

Creating good listening and visual conditions for learning in education

Carrie MacHattie, Access to Education,
Sensory Support

“...inadequate temperature control, **lighting**, air quality and **acoustics** have detrimental effects on concentration, mood, well-being, attendance and, ultimately, attainment.”

The Centre for Learning and Teaching, University of Newcastle, The Impact of School Environments: A literature review, (2005).

the classroom environment can affect a child's academic progress over a year by as much as 25%

<http://dx.doi.org/10.1016/j.buildenv.2012.09.016> [P.S.Barrett, Y. Zhang, J. Moffat and K.Kobbacy (2012). "An holistic, multi-level analysis identifying the impact of classroom design on pupils' learning." *Building and Environment*.]

The 'Steer' report, 2005

“Architects and contractors should pay special attention to acoustics and lighting in classrooms to support pupil participation in lessons”

Learning behaviour, The Report of The Practitioners' Group on School Behaviour and Discipline, DES, 2005

Hearing and Vision are the primary channels for learning

- 75% of the school day involves listening activities.
- 80% of what we learn passes through the eyes and the 'vision' part of the brain

We need to ensure that –

all of our children **all** of the time are getting a good speech intelligibility signal and have good visual access

If children can't hear or see properly their learning is significantly affected

Today's objectives

- Look at how listening and visual conditions affect the learning environment for **all** children, not just those with sensory impairments
- Look at the challenges to good listening/the visual environment
- Look at how you can improve the learning environment in your setting
- Think about the legal framework

Activity 1

Groups on a flip chart

- Group 1 - What could make it difficult for children to hear clearly in the classroom?
- Group 2 - What could make it visually challenging for some pupils?
- Group 3 – what would a good acoustic environment ‘look’ like?
- Group 4 – what would a good visual environment look like?

Acoustics in the Learning Environment

Acoustics is an invisible problem

A classroom that may sound OK to an adult may be very inadequate for children who are neurologically under developed and who have not had decades of language and life experience”

Carol Flexor

<https://www.youtube.com/watch?v=1Adcky8E47M>

Audible but Intelligible?

Auditory Closure

Children can't listen like adults because they haven't fully formed cognitive recognition skills to fill in the gaps

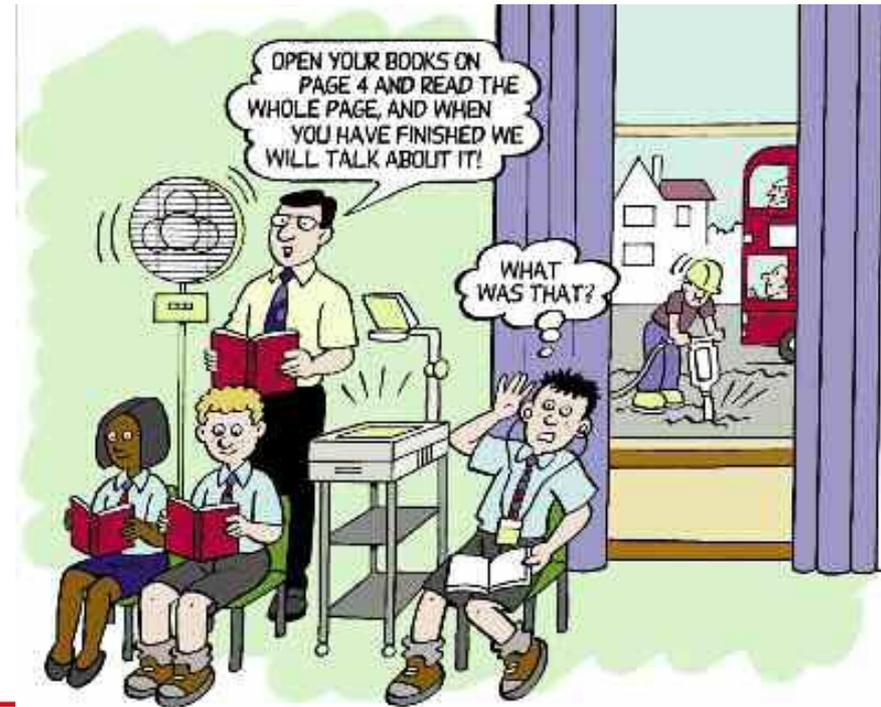


Intelligibility means that the speech is not only heard, but heard clearly enough for the listener to identify critical word/ sound distinctions

