



## Chapter 6: Costing and Value for Money

### Highlights

An analysis of value for money was undertaken as an attempt to assess the relationship between the resources used and outcomes produced from the Strategies. This analysis does not meet the technical definition of a cost-effectiveness or cost-benefit analysis for several reasons, including the absence of an alternative programme to which the Strategies can be compared. The Strategies, however, have clear and limited goals, a relatively well-defined way of reaching those goals and a clear way of measuring success, thus making it possible to consider the value for money of the initiatives.

#### *Assessing value for NLS and NNS*

- Value for money in relation to the Strategies was determined by considering the increase in the proportion of students reaching level 4 on Key Stage 2 national test results since 1998 as a ratio of the increase in expenditure on literacy and mathematics in primary schools.
- The increases in achievement since 1998 (the increased percentages of pupils reaching Level 4 and above on Key Stage 2 national tests) are determined to be 15% for literacy and 23% for mathematics.
- Resources being used to achieve improvements in literacy and mathematics fall into three categories: new resources allocated to the Strategies; existing resources reallocated to literacy and mathematics from other activities; and existing ongoing resources to support literacy and mathematics. Resources may be allocated by central government, local authorities, schools, students and families.
- The new resources allocated to the Strategies by central government were approximately £140 million per year or 4.4% of the total estimated expenditure for primary literacy and mathematics. We estimate that LEAs and schools provided a small amount of new money (perhaps £10 million) and a larger amount in existing resources reallocated to the Strategies from other activities

(perhaps £20 million). We estimate that the cost of all staff time and other activities supporting Literacy and Numeracy amounts to another £330 million. We have no basis for estimating the value of time contributed by pupils and parents, though it was clearly substantial.

- The expenditure by central government of an additional 4.4% per year has so far produced gains in the percentage of pupils reaching the required standard at the end of Key Stage 2 of 15-23%, an increase in the target outcome that is substantially greater than the additional investment. This analysis suggests good value for money.
- This conclusion must be tempered by the lack of any standard of comparison for value and the apparent declining impact of the resources over the four years.

#### ***Broadening the analysis of benefits***

- A review of international evidence on longer-term returns to improved literacy and numeracy suggests that gains in literacy and mathematics skills among children, as well as reductions in the gap in achievement levels will yield long-term economic benefits considerably greater than the cost of the Strategies. Our review of the impact of the Strategies on pupil learning suggests that in both these regards NLS and NNS have been successful interventions.

## **Background**

In its 1998 invitation to tender for this evaluation of the Strategies, the then-DfEE specifically asked for an assessment of the cost-effectiveness or cost-benefit of the Strategies. The rationale for this request is laid out in several documents (most notably *Appraisal and Evaluation in Central Government*, Treasury Department, 1997), as part of an effort in all programme areas of the British government to use evidence on costs and benefits of public policy in making budget allocations to programmes and departments.

From the outset of our project, for reasons described below, we knew that we would not be able to do work on NLS and NNS that would meet a technical definition of cost-effectiveness or cost-benefit. We therefore describe our study as an analysis of value for money, which is not a term that has a particular definition associated with it in the

literature but refers here to an attempt to assess the relationship between the resources used and outcomes produced from the Strategies. (See Appendix C, Part 1 for this material.)

A supplement to our first report (Levin, 1999) outlined in detail the conceptual basis for this work. Our second report (Earl et al., 2001) provided an initial analysis of costs and gains in outcomes in the Strategies. In this final report we review briefly our approach to the issue, outline the evidence we have gathered, and present our conclusions.

## **Issues in Analysing Costs and Outcomes**

In the economics literature the terms *cost-benefit* and *cost-effectiveness* refer to specific kinds of analyses. Cost-benefit is “the evaluation of alternatives according to their costs and benefits when each is measured in monetary terms,” while cost-effectiveness is

“the evaluation of alternatives according to both their costs and their effects with regard to producing some outcome” (H. Levin & McEwan, 2001, pp. 10–11). These definitions raise important issues. It is one thing to attempt to assess whether a particular policy initiative produced satisfactory outcomes in relation to its costs. It is quite another thing to determine if that initiative was the best way to use resources to improve a given outcome. The latter is considerably more difficult, since it involves comparing a given use of resources with other plausible alternatives.

