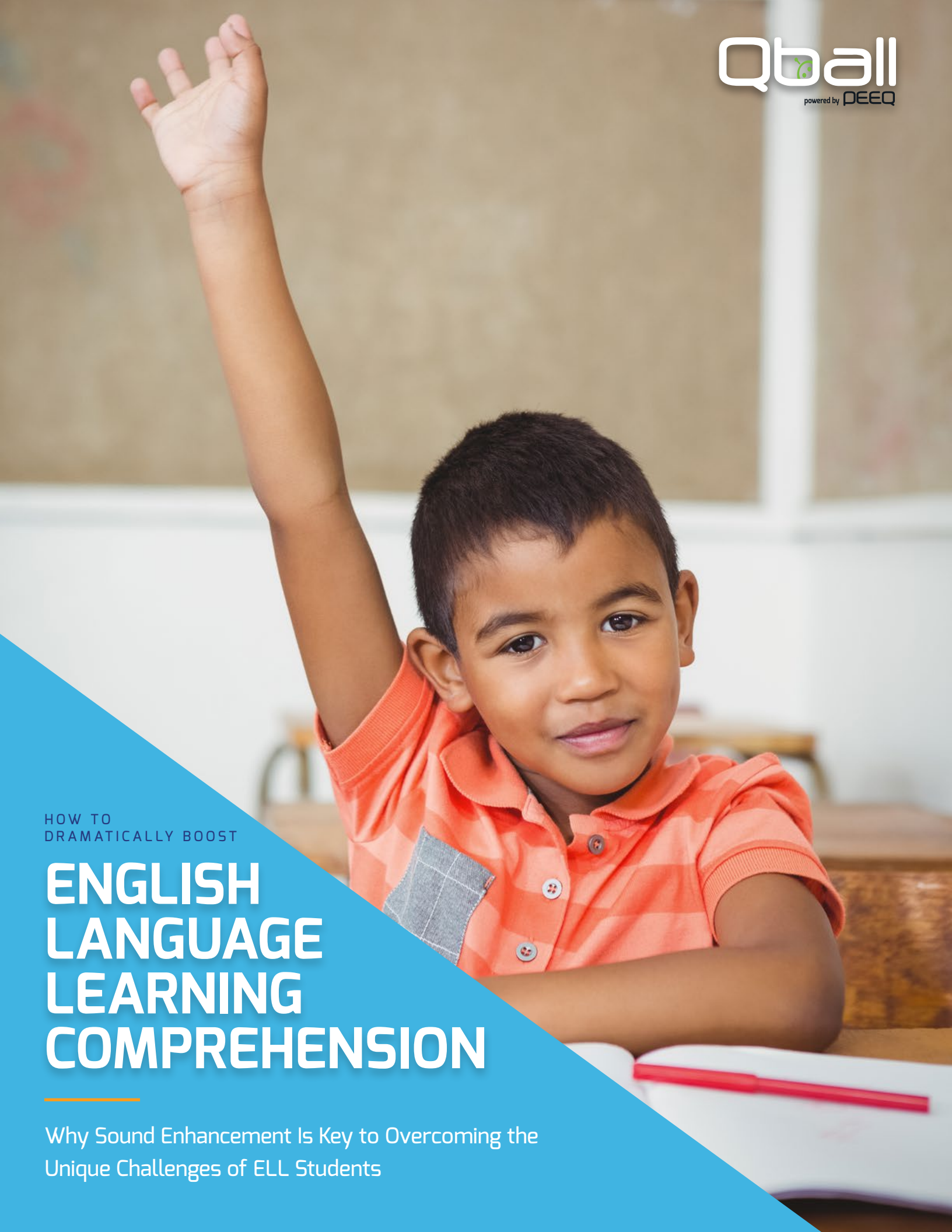

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HOW TO
DRAMATICALLY BOOST

ENGLISH LANGUAGE LEARNING COMPREHENSION

Why Sound Enhancement Is Key to Overcoming the Unique Challenges of ELL Students

Imagine you're sitting in the audience of an important educational seminar, and the speaker's heavy accent makes him difficult to understand. Now imagine beeping cellphones and whirring projectors add to the ambient noise, and on top of that, the speaker has decided to open the windows, letting in the sounds of traffic, birds and lawn equipment. Pretty hard to focus, no?