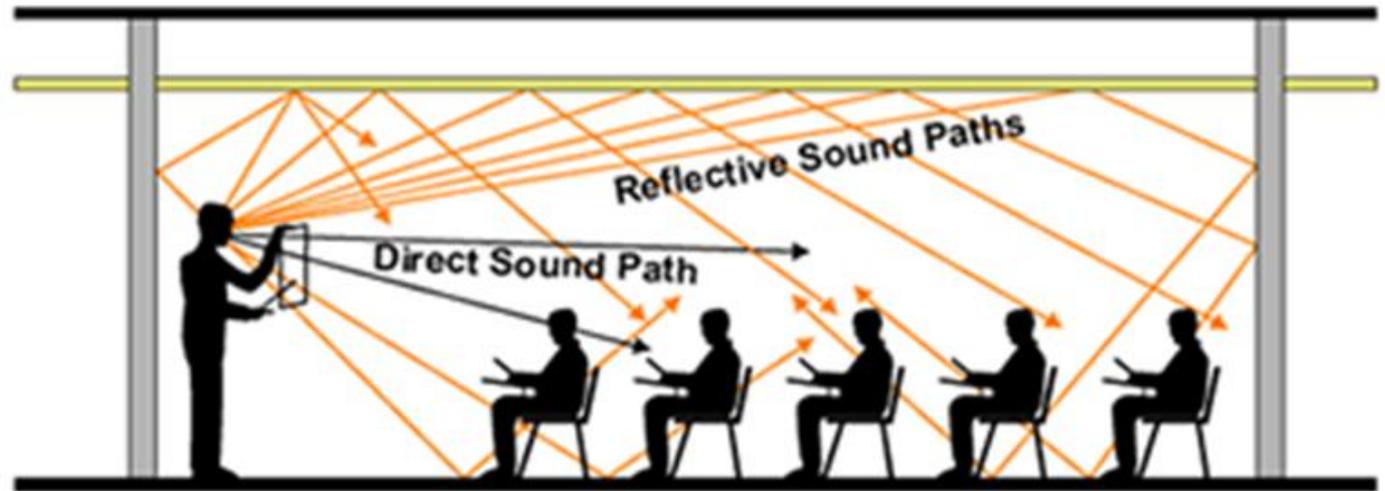
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Factors affecting intelligibility

- Reverberation
- Background noise
- Distance



The Impact of Reverberation



- Is the sound that continues in a room when the sound from the source has stopped
- It is caused by reflection of the sound from the surfaces in the room.
- It increases the effects of background noise
- distorts the quality of the original signal making it less intelligible.

The effect of this is to distort speech which can be represented visually by –

The following is a list of Farmers' markets to be held in the surrounding areas

The Impact of Noise

The Lombard Effect:

Noise begets noise

The poorer the acoustics

.....The noisier the environment

.....The noisier the children

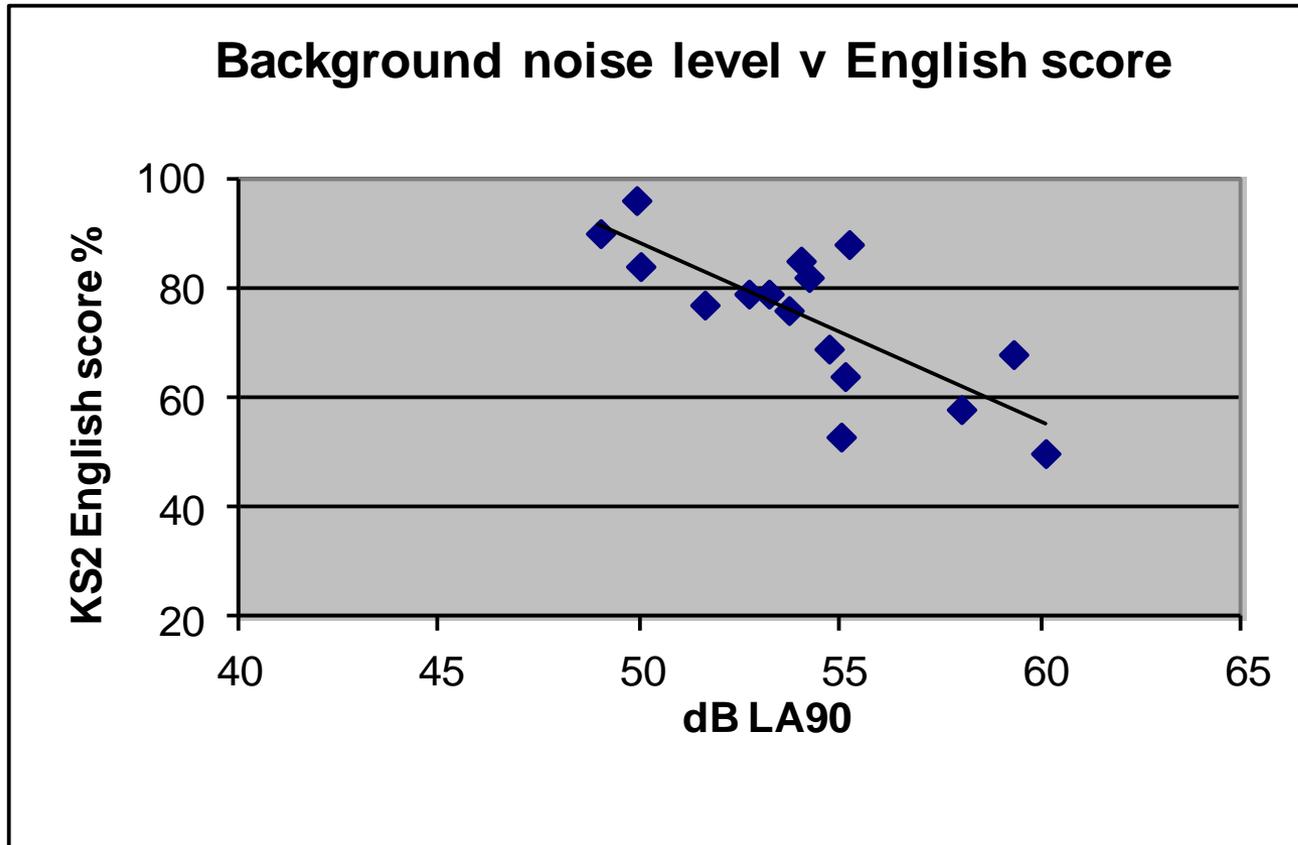
The impact of noise

- Literacy