Behind the seemingly straightforward request to determine the costs and benefits of an educational programme lie a host of issues that are not easy to resolve. Although education is a very large enterprise, work on cost-effectiveness or cost-benefit remains scarce. In 1983 Henry Levin published what is usually regarded as the classic work on cost-effectiveness in education (H. Levin, 1983). A second edition was recently published (Levin & McEwan, 2001) noting that in the nearly 20 years between the two books there has been little empirical work or conceptual development in this field (H. Levin, personal communication, August, 1999; see also Hummel-Rossi & Ashdown, 2001). In their new volume Levin and McEwan made determined efforts to list as many empirical studies as they could, but found very few studies from the last decade, and many of those listed are in a few specific areas such as early childhood development and computer-assisted learning. The Treasury Green Paper on cost-benefit analysis provides no citations of studies from the field of education.

The intractable nature of the problems is evident in the heated debate over a number of resource issues in education. For example, analysts do not agree on whether increasing

spending for schooling is related to educational outcomes (Burtless, 1996; Greenwald, Hedges & Laine, 1996; Hanushek, 1996; Vignoles et al., 2000). A similar debate has occurred in regard to class size, with differences in opinion about the impact of such reductions and about whether class size reductions are the best way to improve outcomes for a given increment of resources. (For an overview of this debate, see *Educational Evaluation and Policy Analysis*, 21(2), Summer, 1999)

These examples show how difficult it is to arrive at any consensus on the impact of resources on educational outcomes. The problems arise because there is disagreement about what the costs of a programme are, what the outcomes are, and about how resources might actually work to bring about these outcomes. As Kelley (1999) puts it,

*Research evidence to date suggests that the valued outcomes are contested, technologies are often inadequate, the system lacks capacity, and the design of incentive structures is tricky. ... The desired outcome – significant improvement in student achievement – may be unattainable using available tools, resources, and system capacity.*  
(p. 643)

Because the debate over costs and benefits is so difficult, discussion in education often focuses on quantities of inputs as indicators of quality. For example, spending more time on a subject is considered to be a good thing regardless of evidence on outcomes.

We have discussed earlier in this report the problems involved in trying to link outcomes to particular educational programmes or interventions. Such work should involve a careful specification of proposed relationships

and requires high-quality data on programmes and outcomes, all of which are often either unavailable or a matter of controversy.

In addition to these generic problems of programme evaluation, a value-for-money analysis raises some difficult issues around determining costs.

The official costs of a programme may not reflect the real total resources. Sometimes those involved allocate other resources to a programme. Often there are other sources of support for the goals of a programme, such as the efforts of families. In addition to funds spent by schools, other public bodies allocate funds to support children with, presumably, positive impacts on school outcomes (Picus, McCroskey & Robillard, 2001).

In many cases the resources devoted to a programme or outcome – for example additional time allocated by teachers or parents – are difficult to measure in monetary terms. Although it is generally thought that an analysis must take into account all resources used, whether paid for or not, in practice this is rarely feasible (Hummel-Rossi & Ashdown, 2001). In other cases price does not provide a good measure of value. The costs of two staff people may be equivalent but one may be much more effective than the other. Costing models seldom capture differences in effectiveness or quality of people or services.

Even when agreement can be reached on what should count as costs, the necessary data may not be available. Very few schools or school systems track the allocation of resources at any level beyond the aggregate. A main problem is that so little is known about the most important resource in schools, teacher time. Because pupils are educated in groups, by a number of adults, it is very

difficult to determine which resources in schools actually flow to which pupils.

From the standpoint of a funder of an initiative, internal reallocation of resources or better use of existing resources is a positive outcome, not a cost. From the standpoint of the system as a whole, however, the full cost of an outcome can only be known if the costing includes all the elements, whether or not designated in the plan, and whether or not it is easy to attach a monetary value to them.

Both costs and benefits can accrue to different actors. Typically analyses focus on costs and benefits to clients, but there can also be costs and benefits to service providers (staff), funders (government) and the wider society. Indeed, one party's costs can be another's benefit. For example, if staff work harder for the same pay, they carry part of the cost (usually unacknowledged) of whatever benefits accrue to programme participants or funders. In practice these issues are very difficult to sort out clearly.

### **What Constitutes Good Value for Money?**

An additional problem in doing value for money analysis is that we do not have a good basis for determining what would be a satisfying result. What level of return should be expected from additional funding for a programme such as NLS and NNS? Should we expect 10% more money to produce 10% better outcomes, or more than that, or less than that? The lack of empirical work in this field makes it hard to interpret the results of any particular analysis.