Welcome to the world of the average English Language Learning (ELL) student. ELL classes are often deprioritized in favor of other subjects, meaning low resources can create an environment that challenges the effectiveness of class time for both students and teachers. Even in an ideal setting, English learning is extremely difficult. It can take between five and 10 years of dedicated study to reach academic levels of proficiency, according to one study[1]. Coupled with that, ELL students face unique hurdles, such as cultural adaptation obstacles, and they tend to come from low-income backgrounds.

To help reduce these challenges, ELL facilities should do everything possible to aid students' experience by taking into account their unique needs. One of those needs is the ability to clearly hear the teacher. This paper offers an academic look at the listening-based obstacles faced by ELL students, as well as potential solutions such as sound enhancement.

THE PROBLEM:

Many Classrooms are Suboptimal Audio Environments

According to guidelines set by the American Speech Language-Hearing

FAST FACTS ABOUT E.L.L. STUDENTS:

- About 1 out of every 10 public school students in the United States right now is learning to speak English. They're called ELLs, for "English Language Learners." The vast majority — about 3.8 million — of these students speak Spanish. Other common languages include Chinese (both Cantonese and Mandarin), Arabic and Vietnamese[2].
- In 2016, 32 states reported an inadequate supply of teachers for ELL students[3].
- There are ELLs attending schools in all 50 states, although they are heavily concentrated in states such as California, Arizona, Florida, Texas, New York and Illinois. California has more than 1.5 million ELLs, who comprise nearly 25 percent of the state's total K-12 population[4].
- Nearly 60 percent of ELLs nationwide are from low-income families[5].
- While some ELLs are immigrants themselves, the majority of English learners are US-born children of immigrants. More than 75 percent of ELLs in grades K-5 are second or third- generation Americans, and 57 percent of middle and high school ELLs were born in the United States[6].

Association (ASHA), ambient noise in the classroom should be no louder than 30-35 decibels when the room is empty, and the signal-to-noise ratio (how much louder the teacher speaks compared to background noise) should be no lower than +15 decibels. However, research shows the average unoccupied noise levels are much higher, at 50 decibels, and (worse!) average signal-to-noise ratios can be lower than +4 decibels[7]. This is suboptimal for even adults, who require a signal-to-noise ratio of about +6 decibels to hear clearly.

The mismatch has severe ramifications on the ability for all schoolchildren -- not just ELL students -- to learn. Lori Hubble Dahlquist of Children's Care Hospital and School summarizes the predicament:

"Oh-oh, the teacher's starting to talk again. The other kids are going to get what she's saying but I'm not. I know I'm not going to be able to get it." He may not say it, even to himself, but that is often how a child with auditory perceptual difficulties feels when he is asked to listen and learn in the classroom. He can probably hear sounds perfectly well, but he can't interpret their meaning[8].

> ***"Children for whom English is a second language exhibit greater speech perception difficulties than native English speaking children, particularly in degraded English listening environments."***
>
> -- Carl Crandell, Ph.D., of the University of Florida

Essentially, when children have difficulty hearing, their frustration can lead to disengagement. Illustrating these effects, a 2013 study in the Journal of Urban Health found that 8- and 9-year-old students who experienced higher levels of ambient noise in school performed significantly worse on standardized tests in mathematics and French language, even after controlling for their socioeconomic backgrounds[9]. Many other studies have found similar results.

In the ELL world, these problems can become even more pronounced.

WHY SOUND ENHANCEMENT IS EVEN MORE IMPORTANT FOR ELL STUDENTS:

In 1995, scientists at the University of Florida found a startling result when studying the impact of ambient noise on ELL classroom performance[10]. To conduct their study, researchers

took two groups of students: one group consisted of native English speakers; the other group was comprised of ELLs. They then tested their comprehension in various levels of background noise.

The results couldn't be more clear. In quiet settings, ELL students and native English speakers perceived the teacher's voice equally well and exhibited similar scores on listening comprehension tests. However, when levels of background noise increased, the results diverged sharply. As ambient noise got louder, the ELL students performed proportionately worse than their peers. **In other words, the louder the noise, the harder it became for the ELL students to do well in class compared to the native English speakers.**

This study has two interesting takeaways.

