CLASSROOM ACOUSTICS AND ARCHITECTS

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As an architect, good acoustics, good sightlines, and a sense of intimacy have been the criteria used for classroom design and performing arts facilities. Although classrooms and lecture theatres tend to be smaller in size, volume and number of seats than performing art venues, we have tried to incorporate the above criteria to improved room acoustics in classrooms.

As architects with an appreciation for the benefits of an improved acoustical environment, we do not consider ourselves to be acoustical consultants, we have taken a pragmatic approach to acoustical design, in as much as that many of the installations are untested, either before or after design and construction, but we have tried to address acoustical concerns within the challenge of designing contemporary classrooms. We have used the criteria outline in Michael Barron's 1993 book entitled Auditorium Acoustics and Architectural Design for describing an acoustical environment as follows:

Clarity	is it muddy or clear?
Reverberance	is it dead or live?
Envelopment	is it expansive or constructed?
Intimacy	is it remote or intimate?
Loudness	is it loud or quiet?

The functional challenges of a classroom design are many.

There is a space requirement to seat a specified number of students usually from 25 to 250. The room may be flat floored or in larger classrooms and lecture theatres, sloped or tiered. The spaces are usually multi-purpose and provide for a single speaker without amplification to several speakers and a variety of interactive audio/visual requirements. In current classroom design it is not only the presenter that has access to power and data, but the students too. Writing benches are now being installed for laptop computers and requiring power and data connections. Projection booths provide audio/visual support in addition to the traditional chalkboard or whiteboard needs. Overhead projectors, digital data projection and video and film presentations are now the norm in classroom design. Structural, mechanical and electrical consultants provide necessary engineering input. Architectural, structural, mechanical and electrical needs must be met to satisfy current building codes to support life safety issues and indoor environmental considerations. Classrooms must be accessible to those in wheelchairs and if above 60 seats must make provision for those who are hard of hearing. This is usually in the form of infrared assistance systems. Classrooms are by building code definition "Places of Public Assembly".

In designing classrooms we have considered the following issues to be article in promoting and supporting an improved acoustical environment:

- Acoustic isolation of the classroom from the exterior or adjoining noisy spaces. E.g.: Specifying carpet in adjoining corridors to reduce impact noise.

- Reduction in the ambient noise level within the room. Within some auditoria we have measured NC15. Normal classroom use is substantially higher, NC25 has been our target. This has been achieved with quiet mechanical systems. The use of electronic ballasts in direct/indirect lighting fixtures and a mixture of reflective and absorptive surfaces.

- We have experimented with room shapes and modeling of the walls and ceilings.

- We have tired to consider reflections, echoes and reinforce intelligibility with early lateral reflections.

- We have incorporated the need for diffusion and absorption with various architectural finishes.

- We have experimented with ceiling reflectors and hard reflective surfaces on the floor and walls of the presentation area.

- Floors for the audience have generally been carpeted and rear walls absorptive surfaces.

- We have tried to consider reverberation times realizing that levels above 1.5 seconds will not be good for speech. But also realizing that too dry an environment will lack character and induce a surreal and a natural experience that lacks excitement. Teachers and instructors need to excite, motivate and inspire. It is suggested that a

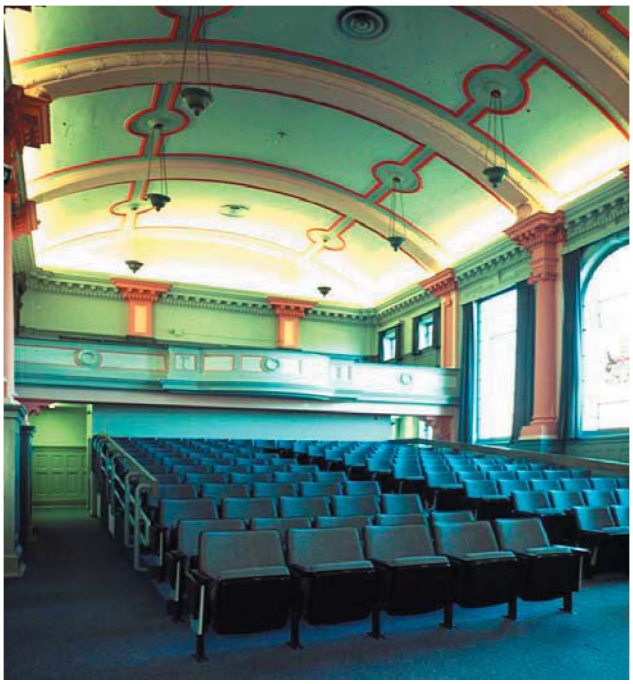
room that is too dry is even more difficult top excite students than a reverberant space.

- We have tried to deal with the two approaches to teaching and learning: 1) "the sage on the stage" 2) "the guide on the side". The Centre for Innovative Teaching at the University of Victoria illustrates these issues.

In addition to the Centre for Innovative Teaching many other examples of classroom, lecture theatre and music/drama education facilities will be illustrated.

References

Barron, Michael (1993). Auditorium Acoustics and Architectural Design.



Young Theatre, Camosun College

Lam Auditorium, University of Victoria

Centre for Innovative Teaching, University of Victoria

Victoria Conservatory of Music

Student Services Building Lecture Theatre, Malaspina University-College