As noted earlier, the decision about where to invest resources should depend not only on the results of a given policy, but on a comparison of that policy to other

alternatives. If, for example, investment in early childhood development is more effective in improving literacy than changes in school programmes, it may not be particularly useful to try to assess the relative merits of various changes in schooling. To put this issue in the context of the Strategies, one might want to ask whether the best way to produce gains in literacy and numeracy is to invest in changes in schooling, as opposed to, for instance, using the funds to improve early childhood development or nutrition or family income (Rothstein, 2000).

There is not currently an adequate base of empirical evidence to answer the question of what would be “good value” in either of the above senses. As noted earlier, the literature on cost-benefit analysis in education is very limited and the work that has been done tends to be hedged with qualifications for the reasons already outlined. Even when some estimates of impact are made, given all the uncertainties already described in relation to determining costs and outcomes, one would want to be very cautious about comparing estimates from quite different initiatives made under quite different assumptions.

We do know that the link between additional resources and improved outcomes is an uncertain one. Many large-scale innovations, even with substantial resourcing, appear to have had little or no lasting impact on pupil outcomes (Leithwood, Jantzi & Mascal, in press). The history of education policy is littered with programmes announced with great fanfare and abandoned a few years later.

However an alternative view, which also has research support (e.g., Odden & Busch, 1998; Kelley, 1999; Earl & Lee, 1998) is that small investments can have disproportionate effects if used wisely in that they can spark changes

in the larger system and thus improve efficiency. Some school improvement programmes do claim significant benefits from a relatively modest investment of additional resources – for example Reading Recovery or Success For All.

It is worth noting here that there is relatively little variation in the way that schools use resources. Almost all schools assign the bulk of their resources to hiring teachers, and assign teachers to groups of pupils according to very similar principles. The lack of variation in resource allocation makes it very hard to show meaningful differences in outcomes resulting from resources. There are, however, some new models emerging of how school resources could be allocated with the goal of improving outcomes with the same level of resources (e.g., Odden & Busch, 1998; Kelley, 1999).

The DfES has commissioned a number of studies in the last few years that include a requirement to assess costs and benefits, or value for money. Such studies should gradually lead to a stronger theoretical and empirical basis for this important work. However, a reading of several of the existing reports, and discussions with a number of the principal researchers indicate that the difficulties already described have made it impossible to take any of these analyses beyond a rather general and speculative level (e.g., West, Noden, Kleinman & Whitehead, 2000).

Our report also draws on a growing literature analysing costs and benefits in other areas of social policy. The most important examples are in health and in early childhood development. A full review of this work is beyond the scope of our study. However a couple of recent examples illustrate some of the possibilities.

Levin (2001b) looked at evidence on the cost-effectiveness of alternative approaches to the education of children with special needs and concluded that existing evidence, while by no means conclusive, suggested that inclusive and preventive approaches were more cost-effective than most forms of segregated special education.

A recent study by the RAND corporation in the United States (Karoly et al., 2001) reviewed evidence on the effectiveness of various interventions for young children. Their work provides helpful methodological guidance as well as reinforcing cautions about this kind of work. They also suggest that some intervention programmes appear to produce benefits for governments and for participants that are substantially greater than their costs.

These studies suggest that it is possible to draw conclusions with a reasonable degree of support from empirical evidence. As in all areas of science and social science, multiple studies are required for greater knowledge and certainty.

## Assessing Value for NLS and NNS

In assessing value for money in the Literacy and Numeracy Strategies some of the problems noted are diminished. The Strategies have a clear and limited goal, a relatively well-defined way of reaching that goal, and a clear way of measuring success. These conditions make it much easier to determine the resources that are involved and to provide an analysis that could assist policy-makers to make a judgement about the value of the Strategies.

Our evaluation of value for money has focused primarily on assessing the

improvement in the targeted outcome measure in relation to the additional resources provided. Our conclusion is framed as follows: an increase of x% in expenditure has led to a y% change in the target measure of achievement. Put another way, the analysis can be represented as:

$$\text{Value} = \frac{\text{Gains in achievement}}{\text{Previous achievement}}$$

as a ratio of

$$\frac{\text{Additional resources for literacy and numeracy}}{\text{Previous resources for literacy and numeracy}}$$

Note that this method produces a correlation between spending and outcomes but does not allow us to conclude that the gains were a result of the programme.

After presenting the results of this analysis, we also provide another approach using a much broader view of outcomes from the Strategies.

