

Managing Noise in the Classroom by Building RAMPS

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Good acoustics – a sound investment

The major goal of classroom education is to transmit and transact knowledge, share experiences and exchange ideas, thus assisting students to become independent thinkers. For many students, typical classroom levels of noise create barriers in achieving this goal. Poor acoustics may negatively affect listening, learning and psychosocial behaviour. Those at risk include students who are deaf and hard of hearing, learning disabled, developmentally disabled and those for whom English is a second language. Investment in good acoustics has a sound economic foundation. The benefits include improved access to curriculum for all students and reduced vocal strain for teachers, resulting in less absenteeism.

Current legislation

Under the Ontarians with Disabilities Act 2001, broader public sector organizations, such as public transportation organizations, school boards, hospitals, and colleges and universities, are required to prepare and publish annual accessibility plans. Information about this obligation is available at www.gov.on.ca/citizenship/accessibility/.

Noise, reverberation and distance – Challenges to listening in the classroom

Research clearly indicates that most classrooms are too noisy. In addition, reverberation, or sound reflection, tends to smear speech signals, making it difficult to perceive them clearly. Optimal speaker-listener distances and a signal to noise ratio of at least +15 dB, recommended for children with hearing loss, are rarely achieved (*Classroom Acoustics, a resource for creating learning environments with desirable listening conditions, ASA*).

The Acoustical Society of America (ASA) has developed a new standard on classroom acoustics. It sets specific criteria for minimum background noise at 35 dBA, the sound level in decibels in the A weighted scale which resembles closely how our ears perceive sound. The ideal reverberation time should be in the range of 0.4 to 0.6 seconds. *Classroom Acoustics, a resource for creating learning environments with desirable listening conditions* is available online at <http://asa.aip.org/classroom/booklet.html> and *ANSI/ASA S12.60-2002, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools* can be ordered from ASA at (631) 390-0215 (phone), (631) 390-0217 (fax), or online at asastds@aip.org.

This material is not intended to replace the services of a professional acoustical consultant but rather to highlight the need for an accessible listening environment for all students.

How students can access the curriculum by building RAMPS

Poor acoustics are a barrier in the same way as a flight of stairs is to a person in a wheelchair. Both require ramps. **RAMPS** is an acronym for a method of managing noise, reverberation and speaker-listener distances in the classrooms.

R - reduce noise

A - amplify teacher and student voices

M - manage noise, reverberation and distance

P - Parents and professionals working together on acoustics

S - Student strategies

Strategies for improving acoustics

Issue	Current situation	Desired change	Comments
Reduce noise	Most classrooms are too noisy.	Speaker's voice should be at least 15 dB higher than the background noise (S/N ratio).	Use sound absorbing surfaces, such as ceiling tiles, carpets, curtains, tennis balls on chair legs, and absorptive panels which can be either removable or permanent. Refer to the Ministry of Education Ontario Curriculum Unit Planner, <i>Special Education Companion</i> , 2002 for further suggestions.
Amplify teacher and student voices	No amplification is used or amplification systems are used inappropriately.	Use appropriate amplification, including FM and sound-field systems with pass around and conference microphones. Check amplification systems daily and provide regular in-service by an educational audiologist.	Amplification systems alone do not solve all issues related to poor acoustics. Teacher absenteeism may decline as a result of reduced vocal strain.
Manage noise, reverberation and distance	Class sizes are large. Discussion groups present a difficult listening environment. Open concept learning areas are a significant challenge.	Reduce class size where possible. Establish strategies for students and teachers to maximize listening during discussion. Avoid open concept classrooms. Develop a school building plan for managing noise. Address effective acoustical treatments in School Board Accessibility Plans.	Consider closing doors to hallways, turning off overhead projector equipment and eliminating other background noise. Street noise can be reduced through effective landscaping treatments.

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Parents and professionals working together	Schools may have limited financial resources.	Emphasize that good acoustics are in the best interest of all students and teachers and deserve priority funding consideration.	SEACs can reiterate that effective acoustical treatment will benefit students with many different exceptionalities. Parents may assist in soliciting donations of materials to offset costs.
Student strategies	Many students are unaware of the effect of poor acoustics and/or do not advocate on their own behalf.	Increase awareness of the effect of noise, distance and reverberation on the entire student population. Encourage self-advocacy.	Choose preferential seating and utilize assistive listening devices. Select a peer buddy if necessary for P.A. announcements. Request a print version of announcements, lectures and videos.