Making a Case for Classroom Acoustics (Professionals, Parents)

Recorded Nov 3, 2009
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AudiologyOnline.com Course #14777
[Donna] From Cochlear Americas Hope program, and I'm really delighted to welcome you today to making a case for classroom acoustics. I am Donna Sorkin and I will be your presenter today. This is a special topic for me, it’s something that I have been active in, and really, have worked with a number of you that are here and others from around the country. I have had a person interest in it for nearly 20 years, so I'm really glad to share my information with all of you today and hopefully enlist you in our efforts to improve classroom acoustics. Just a little bit about me, and you have a picture of what I look like. I am an advocate for parents and adults with hearing loss. I'm very pleased to be able to direct Cochlear America's Hope program, which provides rehabilitation and educational support to professionals and parents and adults. I also am in charge of our public affairs activities at Cochlear. I am the former executive director of the Hearing Loss Association and AG Bell and not at the same time of course. I served on the US Access Board for eight years, specifically also served on a working group for classroom acoustics while I was on the board. And I write and lecture on access and the rights of people with hearing loss including classroom acoustics so it's really a fun topic for me to be able to present on for Hope.

So our agenda today includes a bit of introductory information on acoustics and then we'll move right in to making an effective case for acoustical improvements in schools. We'll talk about legal mechanisms for making that happen and what rights a child has. We'll cover what specifics you should be asking for as a parent or an adult in a graduate program or an undergraduate program or a professional who's working on behalf of children. And then we'll talk about what's been going on now including acoustics in some of the legal mechanisms that we have and then I'll give you some additional resources because there are some really excellent things out there that you can be taking a look at. So to begin with, I'm pleased to say that I think things are improving in that information is better than it ever has been before. In the past, a lot parents and professionals really knew very little about acoustic but I find that that's not so much the case anymore. My own involvement with acoustics dates back to 1992 when my husband I were building a house and began working with our architect on the
design of our house. For those of you who don't know me, I am deaf and use a cochlear implant that early in 1992, I had not received an implant yet and I had not realized what an extraordinary difference it was going to make and so I made use of every little bit of sound that I could to be able to listen and early on in the process of designing our house, we asked our architect about things that he could do to improve acoustics in our home. And he was wonderful but he had no training in architecture school about acoustics and so he really had to do some research and think about what he could do for our house and I have found this to be true with many architects that I've worked with a little bit later in my career I was, when I was the executive director at AG Bell, asked to see the plans for the renovation of our historic building.

I found it in Georgetown, it was actually constructed by Alexander Graham Bell in 1890 and when I arrived on the scene in 1999 we had plans in place and were moving forward with that renovation. And I asked to see what the acoustical environment would be like in our conference forum which would so the historic library for the building. And the architects hadn't checked. So they did some research and determined that the noise level in that room where we held many meetings was expected to be about 52 decibels, which is not an environment that you would want for people with hearing loss. So we had to make some changes which resulted in some additional expense for us for drawing changes and changes in the plans, etc. But as just to emphasize to you that you can not assume that acoustics will be taken care of in a small building or any other space because in the past, very few people asked about it, architects are not necessarily trained in it unless they specialize in acoustics. And fortunately there’s much more tension now. The US Access Board began a process in 1998 while I was still on the board, in terms of looking out acoustics and looking at legal mechanisms for requiring acoustics be addressed as part of building construction and renovation and that resulted in the voluntary ANSI standard and I will talk about that standard a little bit later. Unfortunately, the ANSI standard was never adopted into law. It’s still a voluntary standard. Consequently, it hasn’t had the impact that some of us hope that it would. There is discussion now of restarting the process of
including the ANSI standard in the ADA which is where it really belongs which would mean that as schools are renovated or constructed new, they would have to follow the ANSI standard. The other thing to know about acoustics is I happen to work at a cochlear implant company and therefore I’m concerned about acoustics for children who use our implants, cochlear implants, and the BAHA system. But in fact, acoustics are important for children with all levels of hearing loss and all types of hearing technology or no technology and for people of all ages benefit from it. I’m gonna actually talk to you some more about that and show you the effect that it has in a little bit. But it’s an important accommodation for children with any level of loss. The other thing that I sometimes hear is that while we’re taking care of acoustics with an FM system, and that actually doesn’t cut it. It’s not an either or for FM and acoustics. You really need to be looking at both and we’ll talk some more about that. So when we talk about hearing loss, it’s really important to explain that simply increasing the volume isn’t enough.