- Mathematics
- Attention
- Memory

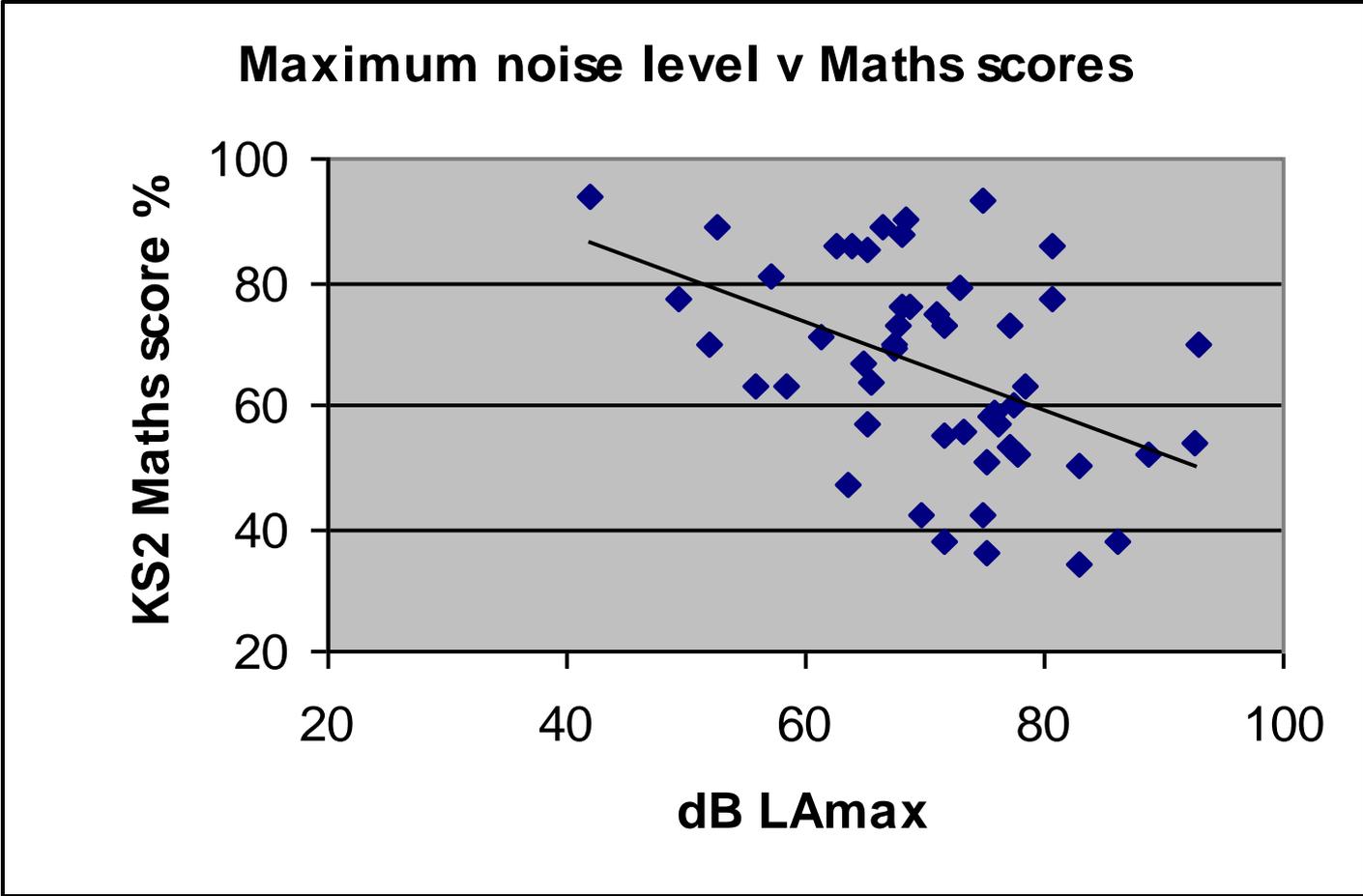


Research has shown that all these areas of learning were negatively affected by background noise