### *Determining the Outcome Side of the Formula*

Three of the four terms in the value for money formula are relatively easy to define. The achievement outcomes for literacy and numeracy have been defined by the Government as the proportion of pupils achieving the appropriate standard on the national test at the end of Key Stage 2. These results are in Chapter 3. For purposes of this analysis, the 1998 outcomes are subtracted from the 2002 outcomes, yielding an increase of 10 in literacy and 14 in numeracy. These differences are then divided by the starting score to yield a percentage gain, which is shown in Table 6-1.

**Table 6-1: Percentage Gain in Literacy and Numeracy from 1998 to 2002**

	1998%	2002 %		Change as % of
	Reaching Level 4	Reaching Level 4	Change	starting point
Literacy	65	75	+10	15%
Numeracy	59	73	+14	23%

It should also be noted that the gains in achievement were broadly shared and had the result of reducing disparities among pupils, schools and local authorities. The number of pupils performing at the lower levels has fallen substantially. The gap between the best and poorest achieving schools has also been reduced. Reductions in disparities are a positive outcome of the Strategies and are especially important to track as overall outcomes increase, to ensure that the gains are broadly based. The results of PISA 2001 (OECD, 2001) indicate that some countries are able to achieve not only high levels of achievement, but relatively low variation in achievement levels among regions and sub-populations. This push for equity should in our view continue to be an important and explicit goal of the Strategies.

#### *Determining the Level of Previous Investment*

The calculation of previous resources for primary literacy and mathematics is also relatively easy to make with some simple assumptions. The total cost of primary education in Britain in 2000–2001 was £8 billion (DfES, 2001 Department Report, Table 4.3). English and mathematics are typically at least 40% of the school day, and teacher time allocations are an excellent proxy for total resource allocations because teacher salaries are by far the biggest single component of education spending. It is reasonable to assume that costs other than teaching (support staff, administration, supplies) could be allocated on approximately the same basis, so that one could estimate the

ongoing cost of providing literacy and mathematics education in primary schools in 2000–2001 at about 40% of total spending, or £3.2 billion. This figure could easily be out by £200 million or more, but even a change of that size would not substantially alter the conclusions.

Note that the value of pupil and parent time and effort is not included in the formula, even though there is good reason to think (Coleman, 1998; National Literacy Trust, 2001) that these are vital factors in shaping achievement. We know that pupil effort and family support are important, yet we rarely include them either in our models of improvement or in our analysis of costs and outcomes.

#### *Determining Additional Investment*

A more difficult determination is what to include in the category of additional and reallocated resources for primary literacy and numeracy. We place the resources being used to achieve the Strategies' goals into three categories:

- New resources allocated specifically to the Strategies.
- Existing resources reallocated to primary literacy and numeracy from other functions or activities.
- Existing resources that were previously and continue to be used to support primary literacy and numeracy.

<b>Table 6-2: Defining the Resources for NLS and NNS</b>			
<b>Level</b>	<b>New resources</b>	<b>Reallocated resources</b>	<b>Ongoing resources</b>
National	<ul style="list-style-type: none"> <li>Standards Fund                             <ul style="list-style-type: none"> <li>Literacy, Numeracy</li> <li>other programmes</li> </ul> </li> <li>Running costs for DfES for NLS and NNS</li> </ul>	<ul style="list-style-type: none"> <li>Other programmes whose funding can be used to support the Strategies</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing work of DfES related to literacy and numeracy</li> </ul>
Central agencies (OFSTED, QCA, TTA)	<ul style="list-style-type: none"> <li>OFSTED                             <ul style="list-style-type: none"> <li>special inspections</li> </ul> </li> <li>QCA                             <ul style="list-style-type: none"> <li>additional tests and support materials</li> </ul> </li> <li>TTA                             <ul style="list-style-type: none"> <li>additional work to support the Strategies</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>Ongoing work of agencies related to literacy and numeracy</li> </ul>
LEAs	<ul style="list-style-type: none"> <li>Matching funds to Literacy and Numeracy bids</li> <li>Other additional staff or operating costs</li> </ul>	<ul style="list-style-type: none"> <li>Staff time and support services reallocated to literacy and mathematics</li> <li>Resources from other related programmes used to support NLS and NNS</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing operating costs related to literacy and numeracy</li> <li>LEA overheads</li> </ul>
Schools	<ul style="list-style-type: none"> <li>Additional staffing, professional development and materials costs</li> </ul>	<ul style="list-style-type: none"> <li>Resources from other related programmes used to support NLS and NNS</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing operating costs related to literacy and mathematics (staff time, materials, etc.)</li> </ul>
Family and community	<ul style="list-style-type: none"> <li>Purchases of books and materials</li> </ul>	<ul style="list-style-type: none"> <li>Time diverted from other activities to support literacy and mathematics learning</li> </ul>	<ul style="list-style-type: none"> <li>Parents' and pupils' ongoing efforts re school learning</li> </ul>

These categories are applied to the Strategies at four levels – national (DfES and other central agencies), LEA, school and family (pupils and parents). At each level, resources can be new, reallocated or ongoing.