And sometimes people who aren’t involved in hearing loss, they think that that’s all you need to do, just increase the volume and that will make everything better but I want you to just think about what it’s like, for example in a noisy airport, when you’re trying to listen to a very loud announcement in a reverberant, noisy space and how hard that is for those of us that have a hearing loss. ‘Cause one of the things that happens when you lose hearing is you lose the ability to pick out that one voice that you wanna hear. And people with normal hearing do that fairly effortlessly, or not but they do it certainly much better than those of us with hearing loss do. We need a larger signal-to-noise ratio. In addition, children have immature listening systems and that is the case until they’re about 13 years old. That’s true for all children as though you already have the problem of a child with an immature listening system and on top of that, you have kids with impaired hearing. So that’s gonna make it very, very difficult. If we want children to be accessing language through their auditory channel, then we have to make sure that they are able to understand the words that are being spoken. And then the last point that I wanted to make about this is that kids don’t necessarily
tell us that they're having a problem. And in fact, if they're in a noisy room at school they may not know why they're not understanding what's going on. They may think it's something about the teacher's voice or the content or things that are going on. So then they may not know or they may not want to be always in the position of raising their hand and complaining that they can't hear. So it's important for us to be vigilant for our kids and make sure that the acoustical environment is always appropriate for them. So this is a slide that I wanted to share with you that demonstrates the effect of age on word recognition with distance and noise. These data are for normally-hearing children and adults. What this is showing you is that for first that the four year old child. If a four year old child is up close, within 1.8 meters and in a quiet environment, they are expected to understand 88% of words and sentences. But an adult in that same situation will receive 99% of those words. But let's see what happens when you look at that next column and you add distance and you add some noise. The four year old's word recognition is going to go down to 67%. The adult will go down a little bit from 99 to 97% but that's a small difference compared to what the child is experiencing. So that's a really significant change for a child with no hearing loss.

And that goes to the issue of the immature listening system and that holds up. It's not as dramatic with the six year old but it's still a nearly 12% difference and that difference as I said holds up until children are about 12 or 13 years of age. FM certainly helps overcome the factors of background noise and reverberation and distance from the sound source, but not entirely. If the child, for example, is using a sound field amplification system and you have a lot of reverberation in the room, you can actually make it worse 'cause you're pushing that sound around in a reverberant environment. So let's talk a little bit about the components of acoustics and why we should concerned about those different components. So when we talk about acoustical barriers, we're talking about noise in the space and that can be noise coming from the system, it can be noise coming from the hallway. It can be noise coming from the children themselves. But we measure that noise in decibels. It can be an inadequate speech level and in general, we're talking about the teacher's voice. And if the teacher
isn’t using some kind of an amplification system, by the end of the day most likely his or her voice is going to go down in volume a pretty significant amount because it’s quite difficult to maintain a high volume of speaking throughout the day. So that’s the second factor. And the third is reverberation. Reverberation refers to the way a sound bounces around in a room and we measure that and that you would need to have an acoustical engineer come in and actually measure how long it takes for sound to degrade in a specific space. So a very reverberant environment is going to mean that the sound is smeared and we hear that same sound multiple times and those of us with hearing loss, it makes it very, very difficult to understand speech. You might think of some of the reverberant environments that you’ve been in like a train station, lots of parks, surfaces on the floor and on the walls, high ceilings, your state capital. Places like that are highly reverberant but we can also find reverberant environments in a classroom where they are tile floors. Maybe not the best acoustical tile on the ceiling. Maybe cinder blocks on the wall. The gymnasium is often highly reverberant in the school.

But even the classroom can be a reverberant space. Now one thing to remember is that because acoustics are invisible, they’re often overlooked in schools. I mentioned before that architects generally are not very knowledgeable about acoustics and yet, speech intelligibility is absolutely necessary to auditory learning. Sometimes people say, well she can hear if she really puts her mind to it, if she really works at it. But let’s think about how hard that is for a child and if we really want them to be putting all their effort into struggling to listen as opposed to putting their effort into thinking and learning. I often hear from parents that they put the hardest courses of the day first for their children because by the end of the day, they’re so tired from trying to listen that it’s just impossible to do the difficult subjects at the end. I find that’s true for myself as well. If I really have to struggle to listen, I’m exhausted at the end of the day versus if I’m in a place where the listening is easy, it’s just like you. I can go the whole day and not become exhausted from the listening process. So I want to tell you a story in the next slide. During the time that I was on the Access Board, we held a public hearing
out of Washington and I'm not gonna embarrass the community by saying who it was but we had gone to that community because we wanted to see what they were doing in terms of ADAA access for children in schools. The architect for the school system was with us for a full morning and described the process that they had gone through to improve, remove barriers for children in the school environment and it was a very wonderful process that they had undertaken that included adapting the playground for children that had physical disabilities so that they could use the playground and just ensuring that all the spaces within the school were accessible. So after he spoke, I asked him what they had done in terms of acoustical improvements because everything that he had described had really been removal of physical barriers. And he thought for a minute and he said, well nothing but I think the acoustics in the classrooms are really pretty good.

