

‘value added’ measurement of school effectiveness: an overview

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nfer

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This summary distils the key findings from a report which reviews in detail the academic and policy literature on value added measures of school effectiveness. The full report may be ordered from the NFER Communications and Dissemination Unit, The Mere, Upton Park, Slough, Berkshire SL1 2DQ.

1. THE CHANGING CONTEXT FOR EDUCATIONAL 'VALUE ADDED'

1.1 Introduction

A critical review of value added in education is particularly relevant in the late 1990s. The introduction of the so-called national value added system from autumn 1998 can be seen as the culmination of a decade of sustained and public argument about how to measure the performance of pupils in the nation's schools in a way which sheds light on progress as well as standards. It might even seem that common sense – albeit supported by complicated statistical techniques and qualified by methodological reservations – has won a brilliant victory. At the very least, the academic debate on school effectiveness and how to measure it is now integrally linked with the national political agenda for educational quality.

This means that the range of parties interested in value added extends from politicians to school senior managers, and from academic researchers to lay governors. There is consequently a need for continuing discussion not only of the technical questions – how most sensitively and/or informatively to measure added value – but also of the different expectations and requirements of different 'stakeholders'. Can the same indicators be used for both accountability and improvement purposes, for example? And what do we actually mean by 'value added'?

1.2 What Is 'Value Added'?

In essence, 'value added' in educational terms is a concept that was adapted from economics to give expression to the notion that we should be able to measure how far any given school makes a positive difference to the educational outcomes – the qualifications and future life chances – of its pupils. But 'value added' is one of those ideas which may make intuitive sense but are harder to pin down in practice. The term has become a handy way of describing a whole range of connected but distinct activities, including:

- ♦ making '*like with like*' comparisons of schools' (or departments' or classes') performance;
- ♦ representing pupils' *progress* as well as their achievement;
- ♦ identifying which schools/departments/classes are *currently performing above or below predictions*;
- ♦ identifying which individual pupils *are likely to perform above or below predictions*.

Whilst these may each be desirable activities, they are not equally susceptible to statistical analysis. The application of rigorous statistical models is more appropriate to analyses of aggregate past performance than to the prediction of individual current or future performance. 'Value added' is therefore probably best viewed as an extension of school effectiveness research, since the way it has come to be operationalised statistically is in terms of a relative input–output model in which schools' performance in national tests and public examinations is compared with the average after adjusting for factors which are likely to have influenced patterns of performance but over which individual schools have little or no control.

In terms of assessing effectiveness, value added indicators are certainly an improvement on raw results, to the extent that the latter say a lot more about the intake than about the effectiveness of a school. Value added analyses attempt to strip away factors which are associated with performance – either positively or negatively – but are not related to institutional quality. These include pupils' prior attainment, sex, ethnic group, date of birth, level of special educational need and social disadvantage. *Typically, pupils' prior attainment plus the overall level of social disadvantage in the school (as measured by free school meals) can account for as much as 80 per cent of the apparent difference between schools.*

1.3 The Changing Policy Context

It is interesting to look back and see how dramatically the political context for calculating value added measurements of performance has changed since the 1980s, when 'value added' was regarded as a quasi-technical idea which had strayed into education from economics and whose practical application to the debate on standards was not immediately obvious. It took even longer for national government to be convinced: at a time when the principle of value added was clearly understood and its practical possibilities advanced to the point of several systems and services being widely available, the Secretary of State for Education in 1993-94 was adamant that results which were anything other than 'raw' must be 'cooked'. Five years on, and government agencies like the Standards and Effectiveness Unit at the Department for Education and Employment, the Office for Standards in Education and the Qualifications and Curriculum Authority are taking a lead in the production of national value added data on school and local education authority (LEA) performance. In part, this is intended to aid the setting of 'challenging but realistic targets' for schools and LEAs (see DfEE Circular 11/98). One might argue that it is this statutory requirement to set targets which will bring value added analyses closer to the everyday life of schools and teachers.

BOX 1: THE NATIONAL VALUE ADDED SYSTEM

- 1993 Sir Ron Dearing's interim report on the National Curriculum and its assessment recommends that work be commissioned into value added performance indicators for schools
- 1994 SCAA working party, chaired by John Marks, reports to Secretary of State with 25 recommendations for taking value added measurements forward based on public examination and National Curriculum assessments
- 1995 Contract for a feasibility study of the procedures necessary to set up a national Value Added System awarded by SCAA to the Curriculum, Evaluation and Management Centre, University of Durham: statistical studies on available datasets to be completed by September 1995 and two new pilot projects – KS1-2 and KS3-4 – to run from September 1995 to December 1996
- SCAA specified that a national system would need to be:
readily understandable
statistically valid
not an undue burden on schools
cost-effective
- 1997 Series of project reports published, advising that *'it is possible and desirable to set up a national system to provide schools with value added indicators of their performance'* and providing detailed findings from the project
- 1997-98 Consultations take place with schools and other interested bodies on the best ways of calculating and presenting value added indicators for schools and value added measures in school performance tables
- 1998 The first 'national value added' analyses, covering KS1-2, KS2-3 and KS3-4, published in autumn term in the form of i) lines representing the average achievement of pupils at the median and quartiles of the distribution of outcomes for each possible input score, and ii) 'chances graphs' showing the percentages of pupils achieving different outcomes from the same starting points¹
- Secondary school performance tables contain 'progress measures' based on aggregate data (as distinct from 'true value added' based on matched individual pupil data)
- 2000 Secondary school performance tables to include value added measures
- 2002 Primary school performance tables to include value added measures

¹ The information given here is based on QCA documentation available at the time of writing. It is expected that the models and feedback will be further refined and developed. There is still much discussion, of course, about the nature and validity of both 'input' and 'output' measures, as well as about how to implement 'true' value added analyses (for which DfEE/QCA have commissioned a pilot study).

