

# Sound Field Systems on the Rise in Schools Improved Test Scores Cited as Benefit cite as:

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Baltimore County Public Schools in Maryland may soon join a growing number of schools to amplify general education classrooms with sound field systems. Sound field systems amplify a teacher's voice evenly throughout the classroom so every student can hear eve ry word all of the time.

If the school board approves the proposed budget, a large -scale \$400,000 pilot study may put the systems in up to 25 classrooms in eight elementary schools. But schools in the district didn't wait for the pilot project to begin. In at least three new schools in the county, forward -thinking principals added sound field systems during construction.

After BCPS audiologist Eloise Brown encouraged her to consider sound field, Principal Maralee Clark spent \$13,000 of the equipment budget t o install sound field systems in 10 classrooms and the media center when the school opened its doors last fall. "I read research articles and talked to experts and I knew it was a good opportunity. It helps students to stay focused and to better hear lette r sounds," Clark said. "Any child can benefit from sound field systems."

## Higher Test Scores

For administrators across the country, hearing is believing when it comes to understanding the benefits of sound field systems. The amplification systems are now mo ving out of special education classrooms and into the mainstream as administrators realize the benefits for all students. Approximately 160,000 classrooms in the United States have sound field systems -a number that grows by 20% annually, according to manufacturer estimates.

"I think there are going to be more sound field systems being used because of the link between listening and literacy, and the awareness that literacy is at its core an auditory experience," said Carol Flexer, professor of audiology at the University of Akron, OH.

Neurologically, children's auditory systems are not mature until they reach 13 -15 years of age, and younger children need a quieter setting and a louder signal to develop phonemic awareness, Flexer said.

In an era of the No Child Left Behind Act, increasing student achievement in reading is prompting districts to consider sound field, particularly when the benefits are measurable, said Les Aungst, a retired university professor and public school SLP who has worked for a sound fie ld equipment distributor.

"Research shows that the use of sound field is one way to improve classroom acoustics results in improved student tests scores -and improving scores is a major obsession with school administrators," Aungst said.

## Measuring the Benefits

In the West Orange, NJ school district, improvement in test scores was so significant that the district invested in sound field systems for every classroom.

"We found that students are doing better in state and national tests with sound field," said Karen Tarnoff, coordinator for district assessment. Although assessment results are never due to a single factor, Tarnoff noted, the only difference in classroom instruction during the pilot study in the 2003 -2004 academic year was the use of sound field.

The results of standardized reading tests show that in September, 59% of students in the first grade classroom at St. Cloud School were at or above grade level. In May, 89% were at or above grade level. The data also show that most of the students in the lowest quartile made improvement. Of those 11 students, five rose to the highest quartile by May, and only one student remained in the lowest quartile.

As in many districts across the nation, it was an effort that began with a single speech -language pathologist or audiologist. In West Orange, NJ, SLP Arlene Brafman began the pilot study by encouraging her principal to consider sound field systems.

"The results of the pilot were significant enough -combined with teachers' observations -that we decided that equipping kindergarten and first grade classrooms where students are learning to read would be a place to start," said Tarnoff, who demonstrated the system at a principals council meeting, which is also attended by the superintendent. The district has phased the systems into all classrooms by grade level, and by September 2006, all elementary school classrooms will have sound field.

### **Doing the Right Thing**

In Milwaukee, audiologists Doug Kloss and Joanne Colombo -Hughes launched a pilot study of sound field amplification systems in effort to improve the acoustical conditions in the large urban district.

"As audiologists, we know the benefits of the technology and that it is underutilized," Kloss said. "A large body of research points to the benefit of sound field systems, and for what it costs, it seems like the right thing to do," he said, noting that for 3% more cost a sound field system can benefit an entire class rather than a single student with a personal FM.

Sound field systems were a good solution for the urban district with 100,000 students and 200 schools, many of which have hard floors and high walls. "We serve many students who are low -income or speak English as a second language," he said. "The technology benefits these students as well as those with otitis media, attention deficit hyperactivity disorder, and unidentified hearing loss."

During the 2002-2003 academic year, four classrooms from kindergarten to third grade were amplified. Compared to four control classrooms, the difference was significant, although different teaching styles made direct comparisons difficult.

An informal survey of teachers showed a stark decline in absences. The year before, the same teachers had a combined 35 absences, compared to five during the study year. The teachers also responded positively to the systems: 100% said the sound field systems were very easy to use; 92% wanted to keep the systems; 89% reported less vocal fatigue; and 86% of teachers reported less overall stress.

Sound field systems reduce teacher's vocal fatigue and throat infections and they also decrease the tension in the classroom when teachers must project their voice to command attention.

The schools that participated in the pilot all purchased the sound field systems which had been loaned to them. But obtaining funding for additional sound field systems is a challenge, Kloss said, noting that principals control their own budgets. Today, Milwaukee public schools have approximately 140 sound field units in place. "This technology has been accepted as cost-effective and beneficial," Kloss said.

### **Acoustics Standard**

Efforts to quiet classrooms are supported by the 2002 classroom acoustics standard which was developed by the American National Standards Institute and the Acoustical Society of America (ANSI/ASA S12.60-2002). Consistent with long-standing recommendations for good acoustics in educational settings, the standards set specific criteria for background noise and reverberation times for unoccupied classrooms.

The standards are voluntary unless referenced by a state code, ordinance, or regulation, as six states have done. Another 12 school systems reference similar room acoustic limits on background noise and reverberation as part of construction specifications for new school buildings.