Although I realize probably the gym and the auditorium could use improvements. So having never been in a classroom in that school, I really couldn't contradict him. But during the public hearing portion of the meeting when we invited guests to speak up, a woman who herself had a hearing loss and was a teacher provided her input and she said, you know I've taught in this district for 14 years and I have very rarely been in a classroom that is acoustically friendly so I don't think you should of said the classrooms are not a problem. I think we often encounter people that just don't realize how badly spaces are for children. In thinking about acoustics, it's really important to think about all the places in a school where a child might go. So certainly the classroom and the core learning spaces where they are listening and receiving information and engaging in discussion with their peers, that should be considered. But also the auditorium and the cafeteria and the gym, music rooms, offices, any place where people are exchanging information. If we don't take care of acoustics in the auditorium, it means every time we have a program there we are effectively setting up a barrier for a child with hearing loss to engage and participate in that program. We do need to think about it in those spaces as well. Certainly in the cafeteria where the kids have their social time. That's a hard place to deal with in terms of the acoustics but
again you’re setting up a barrier for that child to be able to exchange information with his or her peers that then leads to their social development which is part of the school experience. We also need to think about daycare centers in preschools. Of course, when I showed you that data a few slides ago about the impact of noise on children, you saw how dramatic that was. The younger the child was. Those are kids who are learning language, being exposed to new words and new concepts that are going to help them when they get to first grade so it’s very important for us to also address acoustics in those early learning environments as well. As we think about where we’re going to build schools, it’s important for all of us to get involved in that decision-making and I always encourage people that after they’ve attended one of these talks to go back and get involved in any school construction projects that you can and make a difference or renovation projects. But we really should be thinking about acoustics even as we site schools so that we’re keeping them away from sources of noise.

Now you can make a school acoustically-friendly even when it’s near noise and there’s a spectacular example of that in St. Louis Central Institute for the Deaf which built it’s new school building about eight or 10 years ago and they were very conscientious about constructing a school that would be absolutely the model for acoustics. Even though the school was located right adjacent to a major highway. So there was a lot of thinking ahead on that and they were in fact, able to construct a school that the ANSI standard in more and it’s just a wonderful learning environment in terms of the quiet that it provides for children and their teachers. The other thing that we hope will happen is that we’re thinking about the design, thinking about acoustics throughout the design, construction and renovation of a building, and not as an add-on. When we have a school that has already been constructed and the acoustics are less than ideal and then a child or children with hearing loss enter that school, we can still make changes and improvements to the school but it’s going to cost a lot more to do that and also, we’re also not have those improvements throughout the school. It’s going to be in those classrooms or spaces where the child is going to be. So it’s certainly not as efficient or effective. It’s certainly what we may have to do if we encounter a child with
hearing losses in a less-than-ideal listening environment later. So let's go back and just review in detail the key factors in classroom listening, I mentioned those earlier. But the first thing that we think about are ambient noise levels in the space, and those are given in decibels and the second thing that we need to think about is the sound pressure level of speech signal or the speaker and that also is given in decibels. Keeping in mind that that decrease is with distance from the speaker so if you're going to measure the sound pressure level of the speech signal and thinking about a child's signal-to-noise ratio, you actually measure that speech signal at the child's ear. So you will take a sound pressure meter and you can get an inexpensive one at RadioShack for about $40. If you were going to see exactly what the ambient noise level in the room was, you would probably take a reading at different places and then see what the speech level was or the child of the teacher's voice, you would measure it at the child's ear not at the teacher's mouth. So that's important. And then the signal-to-noise ratio, sometimes referred to as an SNR is the difference between the speech signal, the speaker's voice and the background noise.