Much of the debate has been concerned with how to strike the right balance between what is ideal, analytically speaking, and what is feasible. It has focused on such basic issues as the pros and cons of using National Curriculum assessments (in the form of 'levels', i.e. integers, or of finer versions of levels) instead of or as well as nationally standardised cognitive ability or skills tests as outcome and/or input measures, and whether or not to adjust outcome indicators by taking into account the socio-economic characteristics of pupils and/or school-level contextual information. There has also been a lively argument about whether or not multilevel modelling is the preferred statistical technique given its lack of transparency to the layperson on the one hand and its unrivalled accuracy on the other.

The remarks of the SCAA working party (1994) report on value added are worth quoting:

... decisions about which variables to include inevitably depend on views about what is important in the real-world situation we are attempting to model... Such decisions are therefore, almost inevitably, open to question and debate... It therefore needs to be recognised that there is no single correct method of analysing a complex social situation... It also needs to be recognised that all corrections and adjustments to primary data are approximate and that there will always be arguments about their validity. There is thus a strong case for using simple methods of analysis alongside complex ones and for presenting analyses in ways which retain as much contact as possible with the primary data...

By the late 1990s, then, the term 'value added' has become part of common parlance, used by journalists, government politicians, local policy makers, school managers and teachers as well as academics, to mean something like 'a fairer or more accurate measurement of pupils' performance and therefore of the quality of their education'. Something like, indeed: therein lies an intriguing difficulty. It turns out that there are diverse and conflicting meanings within the uses of the term which may get in the way of analytical accuracy and practical application.

1.4 The NFER Review of Value Added

The main aim of the NFER review of value added is to contribute to the debate on the *accurate interpretation and best use* of value added measures and it therefore focuses on the following questions:

- ♦ what is meant by value added in an educational context;

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- ♦ the role of school effectiveness research in the conceptual and methodological development of value added;
- ♦ the impact of the changes in the policy context for value added;
- ♦ the implications of value added for the school improvement agenda;
- ♦ what remains to be further developed or resolved in the refinement of value added.

The full report on which this summary is based reviews a large body of academic and policy literature in order to answer these questions. The purpose of the summary is to bring out the key messages from that review *for practitioners and policy makers*.

BOX 2: A NOTE ON THE NFER'S BIBLIOGRAPHICAL SEARCH

There are several extensive research fields whose connection with value added – even when this is only implicit or must be inferred – is crucial for a full understanding of the term's educational import. These include the assessment and measurement of performance, the development of performance indicators, the definition and measurement of school effectiveness, the identification of factors affecting performance, the economics of education and ultimately the issue of using performance data for improving pupils' attainment. There is also a diverse body of literature, ranging from seminal academic reports and articles to ephemeral press features, explicitly concerned with defining, measuring and/or problematising 'value added'. The review concentrated on the following kinds of material:

- ♦ for tracing the historical lineage, articles, etc. published before the mid-1990s (when value added became part of mainstream debate) and limited to items in bibliographical searches whose titles or key words contain the term 'value added';
- ♦ for understanding the mutual influence of school effectiveness and value added research, articles, etc. which, whilst they may not allude to 'value added' as such are clearly methodologically and/or conceptually part of the clarification of what value added has come to mean (this is mainly an exercise in hindsight);
- ♦ for examining the later development of value added, articles, etc. which provide one or more of the following:
 - first-time published use, or clarification, of key concepts and assumptions;
 - important differences from the consensus or conventional view;
 - description of techniques for measuring value added;
 - critical overview of value added approaches in the context of the broader research issues involved;
- ♦ for understanding the changing policy context, reports and press releases emanating from national, especially government, agencies.

A selected list of references is given at the end of this summary; the full report has an extensive bibliography.

2. THE NFER'S PROGRAMME OF WORK IN VALUE ADDED

The NFER has been a major contributor to the development of value added research, primarily in the fields of empirical investigations of independent variables associated with performance and of the practical application of value added analyses to schools' and LEAs' development planning. The range of NFER's work is outlined below. A list of key publications is given at the end of this report.

There are currently two NFER services available which provide high-quality quantitative data to inform school/LEA improvement:

- ♦ ***QUASE (Quantitative Analysis for Self-Evaluation)***

This is a subscription-based service direct to secondary schools in all sectors or entire LEAs. Analyses of overall performance at GCSE are provided, together with 15 GCSE subjects, attendance, and differential effectiveness for girls/boys and lower/higher attainers. Further options – such as pupil and parent attitudinal surveys, summary reports for teachers/governors and brokerage with other QUASE schools – are available.

- ♦ ***Examination Results in Context***

LEAs need sensitive and accurate measures of school performance, both for purposes of accountability and for targeting limited resources more effectively. Several metropolitan LEAs have been participating in a programme run by NFER for a consortium under the aegis of the Local Government Association. The NFER provides value added analyses, consisting of LEA- and school-level tables, of pupils' total and average GCSE scores as well as results in mathematics, English and science.