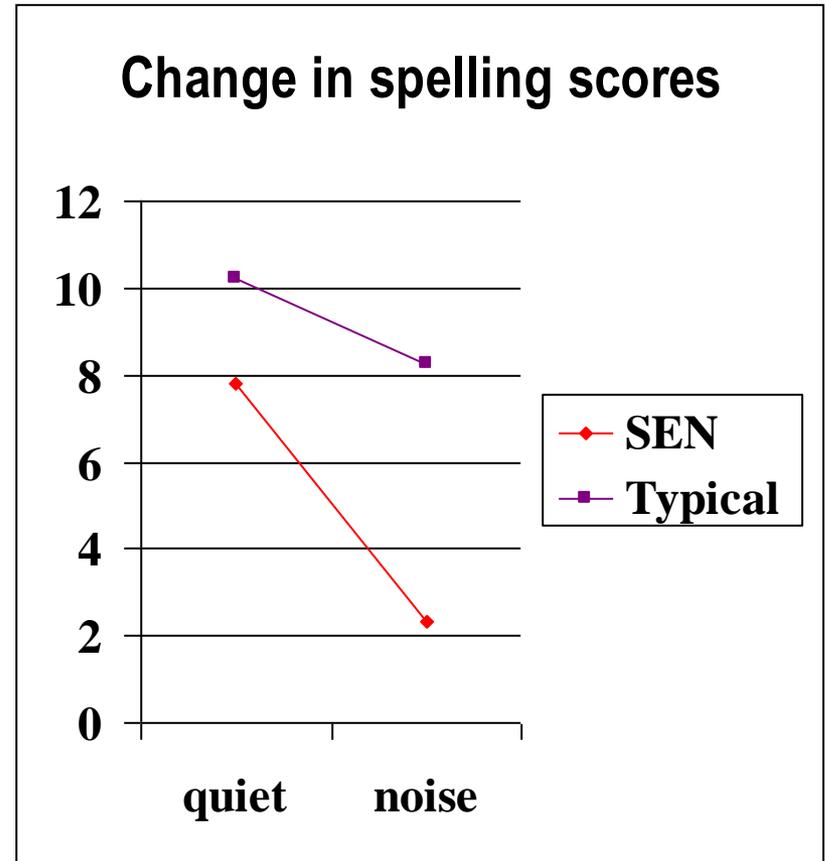
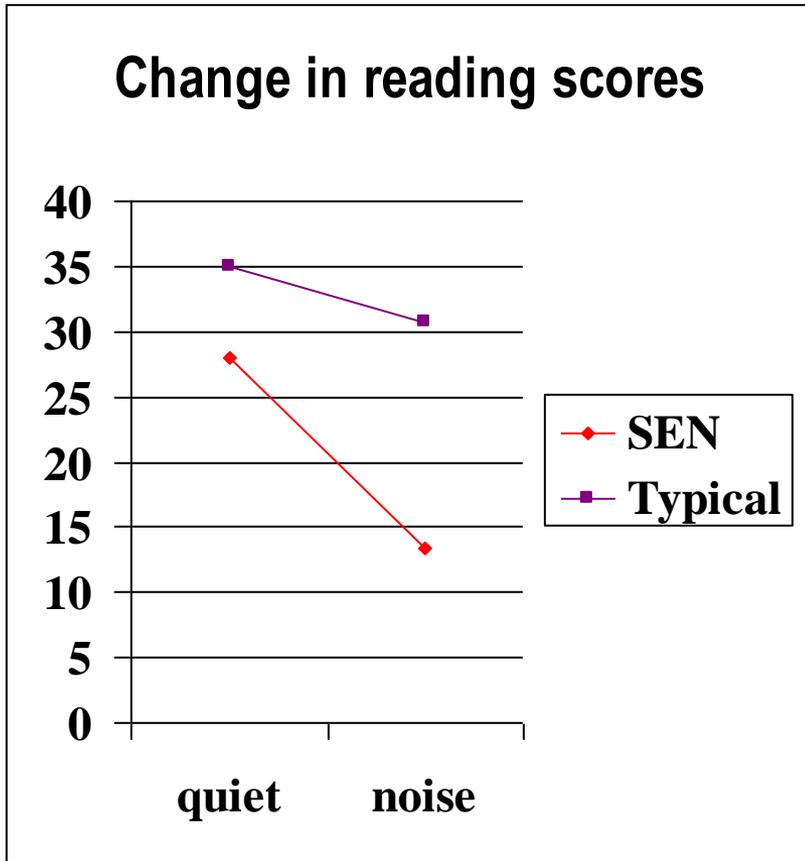
Acoustics research - The effect of classroom noise