So it's not really a ratio, it's really difference. And then Reverberation which I've mentioned before, is the echo from hard surfaces and it's the time in seconds required for sound to decay 60 decibels. Very important to keep in mind that the confined effect of noise and the reverberation is greater than each alone. So you have to look at both of them, you can't just take care of the ambient noise level in the room and teacher's voice, you also have to look at what's going on, with reverberation. So if we were together in a space today, other than doing this virtually, I would probably compute a signal-to-noise ratio in the space where we were sitting, but we're not. So we're going to do this hypothetically. If you have a pencil handy and piece of paper, you could grab them right now. Let's pretend that we're in a typical classroom and we have measured the ambient noise level in that room and we will do this in an empty room, that's how you do it, with no children in the room but you also want to do it with everything going that's going to be in the room when the children are there. So if there's a noisy air conditioning unit that's going to be going on while the kids are in the room, you wanna
turn the air conditioning unit on. If there's an aquarium that's making bubbling noises in the room and that's typically on, turn the aquarium on. If it's a heating system that's pumping air out through vents, turn the heat on. That's how we measure the ambient noise level. Let's just say that we have measured it to be 49 decibels. Which is not unusual for schools. And then let's just say we have measured the teacher's voice at the child's ear and let's just say the child is sitting, preferentially sitting in the second row of the classroom, probably in the middle which is I, my preferred place in the classroom. And we have measured the teacher's voice at the child's ear, unamplified, voice is not amplified, at 54 decibels. So we come up with the signal-to-noise ratio in that space. We're going to subtract the ambient noise level, or 49, from the teacher's voice, the speech signal, which is 54 and you're going to come up with five. Which is the signal-to-noise ratio in that classroom.

Let's just see what happens if we amplify that teacher's voice with either a personal FM system or sound field amplification system. I would say sound field amplification system because we're talking about ambient noise in the room, so we're gonna give her a microphone and we're gonna pump that level up to 66 decibels. So we then need to come up with a signal-to-noise ratio, we're gonna subtract 49 from 66. So amplifying that teacher's voice gets the SNR up to 17.5. So you see what a difference it makes to provide an amplification system within the room and really, for a child with hearing loss there's really no way to get that SNR up without providing an amplification system. Even if it were quite quiet in that space, you're getting so much more benefit moving it in if the space were quiet, think about how getting that up even higher. So let's talk a bit about what we think it should be for a normally-hearing child, we want the signal-to-noise ratio to be higher than what an adult needs. I showed you that with that table earlier on. Adults listeners with hearing loss need 10 to 15 decibel signal-to-noise ratio. I can do very nicely with 10 though I love 15. Children with hearing loss definitely need at least 15 and that's been confirmed by a number of studies. Some people believe actually for some children, it's even higher than 15. But it's not unusual to find classroom ratios ranging from plus five to minus seven decibels. And in our
hypothetical of course ours was five until we put amplification on the teacher. So there has been some thinking about what it should be and I, at ASHA in 1995, published a position statement on acoustics in classrooms and they suggested that the unoccupied classroom ambient noise level should be 30 decibels or less. The SNR should be 15 or greater which is what we mentioned before and that the reverberation in the room should be no greater than 0.4 seconds. That's a really great recommendation, it's hard to achieve and there are very few places other than CIG actually have achieved it. It's certainly something that we want to be working towards. Certainly classroom noise level should not exceed 30 to 35. I mentioned before, it's not unusual to find them as high as 51 and in typical classrooms, the teacher has to speak well in excess of 65 decibels all day long to make this possible and that's just not. So let’s move on and talk a little bit now about sources of noise in a typical classroom. The most common one being from a heating and ventilation system. Typically, that's the problem in most classrooms. Whether that's a central heating system issue or a room air conditioner which is not uncommon in many parts of the South and throughout California.