Each LEA or school receives a confidential package containing a detailed analysis of its performance in the specified outcome areas, given in both graphical and tabular forms and set against appropriate national norms. Interpretative follow-up seminars are also offered.

In order to continue to inform these services as well as to contribute to the academic debate on value added, the NFER is undertaking further research and development projects in the area.

- ♦ ***Schools' Use of Value Added Data: an Exploratory Study***

This study is examining the issue of support and training for schools in managing and using value added data. Better guidance and protocols are needed, based on empirical evidence of what is happening in schools. The aims of the project are to investigate how far and under what circumstances value added analyses have a role

to play in school improvement and the raising of pupils' attainment in different institutional contexts; and to draft some guidelines for good practice.

♦ *Secondary Research and Analysis of Value Added Data*

The main focus of this project is to carry out secondary analysis and research on the QUASE and Examination Results in Context data in order to address a number of important issues, including the following:

- How are GCSE results related to background factors, and have these relationships changed over time?
- What can be said about overall trends in GCSE performance over time, taking account of background factors?
- To what extent are school-level effects stable over time, or over different outcome measures?
- Are there apparently different relationships for schools in inner-city LEAs and those distributed across the nation?

Other work is being carried out at NFER which has a 'value added' dimension, including:

- ♦ *Testing and Evaluation for the National Literacy and Numeracy Projects*
- ♦ *Baseline Assessment*
- ♦ Project to collect pupil-level test results on the optional national QCA tests in Years 3, 4 and 5, in order to monitor progress from the end of KS1 through KS2.
- ♦ Project to collect individual pupil-level KS1 data from 1994 to 1997 and match to subsequent KS2 data.

Each of these has its own Research Information Sheet available from NFER.

3. KEY LESSONS LEARNT ABOUT VALUE ADDED²

3.1 What Are the Limitations of Value Added?

Whilst value added methods of evaluating school performance have gained considerable prominence in recent years, they do not provide unequivocal answers to all the important questions about effectiveness. We need to pose some searching questions about the nature of value added as an analytical tool.

Any quantitative analyses – whether 'raw' *or* value added – have the following limitations:

- ♦ Quantitative analyses usually contain a degree of statistical 'uncertainty': this is because calculations based on differences from the average or norm may be the consequence of pure chance rather than of something more 'real', such as the quality of education. Statisticians use tests of significance to assess the degree of chance in particular sets of results. These tests typically reveal that only a few schools can be said – with a reasonable degree of certainty – to be performing above (or below) the average. This is true for either raw or 'value added' results.
- ♦ Analyses of actual performance data – because by definition based on past results – may be misleading if they are used to set the norms for future performance. In particular, it needs to be remembered that so-called 'predictions' are statistical constructs, not prophecies.
- ♦ Different outcome measures may give different results: a school which is getting good results on 5+ A*-C grades at GCSE may be letting down those pupils at the lower end of the attainment range, i.e. those obtaining 1+ A*-Gs.
- ♦ Likewise, a school may be doing relatively well – compared with other schools – for some groups of pupils (Asian girls, for example) but relatively badly for others (white boys); and, similarly, in some subjects but not in others. Some research suggests that the differences within in a school (between subject departments, for example) may be greater than the differences between schools.
- ♦ The overall relationship between, say, end of KS2 results and GCSE grades – on which the average or expected performance is based – may change. To maintain their accuracy and relevance, statistical models must be continually monitored by empirical research.

Most of these important considerations have been obscured by crude 'league table' approaches, however. *One of the advantages of value added measures has been to*

² A version of this text first appeared in the *Times Educational Supplement*, 10 July 1998 (see Saunders and Thomas in the list of References).

make educationists more aware of the complex and probabilistic nature of all performance data, however superficially simple.

3.2 How Should Value Added Be Calculated?

In the rigorous sense of 'value added' (as defined in Section 1.2 above), the prerequisites for doing it well are as follows: (Boxes 3 and 4)

BOX 3: BEST PRACTICE IN CALCULATING VALUE ADDED

- ◆ Data collected at the **individual pupil level on a large and representative sample**
- ◆ **Outcome measure(s) reflecting all levels of pupil performance**
- ◆ **Prior attainment measure(s) for each pupil** (preferably individual standardised scores), plus items of information about the pupil's background
- ◆ **School context factors**
- ◆ **Multilevel modelling³** to analyse the data
- ◆ **Rigorous quality assurance and quality control procedures**

Examples of approaches which conform to these criteria are: the NFER's QUASE service, the Lancashire and Hampshire projects undertaken by Sally Thomas and Harvey Goldstein respectively at the University of London Institute of Education and the Essex project undertaken by John Gray at Homerton College.

³ Multilevel modelling is the only statistical technique capable of doing justice to the hierarchical nature of the data, i.e. the fact that we need to investigate the effects on performance of the characteristics of schools, of classes and of pupils *simultaneously* and to assess their relative importance in accounting for differences in performance.