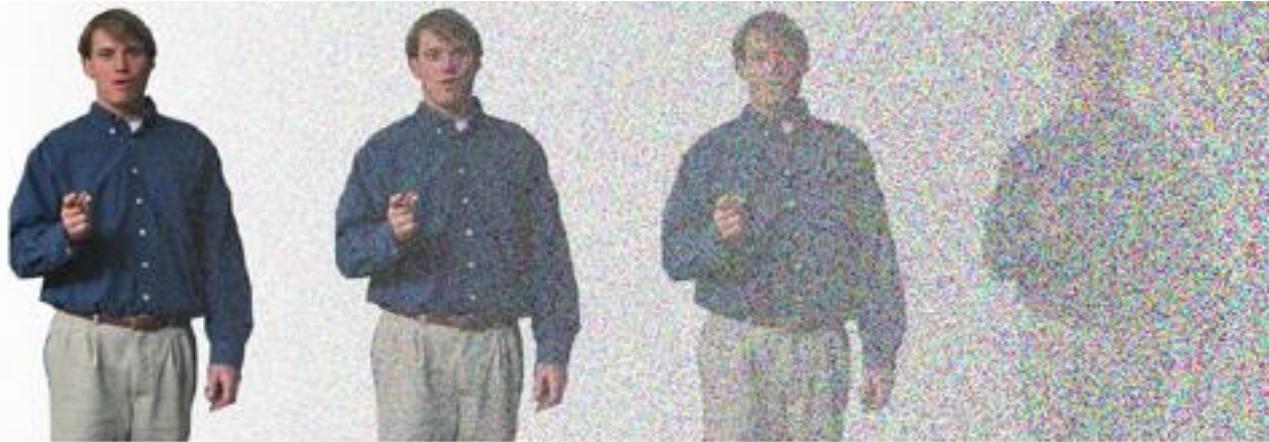
The effect of external noise



The effects of noise on children with SEN



The effect of Distance



3 ft/0.9m

6 ft/1.8m

12 ft/3.7m

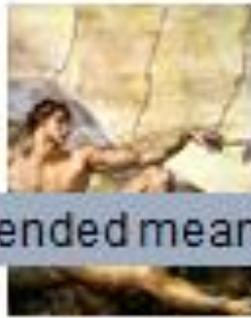
18 ft/5.5m

65dB

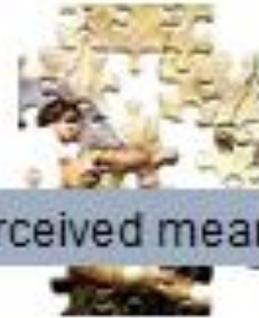
59dB

53dB

47dB



Intended meaning



Perceived meaning

Language

Age, skills, knowledge

Hearing ability

Michelangelo painted the Sistine Chapel

Acoustics

Noise



Michael Angel painted the sixteenth channel?