The question is which of these are to be counted as “additional” resources. Two possible approaches can be taken. From the Government’s point of view, a reasonable argument could be made that only the

*additional resources provided by central government* ought to be included. If the efforts of DfES are able to lever additional investments from other sources, those additional investments can be seen as part of the success of the project, and should not be treated as an additional cost.

Another possibility is to include all the *additional resources provided for primary literacy and numeracy not only by government but also by*

*LEAs and schools.* The argument would be that the additional central government resources by themselves did not create the new results, so a true assessment of value for money requires taking into account all the relevant resources.

Neither of these approaches would assess the *total cost* of producing the new outcomes. To do that it would be necessary to include not only the additional spending by DfES, but also reallocated and ongoing spending by LEAs, schools and others.

Table 6-2 outlines the elements in the matrix of resource types and system levels.

#### *Additional Investment by Central Government*

Based on 2000–2001 data we estimate the additional cost to central government of the Strategies to be in the area of about £140 million per year, an amount that has been relatively constant over the past 3 years.

This amount is made up of:

- The Standards Fund allocations to Literacy and Numeracy (in some cases 50% of the published figures and in other cases 100%), totalling £115 million.
- The running costs of DfES related to the Strategies of about £3 million.
- The costs of infrastructure for NLS and NNS, provided by the Centre for British Teachers (CfBT), at about £8 million.
- Additional funds provided to central agencies (TTA, Ofsted, QCA) in direct support of the Strategies, estimated at less than £2 million.
- The provision of about £100 million in one-time money in the first two years of the Strategies for the purchase of materials, primarily for Literacy. We annualise these

amounts by treating them as capital costs amortised over 8 years, which adds another £12 million per year to the total.

The total amount of £140 million is about 4.4 % of the total estimated expenditure for primary literacy (including English) and mathematics of £3.2 billion. Because overall expenditure on primary schooling has risen substantially since 1998, the expenditure on the Strategies is now a smaller share of the total and thus, if outcomes are unchanged, represents better value.

#### *Total Additional Investment in the Strategies*

Estimating the additional investment in literacy and numeracy from all sources is difficult for several reasons.

First, it is not clear what central government resources beyond the direct support already described should be considered as supporting Literacy and Numeracy. A number of other programmes under the Standards Fund have clear links to improved literacy and numeracy, and other activities supported by the Department, such as the training of headteachers, could also be seen as linked to improved outcomes in literacy and numeracy. As discussed in Chapter 2, many national initiatives in England – indeed, almost everything connected with primary education – could be argued to contribute to literacy and numeracy outcomes. In many of these areas there have been additional investments over the last few years, such as efforts to reduce class sizes in primary schools. Additional general funding to schools could also be regarded as being at least partly an investment in literacy and numeracy insofar as it might be used to employ more staff, provide more support services, purchase more materials, and so on. The government has

increased its contribution to education costs significantly over the last few years.

Second, it is not clear what “new” resources LEAs and schools have actually invested in the Strategies. As shown in our 2001 report, one cannot disentangle LEA and school resources for the Strategies from resources used for other related initiatives or for general school purposes. LEAs and schools are trying to cope with a wide range of pressures and initiatives, and they do not necessarily distinguish where one starts and another stops. The net effect is that at all levels some considerable expenditure, while not specifically targeted to the Strategies, does in fact support the purposes of the Strategies.

Our estimate is that most of the funds provided for the Strategies by LEAs were available to schools in any case and so are not additional in the same sense as new budget allocations specifically for the Strategies. The same situation would apply in schools. Investments from school budgets would appear to be in the area of a few thousand pounds per year for a typical primary school, most of which is being redirected from other uses.

The question of how to treat staff time is another complication in determining the cost of the Strategies. There are good grounds, described in our 2001 report, for believing that the amount of professional staff time spent on literacy and numeracy has increased. Even a small increase in hours by teachers – say 2 hours per week – would imply that an additional £300 million or so in the form of teacher time had been shifted into literacy and numeracy from other activities. Alternatively, if literacy and numeracy were now accounting for 50% of total primary school effort instead of 40%, the additional cost would be another £800 million.