BOX 4: BEST PRACTICE IN PROVIDING VALUE ADDED

- ◆ Results of analyses should be given in table, diagram and textual forms for individual schools or LEAs. These should show whether the measured differences between schools are statistically significant.
- ◆ Wherever possible, results should be given at three stages of analysis: 'raw' results, results adjusted for pupil data (such as prior attainment) and results adjusted for pupil and school context data. Each one of these stages of analysis usually has some insight to offer.
- ◆ A minimum of three years' worth of data is needed to establish a trend upward or downward.
- ◆ If the analyses are likely to be used or adapted to provide 'predictions' of pupils' future performance, it needs to be made clear that the results are a statistical projection; the range of uncertainty needs to be emphasised.
- ◆ It follows from all the above that data is not self-evident. A detailed commentary needs to accompany the analyses to help people interpret the data, and in particular what conclusions may, and may not, safely be drawn from the results.

We can summarise the lessons learnt by saying that value added measures:

- ◆ are only as good as the data they are based on (and most data has some error in it);
- ◆ deal in correlations, not causes (the empirical association between, say, free school meals and lower than average performance is not an explanation);
- ◆ are based on a retrospective and normative model (i.e. every school's results use past performance data and are calculated in relation to the average) – which may not tell us anything about desirable levels of performance in future;
- ◆ contain an irreducible degree of statistical uncertainty;
- ◆ are not self-evident in what they show;
- ◆ represent only one instrument of evaluation (not everything which is desirable in educational terms is measurable, and vice versa);

and that therefore the notion of a value added measure which tells you – and everyone else – how well your school or department or class is doing, and is also simple to calculate, understand and use, is a non-starter!

4. USING VALUE ADDED DATA

4.1 Value Added in the Public Domain

The preceding discussion suggests that, *with careful use*, value added analyses offer a useful approach for exploring issues of school effectiveness. Value added analyses in the public domain are perhaps most useful as an initial screening device for identifying those relatively few schools which are 'outliers', i.e. in statistical terms, those which can be shown to be *significantly* different from the norm. Appropriate kinds of follow-up work should then be instituted to identify possible reasons for these differences.

Adjustments made at aggregate level using Performance and Assessment Data (PANDAs) or national value added data would seem, on the criteria given in Section 3, insufficient for accurately assessing relative effectiveness, *if such assessments are to be in the public domain*. Indeed, we take the view that 'high stakes' use of any value added analyses – for example, in published tables of performance – is no more supportable than crude league tables. Value added measures will not make what is essentially an inappropriate use of performance data more acceptable just because they use better methods of calculation. On their own, they cannot be validly used to make judgements about the effectiveness of a school, still less of an individual department or class or teacher.

4.2 Value Added for Self-Evaluation

What of the use of value added for institutional review and school improvement? Almost certainly, the information on relative performance provided by value added analyses is more robust than that characteristically given by other methods in the past. A commonly heard phrase in schools these days is: *There's no hiding place now*. Most importantly, explanations of poor performance which rely on assertions or assumptions about the inadequacy of the pupils can more readily be exposed. Value added measures make it a great deal easier to identify the root causes, as well as the underlying trends and patterns, of underachievement.

But in this context, value added analyses which focus on schools as the unit for evaluating comparative performance are not particularly revealing. A whole-school score (say, percentage of pupils achieving five or more higher GCSE grades) can disguise the fact that a school contains very varying subject strengths and weaknesses. Or a school population may comprise a number of different pupil groups whose results

are much better or worse than those of their peers in other schools, although again this would not show up in aggregate results. The practical corollary of this is that where pupils in a given school, subject or teaching group perform substantially less well than their peers elsewhere, it is clearly a matter of the highest priority to discover how and why this has been happening, and to find ways of rectifying it. Equally, where there is evidence of substantially better performance, it is in the interests of the professional community as a whole to establish how far and under what conditions this can be replicated in other schools/subjects/classes.

Value added measures do not, of course, provide any quick fixes or right answers to these problems of school improvement. What value added analyses can do, given the right culture, is to help to pose better and more focused questions about the way a school or LEA has performed with its pupils and to stimulate more informed discussion amongst school staff about the way they organise and deliver their teaching.

How far 'the right culture' exists, what needs to be done to nurture it and whether the introduction of the national value added system will help or hinder its growth are key questions to which national policy makers will need to seek detailed answers.

4.3 What Do We Know About the Practicalities of Value Added in Schools?

The evidence on the ways in which schools use value added data is so far quite modest, partly of course because it is only very recently that the majority of schools had access to anything that could remotely be called value added. Few research studies have focused specifically on this aspect of school practice, moreover: it is only a slight overstatement to say that the broad tendency in school improvement research has in the past been to assume that value added data is of limited practical interest outwith the debate on relative school effectiveness. (Several books published in the last couple of years have taken a different view of this issue, however, in attempts to integrate the school effectiveness and school improvement traditions. See, for example, Gray *et al.*, 1996; Reynolds *et al.*, 1996; White and Barber, 1997; Gray *et al.*, forthcoming.)

