The way teaching spaces are designed and used has changed. This overview provides a summary of the Ministry’s new Acoustic guidelines, which reflects these and other changes in the way the Ministry builds schools. The guidelines form part of the Ministry’s Designing Quality Learning Spaces (DQLS) suite of documents. This overview covers key design concepts, who should use it and mandatory requirements.

The target audience of the new Acoustics guide is designers and engineers involved in the design and specification of the Ministry’s schools. It should be used for new builds, redevelopments, upgrades or addressing acoustic problems. It covers four key areas:

- The importance of good acoustics for learning.
- Acoustic concepts.
- Achieving acoustic standards by exploring design concepts and the qualities of different materials.
- Mandatory and recommended acoustic standards for various learning spaces.

Mandatory requirements and key information are in RED (look for the △ symbol). Ministry recommendations and other key concepts are in BLUE (look for the ▽ symbol).

Areas covered in mandatory requirements

- Reverberation times specific to each space type between 0.4-1.5 seconds, e.g. flexible learning spaces should be between 0.5–0.8 seconds.
- Ambient noise levels specific to each type of learning space, typically between 25-45 decibels (dB).
- Minimum sound insulation qualities of walls, ceilings and floors between the various spaces. These are measured and rated through Sound Transmission Class (STC) values and an Impact Insulation Class (IIC) rating.
- For noise absorption, ceilings are to be fully covered in materials with a minimum Noise Reduction Coefficient (NRC) of 0.85.
- Specific acoustic considerations for technology spaces.

The aim of the Acoustic guidelines

The guidelines aim to provide quality learning conditions for students and teachers.

As educational spaces become more flexible, it is now more important to understand how the acoustic qualities of a space can affect the learning activities being undertaken and ensure that the acoustic requirements are adequately provided for within a learning space.

Integrated design: taking a holistic approach

The Acoustics guidelines are based on the research of best practice, lessons learned, and the review of school designs by the Ministry’s Design Review Panel. One of the key findings is the importance of having a holistic and integrated approach to building design, with an aim to optimise a building's performance. This is the guiding principle of all the DQLS documents.

The reason for an integrated approach is to consider how changes to one design aspect may impact others. For example, increasing the amount of windows for ventilation and daylight, without making any other adjustments, could impact acoustic performance and other environmental factors. The graph below represents this example, showing interconnection between indoor environmental aspects.
While all indoor environmental factors need to be optimised, the following hierarchy of importance is essential when making design decisions:

Usability of space > **acoustics** > ventilation > daylight > heating/cooling

### The ‘ABC’ of good school acoustics

#### Absorb

Noise absorbing surfaces help to remove sound from a learning environment, improving reverberation and ambient noise. A simple starting formula is carpet tiles, acoustic ceiling tiles and acoustic wall coverings wherever possible.

**Carpet for general spaces**

Carpet is desirable. Hard floors should be used in isolated areas. Where hard floors are required, look to increase the amount of acoustic treatment nearby.

**Ceilings**

Ceilings should be fully covered in acoustic materials to absorb noise.

High ceilings enlarge the volume of the learning space and can improve acoustics, and may increase wall area available for acoustic treatment.

**Walls**

Ideally walls have absorbent acoustic rated material to at least 20% of the area of the ceiling.

For example, if a ceiling is 100m², the walls should have a minimum 20m² of absorbent material (such as 10-15mm thick acoustic pin board or greater.)

**Block**

Blocking sound between learning spaces is a central focus of the Acoustics guide. Walls, glazing, ceilings and floors should have suitable sound insulation qualities to control the noise travelling through them.

**Within** a flexible learning space blocking sound between different activities can also be important. Using tall furniture or screens placed between flexible learning spaces is one way to achieve this.

Another is to provide breakout learning areas with an ability for acoustic separation, while still maintaining some flexibility and visual connectivity.

#### Consider the learning space and its users

Consider the number of learners in a space and the range of learning activities that will be undertaken. This includes the types of spaces they will require to undertake these activities within a flexible learning space.

Provide sufficient floor area for each learner. Where groups may be undertaking differing activities, providing sufficient space between different activities is important to minimise disruption between learners. The rule of thumb is to provide 3-4m² overall per student in flexible learning spaces.

Provide zoning for quieter and noisy activities. Consider where these are placed and how these are to be acoustically treated.

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*This is a brief overview of the Acoustic guidelines. It does not cover the Ministry’s full requirements for acoustics in schools. Please refer to the Ministry’s website for further information.

Other documents in the DQLS series that form part of the Ministry’s guidelines are: Indoor Air Quality and Thermal Comfort and Lighting.*