If it's, we’re talking about a heating and ventilation system that’s essential system, we’re often talking about the air ducts, pipes or related machinery that are used to pump the air into the room. And the first thing of course to do is make sure that the equipment is working properly. Sometimes the excess noise can actually be fixed by just making some adjustments. In the system often there are other things that can be done in terms of working on the air ducts and the pipes, providing some kind of air barrier for the equipment. And that's for an existing system. Of course if you have the ability to design the system and purchase quiet equipment from the outset, equipment that's designed for low noise output. You're going to do much, much better in the long run than trying to do a fix, a retrofit after the fact. Room air conditioners they should try to avoid at all cost if they can. Sometimes that's what the system uses and you can't do much about it. What I have sometimes seen in both places where they're using heating and places that are using air conditioning units, is the custodian will come in
early in the morning and if this is a heating situation, he or she will turn the heat on and room nice and toasty and then at the time when the teacher begins to talk and turns the heat off in the room and set up a fan and then the noise from the heating and ventilation system stops and then when the children leave the room, turn the heat back on to get the temperature back up to where you want it to be. That's a crazy way to do things but we actually see schools doing that to provide a quiet environment for the children. Some other common problems that we see with ambient noise levels are resulting from open space classrooms and those are always going to be noisier and what we want to do with those is move a child with hearing loss to a confined space. Street noise in city locations or from the playground is another common problem and unfortunately you have to keep the windows closed and install double pane glass. If the doors are letting a lot of that noise in, you can also make some adjustment to the doors to keep the noise out there.

Classrooms that are adjacent to noisy activities should not be chosen for kids with hearing loss. You want to keep them away from the gym and away from the cafeteria and the music room and look for classrooms that are quiet in terms of what's coming from outside. Another common one is self noise from the children. There's really no solution for that. Kids do move their chairs and drop pencils and shuffle papers. What you can do and what works very nicely is carpeting on the floors or in some cases we were also using any tennis balls or there's another product that helps and has the slits already made in it and it's something like a tennis ball on the bottoms of the chairs. So that helps with the moving around. But you can't totally get rid of noise from the children. Reverberation is likely to be a problem in a room if there are tile floors and no carpeting. Some systems have put carpeting in, sometimes I hear from school professionals and parents that say that the school district won't use carpeting because of allergies for the children and the difficulty in cleaning it. In fact, you can now find certain types of carpeting that are designed to be cleaned. In the hallways of hospitals, I've seen it in a number of hospitals. Generally they don't put that in the patient rooms but they put that in the hallways to keep the noise down. So I have to ask if they can
deal with the cleaning, keeping it clean, in the hospital so they really should be able to do that in schools. The other problem that we may see is no acoustical tile in the ceiling or possibly not the best possible ceiling tile, ‘cause there are different ratings of ceiling tiles so that’s an appropriate thing to check out. Sometimes in the process of painting a school, the painters will paint the ceiling tiles, the acoustical tiles, and when you do that that removes their acoustical qualities. They may need to be replaced if that has happened. High ceilings greater than 10 feet are going to cause acoustical problems. Once you look up in the ceiling of a classroom, if you see a lot of lighting fixtures or HVAC grilles or other non-absorptive surfaces on the ceiling and those comprise more than 10% of the ceiling space, then that’s also going to contribute to a reverberating problem even more. And the last one I wanted to mention is a trailer. If your child is being put in one of these temporary spaces, you can usually assume that the reverberation is going to be a problem.

It’s so ironic that sometimes we put hearing-impaired children that are in resource rooms in the trailers. And those are probably the worst spaces that they can be in in the school building so you certainly want to avoid that. So here's some other things you can do. Tile floors. I mentioned the carpeting, the tennis balls on the chair legs. Temporary classrooms or trailers, those kids need to be moved to regular classrooms. Less than the best ceiling tiles, install a higher-rating acoustical tile. Large rooms are always going to be worse than small rooms. You can take a look at the room design and an acoustical engineer can do that and can address shape of a room and design with panels that can be installed in that spot. A terribly expensive thing to do but it can make a big difference in terms of the acoustics in the space. It’s really important to know that any space can be improved. You may not be able to get it up to the absolute best, pristine acoustical environment that you’re looking for but any space can be improved. I think that’s a take home message that I want you to go back with, that you can certainly address this in any room. How can you back and make the case for an improved acoustical environment? I think that it’s important to know that it’s, acoustics I’ve been talking mostly about hearing loss, but it’s a problem for kids with a range of
issues. Poor acoustics are barriers for a child with hearing loss. Other children that are helps are kids younger than 13, children with central auditory processing disorders, those with attention deficit disorder, those who speak English as a second language and there was actually a study done by the House Ear institute a few years ago that demonstrated that. Kids who have Hypercusis or sensitivity to loud noise. And then those who are blind or have low vision need a really high-quality acoustical signal so they also benefit from improved acoustics. Making the Case: Part two. It’s about more than kids with cochlear implants although we find very often parents of kids with cochlear implants, because they’re really focused on making sure that their kids get the very best possible service as they’re often the ones that are pushing for it. But it turns out most hearing loss in kids is actually in the mild to moderate range. There was a study that was published in 1998 in the Journal of the American Medical Association that found 15% incidence of loss in kids less than 19 years of age. Many of it mild to moderate, of course.