A decade ago, the very small amount of evidence gathered was pretty negative: 'The picture that emerged [from a study of schools receiving ALIS-type data] was of a very peripheral level of awareness, a tendency not to attend meetings, to read reports sparingly and to take no action on reports once read' (Williamson and Fitz-Gibbon, 1990). Some years later, another small-scale study (Harris *et al.*, 1997) used NFER

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QUASE data to link quantitative and qualitative evidence at the departmental level. This study postulated a range of common characteristics in departments identified as 'adding value', as follows:

- ♦ good organisation/management, from schemes of work to planning and utilisation of resources;
- ♦ systematic scrutiny of exam and test results;
- ♦ sense of vision (especially of subject discipline) conveyed by department head;
- ♦ change and innovation accepted, if in accordance with departmental vision;
- ♦ effective internal communication within department;
- ♦ delegation of tasks to colleagues (based on sense of professional trust);
- ♦ active involvement of pupils in review of and reflection upon their own work;
- ♦ consistent approach to assessment which motivates, reinforces and builds confidence;
- ♦ clear structure for lessons which also integrates feedback to/from students;
- ♦ consistent homework policy;
- ♦ use of reward, in preference to punishment, to modify behaviour;
- ♦ normal range of experience, capability, motivation, etc., amongst departmental staff, but within a context of low staff turnover.

It was intended that these findings should be used as an aid to self-evaluation and internal improvement within the cluster of schools which had participated in the study. However, the related follow-up study conducted by Wikeley (1998) revealed problems in disseminating and sharing so-called 'added value':

- ♦ staff felt the dissemination of the 'value added' findings had been imposed from above by their senior management team/an external agency;
- ♦ staff in departments which had 'added value' felt that being identified in this way was divisive;
- ♦ some claimed that the research 'told us nothing new';
- ♦ SMT's perceptions about effective departments seemed to differ from other staff's;
- ♦ there was a tendency to distrust external quantitative data as opposed to instinctive judgement; people tended to be much more critical of the basis for the statistical analysis than they were of the basis for so-called professional judgement;
- ♦ there was, on the other hand, a lack of other robust kinds of data to confirm or refute the value added findings;
- ♦ there was a lack of follow-up to the work *via* self-evaluation in departments; staff tended to focus on the need for further resources instead.

This is probably no longer a reflection of the situation in most schools. There is no doubt that the tightening-up of the school improvement agenda by the DfEE's Standards and Effectiveness Unit has focused attention on the respective roles and responsibilities of LEA officers and advisers, school managers, governors and teachers in a new and unprecedented way. Taking a 'lies, damned lies and statistics – I trust my gut instincts' view of performance data is no longer an option for any of them.

The most recent piece of evidence we have encountered⁴ – a written case study of a secondary school which has used QUASE data (West and Moore, 1998) – seems to bear this out. The authors claim several benefits arising from the school's use of value added data and the developments to which this has led in respect of monitoring pupils' performance and progress; these can be summarised as follows:

- ◆ Staff attitudes have changed from a 'minimalist understanding' and even a feeling of unease to a situation where 'measurement data is seen more as a tool to aid increased pupil achievement'.
- ◆ 'There is more openness surrounding the audience for the data and far more discussion about the issues that the data highlights. Many staff now use data to inform their curriculum planning at both departmental and classroom level.' Specific developments have been introduced to enhance the quality of learning.
- ◆ Pupils have benefited from a growing self-awareness about their progress (or lack of it).
- ◆ 'The most valuable outcome, paradoxically, probably belongs to that aspect of school effectiveness that remains elusive, defying quantification. It is to be found in the increased levels of awareness of the teachers, the day-to-day adjustments, the small experiments with new approaches, the time devoted to reflection or just thinking about the relationships between teaching and learning.'

The NFER study mentioned in Section 2 above will also contribute to the evidence base.

4.4 Managing the Introduction of Value Added Analyses

The evidence so far, such as it is, does provide a reminder that careful notice of *context and culture* needs to be taken if value added analyses are to make a real difference to school practice. In particular, the following points need to be borne in mind:

⁴ In autumn 1997, the Qualifications and Curriculum Authority commissioned a qualitative study of the use of value added data for school improvement; at the time of writing, no findings from the study have been published.

- ♦ **Data rarely speaks for itself:** even the most rigorous quantitative analysis needs to be treated with caution, since it depends on a series of prior decisions – not necessarily obvious to the recipients – about *what* has been measured and *how* it has been measured. There are always important aspects of school performance that have not yet been measured, and often other ways, better or worse, of measuring things. One item that always needs to be made plain, for example, is whether the measured differences between schools (or departments) are significant, i.e. not just a function of the normal random distribution of results. So the full meaning of the data must surely emerge from the *interaction* between ‘the numbers on the page’ and what school staff bring from their professional judgement of their pupils, the school’s context, etc.
- ♦ **‘School improvement’ is not self-evident:** despite the years of painstaking research into school effectiveness and improvement, there is no formula by which we can incontrovertibly link identified inputs at classroom, year group or school level with desirable outcomes, such as an increase in test scores. The notion that one can transfer practices in effective schools to ineffective schools has been shown to be particularly problematic. This is hardly surprising: schools are complex institutions and ‘what works’ is likely to be a combination of the transferable and the unique, arising from professionalism *and* personality; pedagogy *and* pastorality; mission *and* ethos; the rational *and* non-rational. A major hypothesis of any guidance should be that different kinds of schools need different kinds of strategy – schools are complex organisations with different backgrounds and starting points.
- ♦ **Schools are not homogeneous:** within any organisation, there are likely to be both missionaries and blockers of a new idea or initiative; left and right hands; change agents, vested interests, defensive positions, hidden agendas, intrigues; more, or less, commitment to consultation at different levels within the hierarchy; delaying tactics, forced pace, wait-and-see management stances; sometimes major differences of style and substance between key people on crucial issues. And so on. It is a shorthand bordering on an untruth to talk of ‘schools’ – as we often do – as if they were monolithic agents, rather than micro-political institutions.
- ♦ In particular, the use to which added value information is put will tend to follow the **existing contours of the style of senior management**. By themselves, value added analyses will not bring about a culture which is supportive of systematic self-review and planning for improvement nor will they turn a predetermined agenda into an open-ended exploratory approach. Classroom teachers may be suspicious that value added data will be used to undermine their role in making professional judgements about pupils or even to make covert judgements about their own performance. Value added analyses may be impartial in their intention, but rarely neutral in their effect in such a context. The purpose to which the analyses are to be put needs explicit discussion amongst all school staff.
- ♦ Therefore, **value added analyses are an innovation to be managed like any other**. All of the above factors mean that when it comes to working with performance data of a kind that attempts to identify strengths and expose weaknesses in performance, planned active management of its dissemination is necessary. But not sufficient: there also needs to be an understanding of the in-school processes by which the data can be ‘translated’ into an instrument for helping staff make improvements, rather than simply undermining them or

