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PRIMARY SCHOOLS: THE BUILT ENVIRONMENT

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This briefing draws on Primary Review Research Report 6/1, *Primary Schools: the built environment*, by Karl Wall, Julie Dockrell and Nick Peacey. The report surveys published research on the ways in which the school site, its building and grounds provide the infrastructure that supports children's learning and development at the primary stage. To understand the ways in which school buildings impact on children and teachers it is necessary to consider a number of key features of the built environment: the school's location, its size, the ways in which classrooms are lit, ventilated, heated and exposed to different types of noise. Poorly managed, monitored and maintained school environments are associated with negative effects on classrooms, pupils and teachers. **The full report lists all sources consulted and is available at www.primaryreview.org.uk.**

The primary school as a built space

- There is a need to need to attend to the built environment both inside and outside the classroom in order to achieve effective learning and socialisation in the context of the safety and wellbeing of pupils and staff.
- The school environment and the organisation of classrooms and offices have perceived and identifiable effects, both positive and negative, on pupils and staff and on the quality of pupil learning.
- The ways in which school design factors impact on children's behaviour and school ethos is complex, and effects are often indirect or cumulative.
- The school environment can also affect different groups in different ways.
- There is now a growing body of research available to inform the appropriate design and physical organisation of primary schools.

Noise

During the past 30 years the effects of classroom acoustics on children's learning and attainment in the primary years have provided the focus for a number of research studies. Rather less research is available on the impact of noise on children's health and behaviour. There are few controlled investigations into the ways in which acoustical treatment and classroom amplification can reduce the impact of poor classroom acoustics.

- There are two relevant acoustical parameters: noise and reverberation.
- Extraneous noise may stem from sources internal to and external to the classroom and involve both speech and non-speech. These different sources and types of extraneous noise have differential effects on learning and performance.
- Poor classroom acoustics can create a negative learning environment for many students, especially those with hearing impairments, learning difficulties or for whom English is an additional language.
- Excessive noise has a direct effect on test performance and reduces performance in SATs.
- Both pupils and staff are annoyed by environmental noise.
- The effect of trying to compete with an acoustically-difficult environment may place severe strain on teachers' voices.

Ventilation and heating

A lack of appropriate ventilation or heating leads to less than optimal educational performance. Hot, humid classrooms affect concentration on the task in hand and impair children's learning.

- Despite this, relatively little research has systematically examined how classroom temperature, humidity, air quality and ventilation affect primary age pupils and their teachers.
- Temperature, humidity, air quality and ventilation interact with each other. The effects of such interactions on pupils and teachers have been little investigated, but may be significant when aggregated.
- Existing research on ventilation and heating draws mainly on adult studies, often in work environments. It tends to extrapolate to settings for young children although hard data are lacking to justify the conclusions drawn.
- From the limited research focusing on young children we know that elevated temperatures and humidity are associated with adverse effects on pupil achievement and behaviour. In the case of humidity there may be health risks as well. For teachers such circumstances may lead to increased teacher stress and reduced classroom effectiveness.
- Poorly controlled classroom ventilation may lead to raised carbon dioxide levels which in turn are associated with a reduction in concentration and the ability to focus on mental tasks.
- Both pupils and teachers show health related effects when room temperature, humidity and ventilation are inadequately controlled. This may be associated with missed schooling on the part of pupils and increase teacher absenteeism.

Lighting

Effective lighting is central to classroom activity and has been the focus for much recent research.

- Adequate lighting levels for particular types of classroom task have been precisely identified and defined.
- Glare arising from reflective surfaces may be disabling, and even when just uncomfortable it may have negative effects on pupil and teacher activity.
- Contrast between objects and the background on which they lie may have negative effects on pupil and teacher activity if levels of contrast are too low and lighting levels are inadequate.
- Poorly managed classroom lighting may exacerbate the negative effects of poorly corrected pupil and teacher eyesight and thus affect access to text and other learning resources.
- Greater exposure to natural light is positively associated with enhanced pupil performance, while having a view from the classroom positively impacts on teacher and pupil wellbeing.
- There is some indication that light colour and its perceived warmth may be associated with positive individual moods and a sense of wellbeing.
- There is increasing evidence that low levels of exposure to natural light may negatively interact with individual circadian rhythms and are associated with reduced concentration, disturbed sleep and depressed mental and social activity. This may lead to missed schooling for pupils or absenteeism among teachers.

The absence of significant data

Our understanding of the effects of the built environment on pupils is limited by failures to collect systematic data for large, appropriately identified samples, to report effect sizes where data are collected and to test modifications in a systematic fashion. There are indicative data emanating from research on classroom acoustics to indicate that this is both feasible and an appropriate way to enhance practice and develop policy.

Implications for Policy and Practice

The built environment has a key role in meeting several of the five *Every Child Matters* outcomes: be healthy; stay safe; enjoy and achieve; make a positive contribution; achieve economic wellbeing. Guidance documents currently exist for each of the environmental parameters considered by Research Survey 6/1. However, bearing in mind our argument that the variables to which they relate need to be considered not just separately but also in combination, they may be difficult to implement.

Further, the lack of a consistently robust evidence base to support guidance is a clear barrier to best practice, and key stakeholders are not always aware of the ways in which these variables can affect both children and adults in educational settings. For all these reasons, policy and decision making in respect of the built environment at the primary stage may be problematic.

FURTHER INFORMATION

The report on which this briefing is based: Wall, K., Dockrell, J. and Peacey, N. (2008) *Primary Schools: the built environment* (Primary Review Research Survey 6/1), Cambridge: University of Cambridge Faculty of Education. ISBN 978-1-906478-24-7.

The report is available at www.primaryreview.org.uk and is one of 32 Primary Review interim reports. Two of these deal with the opinion-gathering strands of the Review's evidence base. The remainder report on the thirty surveys of published research which the Review has commissioned from its 70 academic consultants. The reports are being published now both to increase public understanding of primary education and to stimulate debate during the period leading up to the publication of the Review's final report in late 2008.

The Primary Review was launched in October 2006 as a wide-ranging independent enquiry into the condition and future of primary education in England. Supported by Esmée Fairbairn Foundation, it is based at the University of Cambridge Faculty of Education and directed by Professor Robin Alexander.

The Review has ten themes and four strands of evidence (submissions, community and national soundings, surveys of published research, and searches of official data). The report summarised in this briefing relates to the **Research Survey** strand and the theme **Settings and Professionals**.

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