

# DESIGN STRATEGIES FOR LINEAR SEMI-OPEN PLAN CLASSROOMS: CASE STUDY ON IMPROVING THE ACOUSTIC ENVIRONMENT IN A MODERN PRIMARY SCHOOL

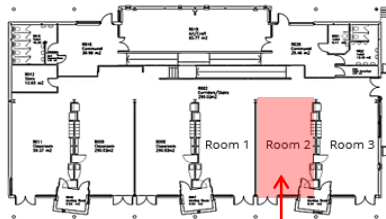
Shenzhi Su, CSP Acoustics, 29 Eagle Street, Craighall Business Park, Glasgow, G4 9XA; Fort Street House, Broughty Ferry, Dundee, DD5 2AB

## Introduction

The design of the school in question is generally aligned with recommendations given in often well-recognised documents: linear layout; absorptive ceiling (Class C) and carpeted floor in classrooms; storage separating walls with Perspex panels on top, extending to steel beams; provide enclosed quiet rooms for each unit.

The school viewed its acoustic environment as unsatisfactory, and was looking for improvements, while maintaining its open-plan nature was not compromised.

This paper assesses the acoustic environment by onsite measurements and a 3D acoustic modelling for speech intelligibility. It compares STI scores of a series of possible improvement measures individually. Based on these, treatments are recommended for refurbishment, general design strategies for linear semi-open plan classrooms are also obtained.



The room highlighted in the paper

## Current internal view



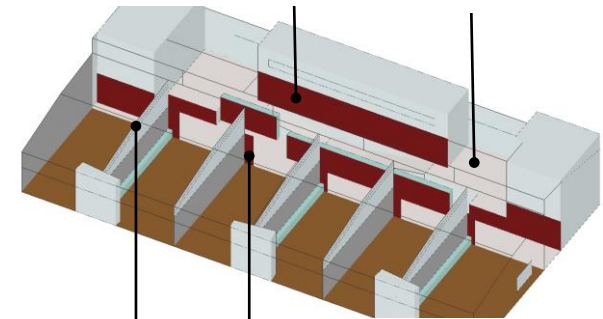
## Recommended Design Strategies:

- A minimum 1m-deep space at the open-side boundaries of each classroom be free of any pupil seating;
- A minimum 1.2m-wide screen between the openings of classrooms, preferably absorptive;
- Walls facing the openings of the classrooms be absorptive, preferably Class B or above;
- When separating elements are extended to the ceiling, Class C ceilings are acceptable in classrooms if visual expression is preferred;
- Both classroom floors and circulation areas be carpeted. Alternatively, vinyl with resilient underlay be installed in circulation areas;
- Use glass or Perspex on top of separating cabinet walls to divide classrooms and maintain feeling of openness

## Recommended treatments for the refurbishment

c) Cover the walls and furniture facing classroom openings with Class B or above wall panels as much as practical

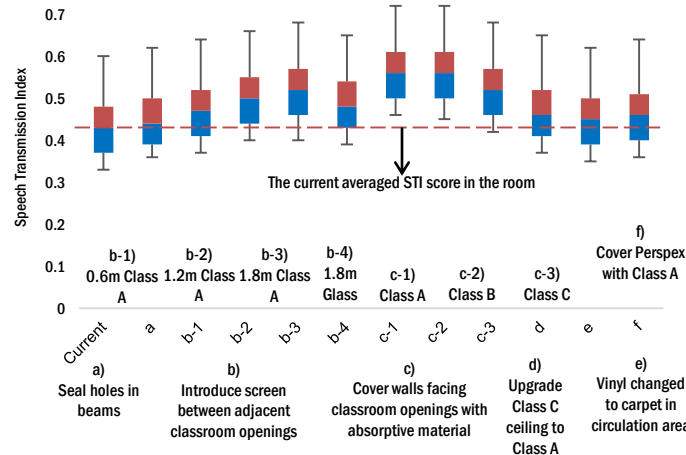
Install resilient underlay below vinyl flooring (this school does not prefer carpet in these areas)



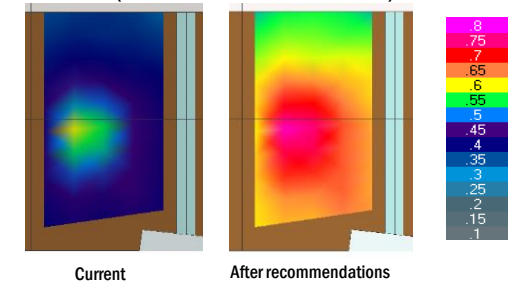
a) Seal any holes in the beams between classrooms using Perspex

b) Introduce 1.2m wide 2.5m high Class A screen between adjacent classroom openings

## Comparison of STI scores using different treatments



## Comparison of predicted STI scores when the two adjacent classrooms are active (teacher with raised voice as source)



Current

After recommendations