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entrenching some of them more deeply. What was discovered in the 1980s about the complexities of managing change needs to be reactivated.

In summary, even though value added measures are only part of the story of school effectiveness, it is hard to see how schools can take steps towards improving pupils' performance without using – and actively seeking to use – data of the highest possible quality. Value added analyses represent a major step towards this goal.

But it is imperative that the analyses are based on valid and reliable data which is analysed and disseminated in such a way to be *useful and appropriate to the complex and often long-term task of raising achievement*. The emphasis in the management of valued added should be on continuing professional development and diagnosing the quality of teaching and learning.

5. THE FUTURE FOR VALUE ADDED?

When all is said and done, is the effort involved, at every level, in producing highly sophisticated analyses of performance data worthwhile? Does it help improve education, and young people's achievements, in practice? These must be the overarching questions for the value added agenda in future.

Three major areas of school improvement research which are directly linked with the value added agenda are:

5.1 Identifying and Addressing Underachievement

Tackling the underachievement of a substantial proportion of young people is a priority for most developed industrial countries, in order to reduce economic wastage, retain people in learning later in life, and provide greater satisfaction and career progression for individuals. Underachievement in school may take different forms, such as:

- ♦ individual subject areas with problems of capacity, organisation and management;
- ♦ teaching and learning styles, and/or the curriculum diet, not appropriate for a (changing) school population;
- ♦ inadequate flows, and use, of information about the progress being made by pupils between public tests and examinations;
- ♦ a small number of pupils who show persistent underachievement throughout their school career;
- ♦ pupils not having equal access to resources in practice, because of low self- or teacher-expectations;
- ♦ deep-rooted problems facing many of the pupil population, such as high local rates of unemployment, poor housing and poverty.

There are no easy answers to such problems, and interactive solutions need to be devised at national, local, institutional, classroom and individual levels. Diagnosis may be impeded if underachievement is conflated with low achievement. It is crucial to know whether pupils and schools are attaining the levels of performance which they could and should be expected to do. Schools getting good results may none the less be underperforming relative to what their pupils could be expected to achieve given, for example, their level of ability on entry to the school; and, of course, vice versa. Some recent unpublished NFER work analysing aggregated QUASE data (Schagen, 1998) suggests that schools which are underperforming in this way display distinctly different characteristics from those which are overperforming. The former are more likely to be

located in inner cities, with lower levels of parental support, and higher percentages of pupils eligible for free school meals and/or diagnosed as having learning difficulties.

As Mortimore and Whitty (1997) persuasively argued, the influence of socio-economic factors on school performance is clear, and a strong case could be made for targeting financial and material resources and other forms of support on disadvantaged schools. At the very least, better methods for controlling for these factors in value added analyses are clearly needed; there is also more work to be done on devising the most sensitive measures for assessing prior attainment and socio-economic factors, and on checking that the right models are being applied; the NFER is contributing to this important area of policy-related research.

Moreover, schools are often differentially effective for different groups of pupils – as much value added work, including that of the NFER, also shows. Yet only if the 'school effect' is enhanced for all pupils, irrespective of sex, age, ethnicity, ability or socio-economic context, can underachievement be said to have been addressed. At the school level, diagnosing precisely where a school's problems lie is a critical first step for which detailed value added data is particularly useful.

But the body of knowledge about the ways schools influence outcomes for different pupils is not well developed: more research is needed both into the generalisability of models of educational effectiveness and into the links between class/teacher and school effects. As Goldstein (1997b) says: *[The conditions for valid inference] imply considerable expenditure of thought and resources as well as the long term follow-up of large numbers of students, schools and classrooms. They need to be replicated across educational systems, phases and types of schooling.* Like other leading institutions, the NFER is committed to working collaboratively with practitioners and with academics in the UK and overseas in order to help build such a body of combined empirical and theoretical knowledge.

5.2 Institutional Development

The decision to devolve funding and planning to school or 'site' level has made great demands on both government and school managers. On the one hand, a national educational system is composed in practice of highly diverse individual 'ecologies', that is, schools with a huge range of different starting-points, profiles and priorities that require different strategies for change. No single approach to improvement will therefore work in every case, and national policy can only ever be a crude instrument. A great onus is on headteachers and senior management teams to demonstrate

improvements in their pupils' achievements through their strategic planning and resource deployment. The studies carried out in the late '80s and early '90s purported to identify key characteristics of effective schools in terms of a policy and management orientation, such as:

- ♦ clear school mission;
- ♦ effective site management;
- ♦ instructional leadership;
- ♦ climate of high expectations;
- ♦ shared and clear goals;
- ♦ safe and orderly environment;
- ♦ collaborative working relationships.

