed in the classroom, the benefits are obvious and immediate," said Principal Craig Ogelby.

On a recent morning, Verlette Straub's third-graders borrowed her microphone, passing it around at circle time so they could better hear themselves. While one student talked into the microphone, a child nearby held the small black transmitter box.

"Without the microphone, you have to repeat yourself," student Chris Bulik said later. "The kids can't hear you."

What has changed for Straub is the reassurance. "I now know they are all hearing me."

A child who has trouble hearing in the classroom might miss only part of a word, but that can make the difference in learning how to use the word properly. Take the words "walks," "walker," "walked" and "walking." They all might sound like "walk."

An adult in the same situation can draw upon a reservoir of language to fill in the gaps, said Carol Flexer, professor of audiology at the University of Akron. Children can't.

"If you miss speech sound, you miss language, you miss information, with all the negative implications of that," Flexer said.

The issue of classroom acoustics is now getting attention. The Access Board, an agency of the federal government, is working with the Acoustical Society of America to develop the first national standards for classroom acoustics. Some provisions of the standard eventually could become rules under the Americans With Disabilities Act.

It is hard to gauge how many sound-field systems have been installed in classrooms, because the handful of companies selling them are reluctant to disclose figures, Smaldino said.

Some school administrators are still cautious about buying them. Each system costs between $700 and $1,200 per classroom — a limiting factor for schools on tight budgets.

Electronic devices such as pagers can interfere with the systems. And some educators wonder whether students could get too accustomed to amplification.

Generally, a school becomes familiar with the systems when one is installed for a child who has a hearing loss.

The teacher often notices that other students are more attentive