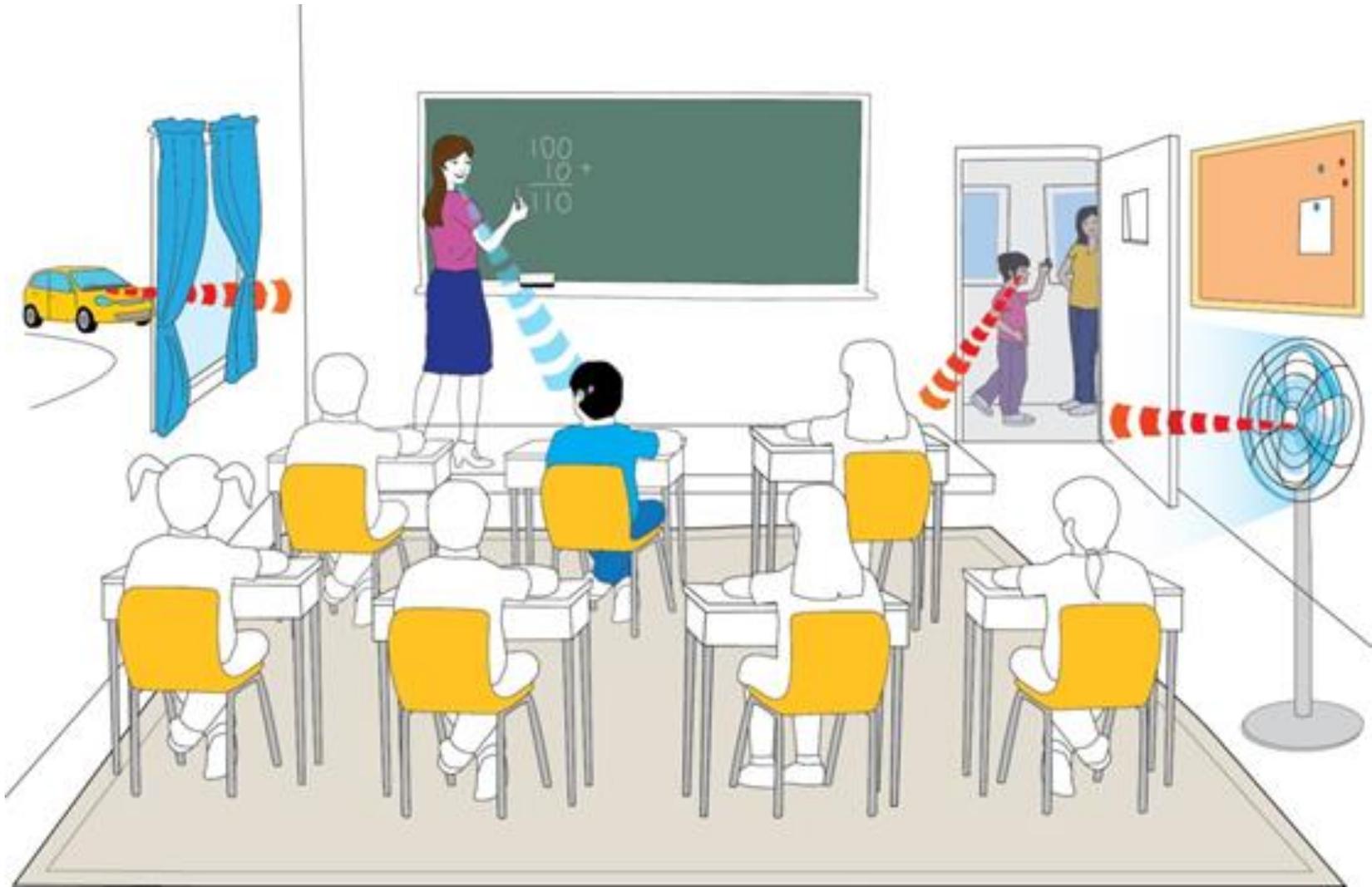
Activity 2

Have a pen and some scrap paper ready

- Listening in quiet
- Listening in noise

Simple changes can make a difference

- Suspended, acoustically treated ceiling
 - curtains or blinds at windows – reduce reflection of internal noise from shiny windows and absorb low frequency sounds
 - cork boards / carpet tiles on walls - reduces reflection of noise from smooth walls prevents some noise leaking through from adjacent rooms
 - Soft furnishings around the room – reading/breakout area with rugs, cushions, table covers etc
 - Books on shelves rather than in bookcases, displays on walls (not laminated and beware of effects on the visual environment)
-



Reducing noise levels

- carpeted floors - absorb sound and drastically reduce the noise from scraping chairs, feet etc. – Hush-ups (or tennis balls) on chair legs can be cheaper)
- double glazing – can reduce external noise from traffic, pedestrians, playgrounds, air traffic etc.