We suspect a lot of this has been caused by listening to iPods that are turned up too loud and kids with unilateral losses may not appear to be hard of hearing but we have found that they have many more academic deficiencies and an untreated unilateral hearing loss and we found those kids have a one-third chance of failing at least one grade if that hearing loss isn’t being addressed. So the other thing to remember that a lot of kids with cochlear implants now are using sound field systems. So if we haven’t looked at the reverberation in that room, we could be just pushing that sound around and having it bounce off the walls and the floors and actually make it worse. We can also have situations where poor acoustics can overwhelm and the system is improvised. So keep in mind that all kids perform better in good acoustical environments. The other thing I like to do is show them what it’s like. Help school professionals appreciate the impact of even a mild hearing loss. There’s a bit of sensitivity training that I’ve probably done 50 times with school professionals and you can just order whatever number of sets so people are gonna be there, the earplugs that I’ve got a picture of there are from Ears, you can get those all for grab. If they're
inserted properly, that will give someone a 29 decibel bit of protection. So a 29 decibel hearing loss. Put some additional background noise into the room. My personal favorite is to record noise in a cafeteria of a workplace and then play that and then walk around the room and give the educational professionals a spelling test. And be sure to walk around the room because that will let them see what it's like for a child when the teacher isn't facing forward and walking around and you can't see their face and they're projecting their voice away from the child. Use common one-syllable words like beach, hall, lock, hit, for your spelling test but use two-syllable words and you will watch the room go crazy when they realize what it is like to take a spelling test, a very typical task that we provide children with just a mild hearing loss and a little bit of noise in the room, typical of a classroom. So the last part of this making the case is showing people the money.

It actually used to be the case that we thought it would really increase the cost and for a long time I used these numbers that are up there because I've been working on this since 1997. So we used to say that a new school costs just about $100 a square foot. Upgraded HVAC system for acoustics would add $4.56 a square foot and a suspended ceiling with high noise reduction would add $2.60 a square foot or we assume that would add 7% to the cost of the school construction so of course it's less expensive if you do that as part of the construction project rather than as an add-on. In fact, what we have found with the latest data is that it's not necessarily more expensive. And this is an article that was done by a parent advocate, John Flanders, who lives in Connecticut. You can find it in AG Bell’s Voices, they probably would share a copy with you. John's parent advocacy group in Connecticut worked with acoustical engineers on a new high school that was being constructed and they found that the additional expense was $55,000 out of an 11 million dollar project so it added about half a percent of cost to have a quiet space all through the school. They also worked on the renovation project in Connecticut and changing from window-mounted HVAC to a central unit made a huge difference in the acoustics and they even save the money because of the improved energy efficiency of those units. So if you're having to make
the case, having cost data is very, very critical. I really recommend that you try to get those numbers for any project that you might be willing to pursue. So just to share some legal mechanisms for achieving acoustics in classrooms. This should have been in the ADA. We passed the ADA in 1990, the ADA is essentially a building code that dictates how we build or renovate buildings. Go in to spaces now you see that there's always the ability for somebody in a wheelchair to get into a space. Go into the bathroom, there's always a stall for somebody in a wheelchair and that's because of the ADA. So if we had put acoustics in to the ADA when we came out with the first regulations in 1992, we would have all of this in place. But we did not. So all of you, I really urge you to get in touch with the Access Board and say, come on, let's have standards for acoustics in the ADA. We got something we can use now, let's do it. Section 504 does provide for communication access so that's certainly something that you can cite. IDEA, it is an eligible accommodation and I have seen parents who have gotten acoustics addressed under their child's IDEA. Importantly there now is an ANSI standard, S12, Noise.