Based on all of the above, our rough estimate as to the total additional cost of the Strategies is as indicated in Table 6-3.

Using this latter figure gives a very different impression of value for money, in that the achievement gains are now much smaller in relation to the additional cost. The same cautions mentioned earlier also apply here. More important in this regard are the lack of other analyses to use in comparison and the points made earlier about our lack of

<b>Table 6-3: Estimate of Additional Cost of the Strategies</b>	
<b>Source</b>	<b>Amount</b>
Central government additional spending as outlined earlier	£140 million
New spending by LEAs – estimated at 20% of their matching contribution requirement	£10 million
Resources (including staff time) reallocated by LEAs from sources not previously used for literacy and numeracy – 40% of LEA contribution	£20 million
Resources (primarily staff time) reallocated by schools from other activities to literacy and numeracy – 5% of total primary school spending	£330 million
<b>Total estimated additional cost</b>	<b>£500 million, or 16% of the total estimated cost of literacy and numeracy</b>

understanding about the kinds of outcomes that might result from additional spending.

### *Total Cost of the Strategies*

Finally, it would be relevant to try to estimate the total cost of the Strategies by all parties, including not only new resources and resources re-allocated to literacy and numeracy, but also ongoing resources which had been, and continue to be, used to support literacy and numeracy by government, central agencies, LEAs, schools and families.

The vast bulk of the monetary resources for literacy and numeracy are in the ongoing work of the school. It would be reasonable to argue, therefore, that the full cost of producing improved literacy and numeracy involves not only the additional expenditures by government, but also all the expenditures of schools and LEAs – that is, the full £3.2 billion.

Our data also suggest, as already described, that teachers are putting more effort into literacy and numeracy, not only in terms of the quantity but also the quality of their work. Since teachers are not paid by the hour, an increase in hours of work would, in standard economic terms, result in an increase in productivity, in that more work is being accomplished without more money being spent. However while there is no cost to government for this additional work, there clearly is a cost to teachers and the question arises as to whether such extra effort is sustainable in the longer term.

In all these analyses, as already noted, the efforts of pupils and parents are not accounted for. There is good reason to believe that the work of pupils and parents is critical to good outcomes. The scope of our research did not allow us to do the very substantial additional

work that would have been required to make a reasonable estimate on this point, but it is important for future reference.

### **Size of the Investment**

Regardless of which resource counting option one prefers, it is important to think about the overall size of the investment in NLS and NNS in relation to its goals. The Strategies have been given quite substantial levels of resourcing in comparison to most education reform programmes. Hiring 600 additional consultants is a significant investment.

However when considered in light of the task of changing teaching and learning in 20,000 primary schools the allocations seem much more modest. Some schools, especially those whose outcomes were already good, have received relatively modest levels of support.

LEAs and schools also varied in their starting point. Some LEAs needed to improve performance by as much as 25% (e.g., from 50% meeting the standard to a target of 75%) to reach their target while for others the requirement is less than 10% (e.g., from 77% to 85%). Some LEAs already had advisers in language or mathematics who could easily move into supporting the Strategies while others did not. Some LEAs had a stronger history of support for curriculum and teaching than others. Some had related initiatives already in place while others did not.

From the point of view of an individual school, the additional funds from the Standards Fund are small in relation to ongoing operating costs. A typical LEA might receive from DfES between £1,500 and £3,000 per school for each of the Strategies not including extra funding for special booster classes or summer schools. Half of this would come from the LEA from existing or other resources. Even with the very optimistic

assumption that all the additional money directly reached schools, a school might be getting additional resources valued at about £3,000 – £4,000 mostly in the form of consultant time and supply teacher coverage. Yet a typical primary school with 250-300 pupils would already have a total budget of around £700,000 not including consultant time, so the incremental resources available for a school to use would be quite small – well under 1%.

It is instructive to compare the resources for the Strategies with some of the other main DfES initiatives based on 2001 figures. The commitment to reduce class sizes in primary schools is funded at about £155 million in operating and £20 million in capital, and is the largest single initiative in the Standards Fund. The various components of the Excellence in Cities Programme receive more than £160 million. General support for school improvement is about £110 million. The DfES funds for NLS and NNS are significant but within the range of several other initiatives, some of which have more modest goals.

