POINTS WEST AUDIO VISUAL LTD.

The Importance of Acoustic Treatment for Classrooms in K-12 Schools

Problems caused by noise and poor acoustic design in educational settings have been recognised for over 100 years. The recently released (May 2012) "Essex Study-Optimal classroom acoustics for all" has defined the need and benefits of acoustically treating classrooms.

Theatres, lecture halls and venues that function as presentation facilities have been using acoustic absorption treatment for years in order to provide an environment where the intended program is clearly intelligible throughout the room.

The Essex study looks at intelligibility from the perspective of reverberation time. It concludes that decreasing the reverberation time greatly increases intelligibility and has the added benefits of putting less stress on the voices of teachers as well as calming the overall noise floor created within a classroom.

It is well known that proximity to the teacher increases student engagement and comprehension of the material being taught. Space constraints make this impractical in most teaching situations where the lecturer is educating 30 or more students. Rows of desks put students up to 25' away from the source of instruction. In that amount of space, the volume level reaching the student is over 20db less than when it is created and is delayed by 25 ms. The brain then has to calculate whether the primary sound is the source material or the sound bouncing and reaching the ear attenuated, delayed and repeated is the primary information. When the natural reverberation in the room, the delay in sound reaching the ear, HVAC noise, the classroom base level sound and noise from the outside are factored, in it is not surprising to find that many children are simply not hearing the material they are being taught.

The reverberation time of a room will depend on several variables; size, finishing surfaces, and other absorbent or reflective features of the room to name a few. A typical classroom would measure 960 square feet with a ceiling height of 12 feet. The ANSI standard for reverberation time acceptable for instruction in a classroom is less than .7 seconds unoccupied. This size of classroom (960 square feet) can have a predicted reverberation time of 1.1 to 2.4 seconds (measured at 1Khz)

Amplifying the instructor has become a solution suggested by many AV companies in order to enhance student engagement and decrease instructor voice fatigue issues. In most cases, this only serves to exaggerate the pre-existing reverberation problems. While there is more volume of sound created,the increased sound energy creates louder reverberation/echo and drive up the overall noise floor of the environment.

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Acoustic treatment prevents reverberation from being created as it converts sound energy in to heat and prevents it from bouncing off reflective surfaces. 17-25% of the wall surface area of a classroom needs to be treated with acoustic panels to achieve results that are obvious in most situations.

Primacoustic Broadway Broadband panels are constructed using 6lb dense fibreglass, which is considered the benchmark for attenuating sound issues. To achieve 20% surface area coverage, a typical classroom (960 square feet) would need 298 square feet of acoustical panels (6 boxes 6/box of 2'x4' panels @$499.99/box) at a total cost of $3000 per classroom.

An unoccupied classroom of this size with windows on one wall and gypsum board as wall surfaces can be predicted to have a reverberation time of up to 1.9 seconds. The predicted result of 20% surface area coverage would be approximately .7 seconds. (measured at 1Khz). The Essex study goes further and recommends a Reverberation time of .4 seconds. This could be achieved by adding an additional 100 square feet of acoustically absorbent material.

The minimal recommended level (.7 sec) of treatment will allow the teacher to communicate source material effectively in an even volume as well as helping to keep the base noise level of the room significantly quieter. The students will be less distracted and the engagement in the material will increase creating an environment where students are given the proper tools for success. The optimal level (.4 sec) would be a very quiet controlled environment with clearly defined intelligibility.

An additional feature of many of the acoustical materials from Primacoustic is that they qualify for LEED certification points. With a background noise level of 45db, 1 LEED point would be awarded. Alternatively, achieving the ANSI standard of .7 sec reverberation time would also earn a point.

Primacoustic and Points West Audio Visual provide outstanding acoustic results to a variety of situations and budgets. We endeavour to take the mystery out of acoustics and provide simple, easy to install and affordable solutions in order to enable environments to perform as they were intended.

Contact Points West Audio Visual locally at 250.861.5424 or toll free at 800.761.7928.

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