Or more simply (and cheaply) -

- Close windows and doors
- Switch off 'noisy' equipment when not in use
- Manage pupil noise in classrooms – 'traffic lights' apps/equipment
- Consideration of scheduling and location of 'noisy' lessons



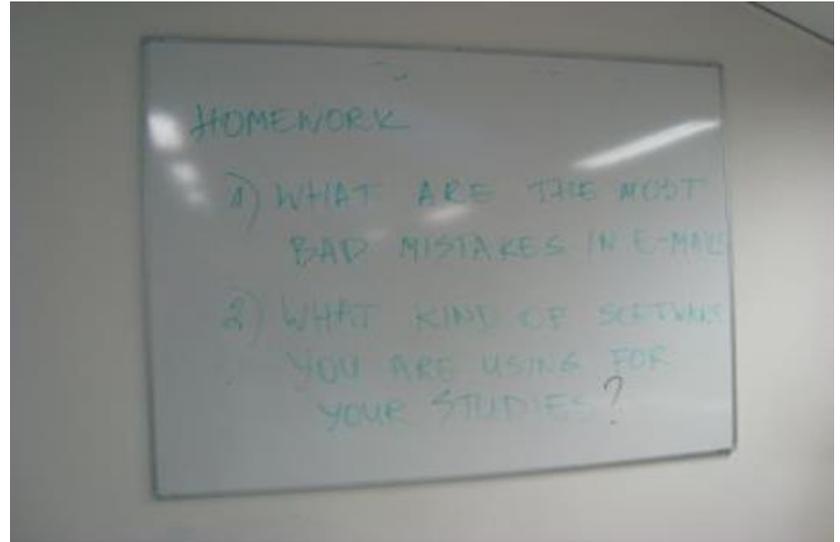
To take away....

- How acoustically friendly is your classroom
 - Effective day to day management of the listening environment by teaching staff
 - Creating good listening conditions factsheet for mainstream teachers
 - NDCS Noise survey
-

The visual learning environment

The **size** of the classroom and interior areas, the colors of the walls, the type of **furniture** and **flooring**, the amount of **light**, and the room **arrangement** all influence how students learn

4Teachers.org, Classroom architect



Environmental adaptations or modifications that enhance visual functioning

- Lighting
- Reduction of glare
- Contrast
- Consideration of furniture, storage and room layout.

Lighting and glare

- Natural/artificial light
- Areas of shadow
- Consider seating position in relation to windows
- Window coverings - adjustable blinds or curtains to allow for the adjustment of natural light
- Overhead lighting in relation to the Interactive whiteboard
- Shiny tables versus matt



Use of colour contrast

- Use of dark pens on clean whiteboards
- Furniture and floor/wall coverings
- Work surfaces
- Doors, door handles, door frames, light switches



- Changes in level – steps and stairs
- Avoid busy patterns on soft furnishings

Research has found that children in highly decorated classrooms were more distracted, spent more time off-tasks and demonstrated smaller learning gains than when the decorations were removed.



Psychology researchers Anna V Fisher, Karrie E Godwin and Howard Seltman of Carnegie Mellon University





To take away....

- Top ten tips for good visual access
- Environmental audit

The legal framework

The Equality Act 2010

www.gov.uk/government/publications/equality-act-2010-advice-for-schools

The Education (School Premises) Regulations 2012

www.legislation.gov.uk/ukxi/2012/1943/made

The children and families Act 2013

<https://www.gov.uk/government/publications/send-code-of-practice-0-to-25>

Guidance

Acoustic design of schools: performance standards (2014)
(Building Bulletin 93)

www.gov.uk/government/uploads/system/uploads/attachment_data/file/392453/BB93_December_2014_v15.pdf

Creating good listening conditions for learning in education
(NDCS, 2014)

The Standard Specifications Layouts and Dimensions publication
(SSLD) on Lighting Systems (2008)

Environmental/acoustic survey and further advice

Please contact Sensory Support:

Cherry Thomas, Cathy Spruce

0121 303 1793

Any questions?

Equipment to help

- Silent Light app

itunes.apple.com/gb/app/silent-light-classroom-timer/id657863900?mt=8

- Too noisy app

itunes.apple.com/gb/app/id521646496?mt=8&affId=1720307

- Connevans Babbleguard

<https://www.connevans.co.uk/catalogue/14438253/Babble-Guard-from-Connevans>