### **Uses of the Resources**

How resources are used is as important as what resources are provided. In the case of NLS and NNS, a substantial portion of the resources has been used for longer-term capacity building. Another substantial portion has been used for short-term support to pupils. We have no basis for judging the relative impact of these two approaches on the outcomes achieved so far, especially since capacity building may take years to show its full benefits.

It is important to note that the greatest share of resources has gone to schools and pupils with the greatest need to improve

achievement, something that is often very difficult to achieve in resource allocation processes.

Finally, it remains a question as to whether the right choice was made in focusing the bulk of the resources on trying to change classroom practices. It might have been a better strategy to invest a greater share of resources in non-classroom initiatives such as family literacy and parent involvement, or even in pre-school programmes to improve children's readiness to learn.

Despite these cautions, in our view the Strategies have generally used a more promising approach to allocating resources than other large-scale education reforms of which we are aware.

### **Broadening the Analysis of Benefits**

As noted earlier, literacy and numeracy are important largely because of their presumed longer-term impacts. The government's rationale for investing in literacy and mathematics is that improvements in skills in young children are thought to lead to better long-term outcomes both for individuals and the country as a whole. Accordingly, a value-for-money analysis should look at the evidence on the longer-term outcomes of improved literacy and mathematics.

Most research on the longer-term impact of education uses years of education or the achievement of particular credentials such as secondary school completion as measures. However in the last few years growing interest in literacy and numeracy has generated a body of research looking at whether these skills have an impact on outcomes independent of or additional to years

of education. Large-scale studies such as the International Adult Literacy Survey (IALS) have made important new data available on this question. The IALS data show that the relationship between formal education and literacy skills is quite variable across countries, and is imperfect in every country (OECD/Statistics Canada, 1997). In other words, the impact of literacy and numeracy is not fully captured in an analysis based only on outcomes such as years of education.

Our team reviewed available research on the impact of literacy and numeracy. Studies from Britain, Canada and the United States, as well as the international reports of IALS, were included. The 15 studies we reviewed used a variety of data sources and methods. Main outcomes evaluated included labour market status (employment) and various measures of earnings. The research studies consulted are listed separately in Appendix C, Part 2 of this report. A fuller discussion can be found in Levin (2001c).

We conclude that literacy and numeracy both appear to have a significant independent effect on employment and earnings, *over and above the impact of years of education or educational credentials*. The estimates vary across studies, no doubt in part due to differences in measures. However some examples give the flavour of the research as a whole. In the United Kingdom, Machin, McIntosh, Vignoles and Viitanen (2001) report that individuals with better literacy and numeracy skills at age 16 have higher earnings and higher rates of employment. In Canada, Green and Riddell (2001) found that a 10% increase in literacy raises annual earnings by 5-6%. In the United States, Murnane, Willett and Levy (1995) concluded that basic cognitive skills had a large impact on the wages of high school graduates, and that this impact grew over time.

The researchers use a wide variety of outcomes as well as different measures of literacy and numeracy. Studies also vary in the controls and models employed. Hence the body of work is currently not sufficient to be able to draw conclusions about specific skills, sub-populations or outcomes. For example, some studies show better returns to numeracy and others to literacy. A number of studies, but not all, show stronger results for women. More research will be needed to be able to draw any firm conclusions on these matters. As well, very little research has yet examined non-economic outcomes such as family stability, parenting, criminality, health status or citizenship although all of these have been shown to be associated to some degree with improved levels of education.

A caution in drawing inferences from this body of work is that the returns to individuals are not necessarily mirrored by returns at a societal level. Everyone might attain a higher literacy or education level without any aggregate improvement in economic outcomes for the society. For example, in Canada as well as some other countries during the 1980s and 1990s, overall educational attainment rose substantially while average individual and family earnings stagnated. Thus a substantial increase in overall investment in education did not yield an increase in overall incomes, although those with more education have continued to do better than those with less. We have just as much evidence of people whose skills are not used at work as of people who lack the required skills (Livingstone, 1999).

Despite this caution, it is reasonable to conclude that improvements in literacy and numeracy among children are likely to yield long-term economic returns, and there is some evidence that reducing gaps in these

skills between the most and least successful will in itself yield benefits (Green & Preston, in press). The monetary value of these benefits could be considerable, even if the effects for any given individual are small. If improved literacy and numeracy contribute even in a small way to higher educational attainment, to higher levels of employment and to higher earnings, the economic benefits would be very large, easily surpassing the costs of the Strategies. While any estimates on this count must be regarded as speculative, an example will show the scale of potential benefits.