I'm going to share that with you. It is not part of the International Building Code yet because it's been tabled by the air conditioning and modular classroom industries from being included. So it's out there, it's a voluntary standard. There are some local and state rules that have been adopted and I'm gonna share some of those with you. There was a Capital Hill briefing on acoustics that was held in May of this year. And as I mentioned before, the Access Board is considering a rule-making which is really what we should be doing. Some new legislation was passed recently called the 21st century Green High-Performance Public School Facilities Act, that's a mouthful. It was passed in May of this year and it requires the US Department of Education to make 6.4 billion dollars in grants for modernization, renovation and repair of public schools including early learning facilities starting in the school year 2010. This law has an emphasis on safe, healthy, high-performing, technologically up-to-date school buildings. But it also includes provisions that allow school districts to use funds to address classroom noise and acoustics. So that's somewhere else you can go for funds for acoustics. S12 noise
is the standard that was developed by a wide ranging group of individuals. Acoustical engineers and architects and teachers and audiologists, speech-language pathologists, parents, adults with hearing loss and I see Michelle DeConti-Johnson is on the list today and Sheryl was there representing her district, her state I should say, Colorado and they’re audiology. I was there representing two organizations ‘cause I was the, at one time at Hearing Loss Association and then I moved to AG Bell so we had a wide group of people. It covers background noise and reverberation in classrooms of moderate size and core learning spaces such as the library and a conference room. It covers background noise but not reverberation in spaces like the hallway and the locker room and the cafeteria and the gym. It has withstood two industry challenges but it is still voluntary in most areas of the country. And I’ve given you the website, you can get a copy of it for free if you would like to see it. This is what the standard is for those classroom spaces, it’s no more than 35 decibels in the reverb time depending upon the size of a space is either 0.6 or 0.7.

Remember they ask a position statement as 4.4 so this is quite a bit more generous and the ancillary spaces don’t have a max reverberation but have the background noise. That’s for the gym and the cafeteria, etc., it’s 40 decibels. These are some states in education boards that have adopted the ANSI standard. That might be helpful to you if you are trying to make the case in your own hometown. And these are some areas where they have directives in use. That means they haven’t specifically adopted the ANSI standard but they have some kind of an acoustical direction that has been adopted by these entities so these are also important to cite. In Connecticut, John Flanders and his group were able to get the state legislature to pass a law requiring all new school construction and renovation projects financed with state monies would be ANSI standard. What’s really neat about this is they did it, basically a small group of parents pushed it through. It took them two sessions at the state legislature to do it. They worked with elected officials in the education appropriation areas and they had to demonstrate that the financial impact was going to be too grade to be able to get them to do it and that’s why they collected that data that I shared with you. So I’m often
asked about portable classrooms and portables or modular classrooms generally have poor acoustics and are inappropriate for kids with hearing loss, period. So if you have a district that wants to put children in that space, just say it’s inappropriate. The Modular Building Institute has opposed inclusion of the ANSI standard in their construction and at the present they’re arguing for a separate, lesser standard for portables. This is likely to cause confusion amongst school officials and I think it’s just not appropriate that meeting a lesser standard makes a portable appropriate for children. So bottom line, children with hearing loss should not be placed in portables unless the spaces have acoustics equivalent to those of regular classrooms. So if you’re going back and advocating. I hope you will use some of these tools that I’ve given you and please get involved in school construction projects and also at the national level. The tools are there for you to use. Here are some web and other resources that you might find useful. Any additional information beyond that, I can give you. A number of these websites found have really nice information for you.

Please go ahead now if you have questions for me, start typing them in and I’m gonna give you some just some final notes here as you’re typing your questions in the chat box. I wanted to share with you that we have some upcoming online sessions including one on November 12th on Linking Baha to FM Systems and Telephones and we’re also delighted to have Carol Flexer with us on the 2nd of December, she’s going to be talking about theory of mind development and distance hearing. Actually tomorrow we have a course in Spanish for parents that’s being given by Lilian Flores, it’s part of our series, of course, it’s in Spanish and Portuguese. So we do have parents that speak English as a second language and want to take advantage of those. I hope you will let them know about it. And then we are starting up our early intervention workshops and actually next, this coming Thursday, our first one is in Kansas City. There’s information about that on the website. And I’ve given you the information about that. We’re going from Kansas City to Norfolk, Virginia, to St. Paul to Portland ME. My contact information is here so I’m happy to take your questions about this seminar and also about the Hope program and please send us your feedback form and it looks like,
good question... For children with cochlear implants, how should a parent go ahead and decide between a sound field and an FM? That’s a really good question. I would work with your cochlear implant audiologist and your school professionals. The best way to do that is to test your child with the different options and see which one she’s gonna do better with. In general, a personal FM system is always going to give you a better signal-to-noise ratio. But there are other factors involved in making that decision. And it really depends on the child and the space that she is going to be in so I would say take a look at both and see what your professionals say and see what her preferences are as well. Any other questions? How do you determine the signal-to-noise ratio if the student is wearing a behind-the-ear FM system? If the student is wearing a behind-the-ear FM and he or she has it adjusted, in general it will be adjusted such that a certain proportion of the sound is coming in via the FM system and a certain proportion of the sound is coming in via their microphone. And that’s so they can access their peers voices if their classmates are not using a handheld microphone.