Much has been written about the shortcomings of such school effectiveness models, both in themselves and as relevant contributions to a better understanding of school improvement. For example, important work has been done on 'failing' schools which suggests that such institutions are not simply deficient in one or more of the effectiveness correlates but have their own 'pathologies' (see Reynolds, 1996). Yet one valuable insight has been that a school is more than just the sum of its parts. It cannot be seriously doubted that there is a consequent need for whole-school planning, development and review, seen in terms of a continuous cycle usually referred to as school development planning. As recent DfEE guidance argues (see, for example, GB. DfEE, 1996, GB. DfEE. SEU, 1997; OFSTED, 1998), an integral part of this cycle must be systematic self-evaluation by schools. This should be tailored to reflect their own challenges and priorities rather than be confined to a single standard model. The process needs to be supported by LEA advisers, and to make use of current research findings in a way which is sensitive to school managers' and teachers' thinking.

But it is clear that the culture of school self-evaluation is not yet fully formed. As the Centre for Educational Research and Innovation (St John-Brooks, 1995) put it:

Although evaluators in most countries would like to develop a 'climate of review' in the schools they are assessing, this is hard to achieve – except in schools which already have a self-confident staff and effective leadership – without a substantial input of professional training. But the act of collecting data for the indicators and more general criteria used in evaluations, and discussing their use, can help schools to focus on and analyse their task; this important aspect is ripe for development in many countries.

This would seem to summarise the current position in England and Wales. The NFER has been active in developing models and materials to support systematic institutional self-evaluation: see, for example, Saunders *et al.*, 1996; Saunders, 1998. Even so – as was argued above – more attention must be paid by researchers and policymakers to *institutional context and culture* if performance data analyses are to make a difference to school practice.

5.3 Partnership Between Schools and Local Education Authorities

In a devolved system such as now exists in England and Wales, different functions must be carried out at different levels and LEAs are the bridges between national policy-making bodies and individual institutions. The most important kinds of function which can be fulfilled by LEAs in relation to school improvement are:

- ♦ to assist with quality control, by inspecting and regulating schools according to a statutory set of criteria or performance indicators;
- ♦ to develop quality assurance, by challenging and supporting schools to interrogate and improve their own practice; this includes the production and dissemination of management information, especially comparative performance data analyses, and support for school self-review;
- ♦ to help change the culture, by mediating long-term partnerships between the educational 'stakeholders' (schools, parents, enterprises, higher education institutions, social services agencies, the voluntary sector and local communities). When it comes to raising the level of young people's achievements and aspirations, schools clearly cannot do it all by themselves.

Different LEAs are at very different stages of development in these key areas. Interestingly, current work at the NFER is revealing that school senior managers' expectations of the LEA and its role in raising achievement are not the same in the late '90s as they were earlier in the decade. Rather than autonomy and devolution, headteachers seem to be looking for leadership, strategic planning and intervention on the part of the LEA. This is an important message for LEAs to take on board in view of their enhanced role in school improvement.

6. FINAL THOUGHTS

School effectiveness and improvement, and the contribution that value added can make, are exciting, but sometimes frustrating, areas to be working in. Whilst there is much that we already know about value added, effectiveness and improvement, the challenges which remain for research are substantial. They include:

- ♦ isolating the pupil- and school-level factors which are associated with better or worse performance but are still undiagnosed;
- ♦ deriving better models of what makes schools effective for different groups of pupils, especially those who are at greatest risk of underachievement;
- ♦ having a better theoretical grasp of the role of institutional and local 'climate' or micro-politics in school change and improvement;
- ♦ knowing how to involve teachers more deeply in action research so that teaching and learning processes in the classroom become a central instead of a peripheral aspect of this area of research;
- ♦ getting across key messages from the huge body of research findings in ways that make sense and are coherent and accessible to education managers and practitioners.

And above all, perhaps, we need to hold fast to the idea that there are no quick fixes, easy answers or standard formulae whilst still believing in the possibilities of, indeed the necessity of, sustained educational improvement.

HINTS FOR SCHOOL SENIOR MANAGERS ON USING VALUE ADDED

- ⇒ **How and with whom should the value added data be shared?** There is no single answer to this – a lot depends on how confident colleagues are about using quantitative data and on how far a spirit of inquiry about curricular and pedagogical practices prevails generally throughout the school. Dissemination and discussion of results needs to fit in with the school's review and target-setting timetable – this should determine how, and when, value added results are discussed with departmental or faculty heads, and then incorporated into a detailed plan of development and action.
- ⇒ **What support and training will staff need?** Value added analyses are of necessity based on sophisticated statistical models, but there is no need for staff to struggle with the detail. What they do need to understand are the principles and implications of value added, particularly the fact that value added analyses enable a 'like-with-like' comparison and therefore strip away various pretexts that may be adduced for pupils' underperformance. So in some schools, considerable initial groundwork on the part of senior and middle management may be needed to assist colleagues to use the data in an open-minded way. But staff should always remember that such data needs to be set alongside other kinds of professional evidence, e.g. classroom observation, as part of a whole-school commitment to self-review and evaluation. Value added data should be treated as an integral part of such a process.
- ⇒ **Where should we begin?** A common approach is for the senior management team to consider the analyses in detail and then compile a list of **points for investigation** with heads of department or faculty. Here are some questions which could be used as a basis for discussion:

First Impressions:

- What aspects of the data please you most?
- What aspects of the results most surprise you?
- What are you most worried by?
- What do you need to know more about?
- What internal development work are you currently or soon to be engaged in to which value added data will make a contribution?

