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The Relationship Between  
Capital Investment  
and Pupil Performance: An  
Analysis by the United  
Kingdom

OECD

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# THE RELATIONSHIP BETWEEN CAPITAL INVESTMENT AND PUPIL PERFORMANCE: AN ANALYSIS BY THE UNITED KINGDOM

The United Kingdom's Department for Education and Skills (DfES, formerly the Department for Education and Employment) commissioned a major study to examine the relationship between capital investment in schools and subsequent academic attainment. In particular, a key objective of the study was to establish, if possible, the additional effect in terms of pupil attainment of every GBP 1 invested in schools capital.

In order to address these objectives, three main strands of work were undertaken:

- a review of existing literature on the links between capital spending and pupil performance;
- a qualitative stream of work involving visits to 27 schools;
- a quantitative stream of work which involved conducting a statistical analysis of information on capital investment and pupil performance in 1 916 English schools.

The study was conducted between September 1999 and March 2000 by PricewaterhouseCoopers. The subsequent report, "Building Performance: An Empirical Assessment of the Relationship Between Schools Capital Investment and Pupil Performance", outlines the main findings from the study and provides an overview of the methodology adopted in each of the three main strands of research.

## Literature review

In total 54 studies were reviewed, most of which had been conducted in the United States. The approach included as wide a range of studies as possible, *i.e.* studies from different disciplines (*e.g.* economics, sociology, architecture), and studies which adopted different methodological approaches (*e.g.* statistically based quantitative analysis, as well as studies of a more qualitative nature).

The estimated impact of capital spending on pupil performance varies according to the broad type of study under consideration. There is, effectively, a spectrum of studies. At one end, there are those studies which find a broadly positive relationship. These tend to be in the architecture literature, and related to specific design features of schools and the overall quality of school buildings, as opposed to

capital spending *per se*. At the other end of the spectrum there is a range of economic studies, the results of which are rather ambiguous with respect to the impact of capital spending on performance. How can these differing results be reconciled? There is considerable scope for further and detailed research into the capital performance relationship to clarify this uncertainty, but it is likely that the answer lies in two areas: methodological differences, and isolating the impact of spending quantity and quality.

## Qualitative analysis

Structured, face-to-face interviews were conducted with headteachers from primary and secondary schools, as well as community, voluntary and foundation schools. The qualitative research with headteachers found that capital investment was judged to have a strong influence on three main factors, each of which had a major impact on pupil performance (see figure on the next page):

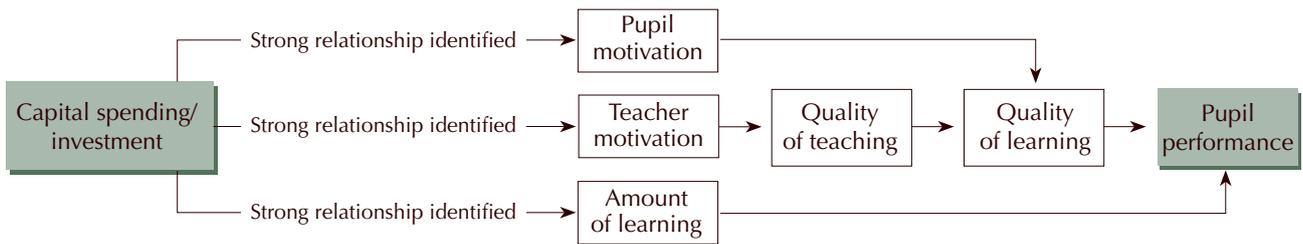
- teacher motivation: capital investment was found to be one of the two most important levers on teacher motivation through, for example, the boost to morale which teachers get from working in an appropriate and quality physical environment;
- pupil motivation: *e.g.* through the visible sign that their education is valued by the teaching staff and society in general;
- amount of learning: *e.g.* by reducing the amount of time lost moving between different school buildings and classrooms.

## Quantitative analysis

The main aim of the quantitative analysis was to assess statistically the nature and strength of the relationship between capital spending and pupil performance, using data from English schools. The analysis is based on a database constructed as part of this study. Amongst the key findings to have emerged from the research are the following:

- The analysis provides *some* evidence of a positive and statistically significant relationship between capital investment and pupil performance, *i.e.* there is some evidence to suggest that investing in school capital can help to improve overall pupil performance.
- However, the estimated relationship between capital and performance is not universally positive, nor is it universally statistically significant. Nevertheless, on balance, the research suggests that where there are statistically significant effects of capital on performance, these are positive and, therefore, consistent with prior expectations. These findings are consistent with existing research in this field.

### Overview of key findings from qualitative research



- The results also suggest that some performance measures are more sensitive to capital investment than others. In particular, the most important effects seem to be in relation to the earlier stages in the education process, especially Key Stage 1 (children aged five to seven) and Key Stage 3 (ages 12 to 14). Improvements in pupil performance at other levels seem to be relatively unresponsive to capital investment.
- The absolute size of the effect of capital spending on pupil performance is relatively weak, *i.e.* capital-related changes in performance are small when compared with changes which can be related to other factors such as the socio-economic composition of the school.
- Good teaching takes place in schools with a good physical environment, *i.e.* schools in which the quality of the capital stock is judged to be favourable.
- Good school leadership can also be found in schools with a high quality capital stock.
- The general attitudes, behaviour and relationships amongst pupils and staff are more conducive to learning in those schools which have had significant capital investments.

### Conclusion

The literature review showed that the majority of existing quantitative studies have found positive relationships between capital spending and performance. It also showed, however, that these relationships were not always significant from a statistical point of view, and that some studies have found negative relationships to exist. Similarly, the quantitative work conducted as part of the study has provided additional evidence of a positive and statistically significant relationship between capital investment and pupil performance. However, in common with the findings of other studies, the estimated relationship is relatively weak. Furthermore, the relationship was not positive in all cases, nor was it always statistically significant.

The relationship estimated by the qualitative studies examined in the literature review, however, is a stronger one. This is consistent with the more positive findings from the interviews undertaken with headteachers and others in the qualitative work stream. The general view emerging

from these interviews was that capital expenditure in schools is strongly linked to pupil attainment. Perhaps the most intuitive evidence of a positive relationship is to be found in the architecture literature in those studies relating to specific design features of schools and the overall quality of school buildings. It was these very design features that the headteachers interviewed emphasised as having strong links with teacher and pupil motivation, which were themselves identified as being strongly linked to pupil performance.

It appears, therefore, that the findings of qualitative studies tend to be rather more positive about the capital-performance relationship compared to quantitative studies. This is likely to be related to the fact that quantitative studies are based on aggregate measures of capital expenditure which include certain forms of spending which one would not expect to be linked directly to pupil performance.

It is clear on the basis of the above discussion that there is considerable scope for conducting further research on the capital-performance relationship.

DfES have now commissioned PricewaterhouseCoopers to undertake Phase 2 of the research, which includes examining in more depth the impact of different types of schools capital investment (*e.g.* condition, suitability and sufficiency) on pupil achievement and also on its effect on the wider community.

*This article is composed of excerpts from "Building Performance: An Empirical Assessment of the Relationship Between Schools Capital Investment and Pupil Performance". Copies of the publication can be obtained from:*

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