So that’s another important reason why we need to have quiet in the classroom because in general, the kids voices are not going to be amplified. They’re getting that amplification via the teacher’s voice but if they’re attempting to hear their classmates' voices over a lot of noise in the classroom, that’s going to be very difficult. So in terms of computing that, I would back to your educational audiologist and have him or her do an analysis both of the teacher’s voice and what the signal-to-voice ratio is going to be. For that, it’s probably gonna be fine. But really more significant here is whether they’re gonna be able to hear their classmates' voices if there’s a lot of noise and it really in the classroom. I thank you for bringing that up. That’s a point that did not... Okay, are the architects and school planners on board in instituting these recommendations for acoustics? It would seem that this is a good starting point to make change. I would say it depends. I think most architects still have not received the training on this so you really have to be vigilant. I have found, in general, if you bring this to their attention, they’re more than willing to take a look at it but you have to do it
early in the process. And I don't think it's a matter so much of being on board as simply not knowing what they should be doing and I think that that hasn't changed dramatically and unfortunately they just don't know. So that's why I'm saying, get involved and see what you can do. Okay, so I got a question here about my spelling test. How does spelling test method reflect actual hearing in cochlear implants? What we're attempting to do there is really just give people a sense of what even a mild hearing loss with some noise in the classroom means in terms of carrying out a very typical school activity. Now let's think about 29 decibels, 'cause that's what you're doing, you're giving them a 29 decibel bilateral hearing loss and our kids with cochlear implants are often mapped around 20 or 25, 25's not unusual. So you're not that far off from where a lot our kids would be now but also remember, a cochlear implant is not gonna give you the same kind of clarity as someone with a mild loss that's got earplugs put in.

You could tell them it's worse for your kids than it is for them, in most cases. But it's really just sensitivity training to let them see how a little bit of hearing loss has a big effect in behaviors that carry this activity out. The other thing I didn't talk about today that is important to remember is our kids don't have the vocabulary that adults do, so if they miss a part of a verb and they don't really know what that word is and they don't understand the context, they're gonna miss the whole thought. We can fill in the blanks but kids can't necessarily do that. Is there a personal FM you recommend, the CI? We have almost continuous problems with one of our student's personal FM systems which has two mics I really can't comment on that. I think the best thing is to work with your clinic and your school professionals. It just wouldn't be appropriate for me to comment on that not knowing your child and not knowing what you have tried already. We do have some materials at Cochlear on FM auctions and if you email me later, and I've given you my email address there, I'll make sure that you get those materials sent to you. I'm happy to do that. Someone's asking, Do I think the unfair hearing test spelling was put out in the '60s on a record, is it still available? I believe it is, Meredith. And I think if you google unfair hearing test, you will find it. I've been told that. One of
our teacher to use and one for a student to use with peers... Sorry I don't know what that question means. Lot of questions here.

What can parents do in large situations outside of the traditional classroom like the soccer field and field trips? A personal FM system is a great way to keep the kid connected. There’s children that use FM systems on a soccer field, on the football field, so that's a really good way to stay connected. And there have been some articles about that in different publications that I've seen at AG Bell and Association. Else I've missed... Is it better to do auditory training in the student's daily acoustical environment or a more quiet setting? Hm. That's a hard question. I think it would really depend on the child and what you were trying to achieve, what your goals were for a particular therapy lesson. Any age of the child. If you’re talking about a kid who has pretty good language in place and you're really trying to get him or her to be able to function in noise then I think it’s an appropriate kind of tool to use as a goal for that particular therapy session. We actually have a product called Sound and Way Beyond that's an interactive computer software product. It’s for adults and for children who have language in place. So a tween or a teen. And it has modules that you can practice with that inject noise into the system. And it has white noise and different kinds of noise options. I like the idea of doing that. I really can’t, in terms of therapy, it’s really hard for me to say for a particular kid unless we knew what the, how old the child was and what you were trying to achieve at that point. Looks like I’ve gotten just about all of these questions and we are over time and believe it or not, I’m supposed to be running to catch a taxi to get to an airplane. This has been a really great session with lots of really excellent questions. If you have other questions that you didn't think of or didn’t ask, please send me an email and I'd be very happy to get back to you and a couple of you I said to send an email and please be sure to do that.