There are approximately 5 million children in primary schools in England. Current labour force participation in the UK is about 75% (UK National Statistics, March to May 2002) and annual income is in the area of £20,000 (derived from National Statistics, 2001). If NLS and NNS improved average education levels and thus earnings on average by 1% over the lives of the children currently in schools this would mean an annual benefit to those persons of £750 million, or more than five times the annual expenditure by government for the Strategies. If 20% of this amount were paid in additional taxes it would totally offset the additional expenditures by central government for NLS and NNS. Moreover, these figures do not include additional benefits such as better health, less use of social programmes, improved parenting skills, and lower levels of criminal behaviour, all of which are associated with better educational outcomes (Vernez, Krop & Rydell, 1999; Osberg, 1998) and all of which could yield savings to governments as well as benefits to individuals.

Higher levels of education are also associated with important benefits whose economic impacts are harder to measure, such as greater levels of civic cohesion, increased

volunteerism, greater propensity to vote and higher levels of public trust (Dayton-Johnson, 2001). These findings are consistent across countries (OECD, 1997).

As another example, a recent UK study (Dearden, Reed & Van Reenen, 2000) attempted to estimate the returns to improving literacy and numeracy for people already of working age. This study used a number of assumptions to estimate wage impacts for individuals as well as returns to government from increased tax revenues and reduced programme costs if all workers could move to a particular level of numeracy and literacy. The returns for adults would, of course, be more immediate than returns to improved literacy for children. Their conclusion was as follows:

*Our model predicts that the combination of increased government tax receipts and reduced benefit spending should lead to a gain from improving basic skills of around £400 per person whose skills are increased in the current tax year. This figure is similar both for literacy and for numeracy skill improvements. Taking the long-run effects of the policy into account, we estimate that the discounted present value of a policy to increase basic skills would be around £4,500 per person for both numeracy and literacy.*

(p. 1)

These results also suggest long-term benefits that are substantially greater than the costs of the Strategies.

Finally, it is worth noting that the benefits of successful educational interventions appear to be strongest for those pupils who are currently least successful (Karoly et al., 1998). As noted, NLS and NNS have generated evidence of significant reductions in

achievement gaps. So, while the numbers cited here are hypothetical, there are good grounds for believing that to the extent that NLS and NNS have improved literacy and numeracy skills they will have generated very significant long-term benefits for the country.

## Conclusions

NLS and NNS represent an approach to school change that is still not common among governments (Levin, 2001a). The investment in building school capacity, and especially in changing teaching practice, is an exciting and ambitious undertaking. The results to date suggest that it is possible to improve outcomes with a sustained and focused approach of this kind. More money does seem to be needed, but the amounts may be relatively modest.

The expenditure by central government of an additional 4.4% per year has so far produced gains in the proportion of pupils reaching the required standard at the end of Key Stage 2 of 15–23%, depending on the subject and the period of time. An increase in the target outcome that is significantly greater than the additional investment suggests good value for money. This is especially so since the literature on education change indicates that even large innovations often fail to produce significant and lasting effects.

This optimistic conclusion must be tempered by several important cautions. First, there is no real body of evidence against which to compare this return on investment, and certainly none involving a project with the scale and scope of NLS and NNS. We have no basis for knowing what a good result is in terms of additional outcome for additional spending.

Second, within the four years of implementation the picture has been changing. The well-known Hawthorne Effect would lead one to expect an increase in achievement in the first year or two of almost any new initiative. Linn (2000) has shown that testing programmes generally tend to show increased results over the years as the system gets used to the test, but that such increases do not necessarily represent genuine increases in learning. Moreover, test results in England were increasing prior to the implementation of the Strategies, and a number of other initiatives, such as school inspections, class size reductions or curricular changes might also have had an impact on these results. Finally, spending on education has increased significantly in the last two years, but test results have remained relatively static. This combination has the paradoxical result of improving the overall value for money but also raising questions about whether the Strategies may have encountered a ceiling effect so that resources are no longer having very much additional impact on outcomes.

On the other hand, a broader and longer-term view of the benefits to individuals and society that are likely to arise from improved literacy and numeracy suggest that these could be quite large. Indeed, they might far exceed the short-term considerations that have been the focus of this study and of the Strategies themselves. In the final result it will be these long-term impacts that really matter, not only as to the success of the Strategies, but as to their importance in the first place. On these grounds we believe that the results give good reason for optimism.