More Detailed Questions:

- Are your value added results based on more than one year's data? If not, what other data sources do you have which might be useful in critically examining performance?
- Are there any major changes between one year and the next in terms of raw and/or adjusted scores? Do the adjusted scores show the same trends as the raw scores, or is there a growing gap upwards or downwards?

- What modifications, if any, do the results suggest need to be made to staff's expectations of pupils?
- Does the data reveal any fluctuations in levels of pupils' prior attainment? Have staff been able to adjust their expectations of pupils, and strategies for teaching, in response to these fluctuations?
- Where is the greatest evidence of underachievement, in terms of pupil groups, for example, ability range and/or sex? And of individual subject areas? Is there any general pattern to this or is the picture a variable one? Are there any conspicuous gender differences in performance for which explanations might be found in terms of staff's or pupils' expectations, or of departmental gender balance?
- What aspects of pupils' performance give you most cause for concern? Where can pupils' performance most easily be boosted? What are likely to be the hardest areas to tackle?

Follow-up:

- Where does support provision and/or further differentiation most need to be targeted? For example, is it the lower attainers, pupils in the middle range or the 'high-fliers' who appear to be most in need of extra support? Are there areas of good practice within the school which can be built on? What role is being played by the school's special educational needs/learning support coordinator (if there is one)? Does s/he have a clear staff development role as well as a pupil support function?
- What action points will you be suggesting to individual heads of department/faculty?
- What further external support and advice (e.g. from the LEA or other agency) would you now be looking for?

Suggestions For Addressing Underperformance:

As far as using value added results for bringing about improvements is concerned, our experience with schools over the years has shown that many different strategies can contribute to higher-than-expected performance – there is no one right way.

- However, research suggests that a helpful place to begin addressing underperformance is with an audit of policies within and across departments to find out what the **learning support strategies** are for individual pupils, whether these differ between departments and/or year groups, and which ones have been found, in staff's opinion, to be **most effective**. We have found that, whilst good practice can usually be found in every school, it may be 'locked in' (especially if it occurs in the smaller departments) and thus not able to be disseminated and built on.
- **Differentiation** seems to be the keyword, in the sense of matching the right syllabuses, the appropriate teaching styles, the appropriate grouping/setting strategies and extra support provision (in the form of revision guides or tutorial

sessions, for example) to the pupils' needs; and also seeking to enhance their levels of **motivation** wherever possible.

- **Challenging expectations** can be key, especially in schools with a poor socio-economic environment. Sometimes staff in this situation strive – justifiably enough – to make school a safe and welcoming environment, as distinct from an academically challenging one; sometimes, at worst, the pressures on staff (and on pupils themselves) resulting from long-term social disadvantage contrive to get in the way of academic progress. In such a situation, it could be helpful to take a closer look, for example, at how far intake test scores are used for diagnostic and monitoring purposes (as well as for initial groupings); how far staff are practically encouraged to question assumptions about particular pupils/groups of pupils (e.g. those from a particular housing estate); and how extra forms of support, such as homework clubs, merit systems, etc., might help to raise academic expectations.
- Related possibilities include **whole-school investigations** of:
 - how effective the systems are for **assessing and monitoring individual progress** up to, as well as including, Years 10 and 11 (based initially on the effective diagnostic use of intake tests); and how well this information is used in individual reviews, to help with target-setting;
 - how consistent the policies and practice are, within and across departments, for **marking pupils' work and setting homework**;
 - how **incentives and motivation** in the classroom might be enhanced, perhaps by instituting more systematic and/or more appropriate rewards for good work and good behaviour.
 - how well the **departmental development plans** reflect any newly identified priorities.

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'value added' measurement of school effectiveness: an overview

Value added' is one of those ideas which make intuitive sense but are harder to pin down in practice. A critical review of 'value added' in education is particularly relevant in the late 1990s. The introduction of the national value added system from autumn 1998 comes at the end of a decade of sustained and public argument about how to measure the pupils' performance in a way that sheds light on schools' contribution to their progress. The debate on school effectiveness and how to measure it is now integrally linked with the national political agenda for educational quality. Moreover, the statutory requirement to set 'challenging but realistic targets' for schools and LEAs is bringing value added analyses closer to the everyday life of schools and teachers.

The range of parties now interested in value added extends from politicians to school senior managers, and from academic researchers to lay governors. There is consequently a need for continuing discussion which takes into account not only the technical questions – how most sensitively and informatively to measure added value – but also the different expectations and priorities of different stakeholders.

This overview (which itself summarises a more detailed scholarly review of over one hundred reports and articles) concludes that whilst much has been learnt about the contribution of 'value added' to school effectiveness and improvement, the challenges which the idea continues to hold out for practitioners, managers and researchers are substantial.

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