First, as the authors write, "the finding that ESL children performed as well as the native English speaking children in quiet listening environments suggests that both groups had essentially equal knowledge of the linguistic contingencies of the sentential material used." That means the divergence in performance was not due to the ELL students' innate inability to comprehend concepts. Instead, it was entirely due to their difficulties in understanding the teacher. **Put simply, the noise was the problem; not the teacher or the students.**

Second, in offering an explanation for the differences, the authors underscore a fundamental way in which ELL students' needs are different from those of native English speakers. The reason that adults require lower signal-to-noise ratios to comprehend speech (+6 decibels compared to +15 decibels needed by children) is that by around age 14, the human ear can begin to rely on contextual cues to fill in the blanks when words are overshadowed by background noise. If you hear the phrase "Two ____ ____ equals four," automatically, your brain will fill in the "plus two" section by relying on an understanding of English mechanics. But before 14, most children don't have enough mastery of the language (native speakers included) to achieve these kinds of linguistic acrobatics, especially when it comes to sorting out the b's from the p's or the m's from the n's.

This challenge is exponentially greater when English isn't a student's first language. As anyone who has tried to seriously learn another language knows, words are so much more than their dictionary definitions. Some words have connotations that differ radically from their denotative meaning (take Bostonians' fondness for using "wicked" as a compliment, for example), and cultural context is fundamental to understanding phrases and idioms that make no sense when taken at face value. Add in native English speakers' frequent use of contractions and regional accents, and the problem only gets worse.

Perhaps the study's authors say it best when they write in their study that "stated otherwise, **ESL listeners may need to correctly perceive essentially every word in a sentence in a noisy or reverberant background for optimum communication to occur"** (emphasis added).

In response to these challenges, some teachers can mistakenly believe the solution is to simply speak louder, therefore increasing the signal-to-noise ratio to adequate levels for comprehension. However, as the next section shows, this has several drawbacks.

WHY TALKING LOUDER DOESN'T WORK:

There are two main issues with using "talk louder" as a solution to students' comprehension challenges.

First, in order to reach the necessary signal-to-noise ratio, a teacher will need to increase his or her volume to levels that are unnatural for the human voice. Because sound gets weaker over distance, some experts believe that it requires a level of 83 decibels to provide the necessary signal-to-noise ratio for students in the back row. This is essentially shouting. As such, it's little wonder that even though teachers make up about four percent of the working population, they compose about 20 percent of the patient population in voice treatment centers[11].

Second, unless you've undergone training for public speaking or theater, it's really difficult to avoid changing your body language and the diction of your words when you speak this loudly. A substantial part of ELL students' development involves picking up on nonverbal cues; therefore, speaking in such a non-natural way is counterproductive.

"I teach in a school where the majority of students are English Language Learners. Because of this, many times they are reluctant to share, comment, discuss or answer questions because they may not be as proficient English speakers as others in the class. I wanted to bring in a fun and engaging way to encourage everyone to participate in classroom discussions! The Qball has really helped everyone in the classroom have a voice!"

-- Tia Thompson, Valley View Elementary

SOUND ENHANCEMENT MAY BE A SOLUTION:

Ultimately, the goal for teachers is two-fold: 1) to provide a signal-to-noise ratio that is high enough for students to hear and 2) to avoid distorting the sounds or causing vocal injury by raising their voice to unnatural levels. The best way to achieve this is through sound enhancement technology. Not only does sound enhancement allow the teacher to control the volume of his or her speech electronically, thus reducing the need to shout, it also ensures the sound is distributed evenly throughout the classroom so that the speech is clear regardless of where students are sitting.

To see this in action, consider a study -- also by researchers at the University of Florida -- that examined the impact of sound enhancement technology on ELL students' comprehension ability. After placing students six, 12 and 24 feet away from the teacher, the researchers saw that comprehension decreased as students moved further away from the front of the room. This is not surprising because, as noted above, a teacher needs to essentially shout in order to reach students in the back row. When the researchers installed sound enhancement technology, these comprehension differences disappeared entirely. The results were statistically significant at the $p < 0.0001$ level[12].

Want more? Several other studies have quantified the vast impact sound enhancement can have on student learning, which you can learn about here.

In summary, research shows that ELL students face unique challenges, including a need to hear essentially every word clearly, as their ability to rely on linguistic structures to fill in the gaps is greatly inhibited. Talking louder is not only unhealthy for the teacher, but it may not even be useful, as it alters nonverbal communication and a person's diction, unless highly trained.

Instead, join others that have tackled these obstacles with sound enhancement and witness the already proven statistically significant positive results for yourself.

THE QBALL: AFFORDABLE SOUND ENHANCEMENT:

While there are many amplification systems out there, the Qball is the most affordable. Only half as much as its competitors, the Qball is a fun way to engage your students and protect your teachers. Visit www.buyqball.com to learn why Leslie Fisher, over 8,000 classrooms and over 150,00 students trust the Qball.

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