


Concerned About Classrooms Coalition


No provincial building standards regarding classroom acoustics currently exists across Canada.

Background

Much of the education that takes place in K-12 classrooms relies on oral communication. Studies have shown that many classrooms have poor quality acoustics and that children are often working in sub-standard classroom listening conditions. In fact, a Canadian study shows that one in six words is not understood by the average Grade 1 student due to excessive background noise and poor acoustics in Canadian classrooms. Background noise levels and poor acoustics in classrooms significantly compromise academic performance, concentration and behaviour in children.

The Acoustical Society of America has developed a classroom acoustics standard which has been approved by the American National Standards Institute (ANSI) as the Acoustical Performance Criteria, Design Requirements and Guidelines for Schools (http://www.acoustics.com/ansi_education.asp). Consistent with long-standing recommendations for good practice in educational settings, the standard sets specific criteria for maximum background noise and reverberation time for unoccupied classrooms.

New Canadian schools must be built with consideration of classroom acoustics and existing schools should be assessed and improvements made to address poor acoustics. Building acoustic standards are urgently needed for Canadian classrooms in order to improve their acoustic conditions and ensure an optimum learning environment for our children.

A sound environment for learning?

Sources of background noise in a typical Canadian classroom:

Consequences of poor acoustics in classrooms

The negative impact of distance on the quality of the signal heard by the student is most significant. According to Trane (Commercial & Residential Air Solutions), at a distance of 1 metre, the teacher's voice usually measures approximately 60 decibels (dB). Average conversational speech is approximately 65 dB. However, for a student sitting 3 metres away, the signal is only 48 decibels, due to factors such as background noise interference and noise reverberation . The teacher therefore has to speak in a raised voice to ensure that the students sitting farther away can hear the message, and as the teacher's voice tires, the students hear less and less. Furthermore, as the teacher raises his/her voice, the signal often becomes distorted making it even harder to be understood by the student. The teacher's voice is constantly competing with background noise interference. When a teacher's voice is too soft it is not "heard" and when it is too loud it is distorted and not "understood."

Consequences for teachers

Classroom teaching requires extensive voice use, placing school teachers at high risk for occupational voice disorders that threaten their ability to continue working. Teacher absences are not only costly on the education system during rehabilitation, but the use of substitute teachers intterupts the learning process for students. Acoustic standards in Canadian schools would mean fewer teachers suffering from health related issues such as debilitating voice disorders due to the stress on their vocal cords when they must regularly speak over competing background noise.

Consequences for students

Children, who primarily learn through listening, do not have the language skills or knowledge to fill in the blanks when they do not hear every word, making noisy classrooms a significant barrier to learning. Students who are particularly at risk for "missing words" are:

- Children learning in a non-native language (ESL, immersion)
- Children with learning disabilities
- Children with behavioural or attentional difficulties
- Hard-of-hearing children with permanent hearing loss or temporary loss due to ear infections

Make yourself heard!

Schools must be built with proper soundscape designs in mind. There are many variables in an acoustically appropriate design. A "good" listening and learning environment is achievable if classroom acoustics are considered at the onset of the design process. Research into the building process shows that it can cost as little as 0.5% of building costs to implement acoustic treatments during construction, while the cost of implementing acoustic treatment after construction can rise up to 20% of building costs.

Classroom acoustic standards, such as the ANSI standards, would ensure that Canadian schools are built to provide our children with ideal classroom acoustical conditions thereby maximizing the opportunity for optimal learning.

Help improve your child's learning environment

Numerous factors determine the sound levels in a classroom, including: where the school is situated, the size and shape of the room, surface treatment, etc. There are some simple and relatively inexpensive steps that parents and teachers can initiate that can improve classroom acoustics, such as:

- Add hypo-allergenic carpeting and curtains, or felt pads on the bottom of legs of chairs and tables when there is no carpeting
- Add cork boards to walls
- Replace ballasts from noisy fluorescent light fixtures and fix loose or vibrating parts on heating and ventilation systems
- Move free-standing furnishings to break up sound reflections and isolate areas in large rooms

For more ways to improve classroom acoustics, please check out the tip sheet on the CASLPA website http://www.caslpa.ca/english/resources/noise_in_classroom.asp.

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A group of organizations whose goal is to protect the learning environment of students children and the vocal health of teachers in Canada.

For more information, please contact Angie D'Aoust, CASLPA Director of Communications at 1-800-259-8519, ext. 241, or by email at angie@caslpa.ca.