The Use of National Value Added Models for School Improvement in English Schools

Andrew Ray, Helen Evans & Tanya McCormack
Department for Children, Schools and Families, London. United Kingdom.

Abstract

School improvement is central to education policy in England. Schools are encouraged to develop and improve within a framework of self-evaluation, inspection, advice and guidance at local and national level, and by taking part in various initiatives and policies. The collection and use of data is crucial in this process. Analysis of data takes place at all levels of the system, ranging from the evaluation of national policies, down to the level of individual pupils, where schools use data in tracking progress and assessment for learning. A range of school improvement initiatives have been developed to try to raise standards in English schools. A crucial building block has been the development of test data which can be matched to pupils' prior attainment and used to generate estimates of schools' contribution to the progress of their pupils: value-added indicators. In England, the availability of national data on the characteristics of individual pupils since 2002 has allowed the development of 'contextual value-added' scores for schools and groups of pupils within schools. These statistics can be analysed in a software package called RAISEonline, developed jointly by central government and the independent school inspection agency. The paper describes these developments and provides examples of the kind of analysis RAISEonline can now provide.

Key Words: Value-added models, English educational system, assessment system, accountability system, growth models.

Introduction

School improvement is central to education policy in England. Schools are encouraged to develop and improve within a framework of self-evaluation, inspection, advice and guidance at local and national level, and by taking part in various initiatives and policies. The collection and use of data is crucial in this process. Analysis of data takes place at all levels of the system, ranging from the evaluation of national policies, down to the level of individual pupils, where schools use data in tracking progress and assessment for learning.

In England there are approximately 8.1 million pupils in 25,000 state-maintained and independent schools (DfES 2007) –7% of pupils are in the independent sector. Some pupils with special educational needs are educated in mainstream schools; others are educated separately in special schools. There are about 17,400 primary schools, which generally cover ages 4-11, and about 3,300 secondary schools, normally covering ages 11-16 (1,750 have 'sixth forms' covering post-16 as well). The average size of a secondary school is 980 pupils (approximately 140 pupils per year group on average); primary schools have about 240 pupils on average, 40 per year.

Maintained schools are funded through local government: there are 150 Local Authorities covering England. Local Authorities vary considerably in size and characteristics. The smallest is the Scilly Isles with just one school and the largest is Kent with 103 secondary schools and 466 primary schools. Educational data is used extensively at local authority level and at the wider regional level (for example, to look at the progress of pupils in London). Analysis is carried out for networks or geographical groupings of schools, for schools themselves and within schools for subject groups, teachers, and groups of pupils with particular characteristics. This paper discusses some of the analysis carried out centrally on data collected on individual pupils and schools (there

is no national collection of data that links individual teachers to pupils' attainment). It focuses on recent developments in the use of value added models and indicators for school improvement.

The starting point for any analysis of school improvement is the development of consistent and reliable test or assessment data. The current system in England for pupils up to age 16 involves assessments at the end of four Key Stages. These were defined as part of the National Curriculum, which, introduced in 1988, sets out the subjects and programmes of study which maintained schools are obliged to cover. Key Stages 1, 2, 3 and 4 cover the age ranges 5 to 7, 7 to 11, 11 to 14 and 14 to 16, respectively. Tests already existed for 16 year olds (GCSEs, and prior to these, 'O' Levels and CSE examinations), but the National Curriculum led to the development of a national system of testing and teacher assessment at the end of each Key Stage. This means that there are currently no annual test results of each cohort: instead the tests measure attainment over periods of between two and four years.

Attainment at Key Stage 1 to 3 is assessed against criterion-referenced national curriculum 'levels'. The testing system is run by the independent Qualifications and Curriculum Authority (QCA) and National Assessment Agency (NAA). Levels in the tests are equated between years using anchor and pre-tests. They are designed so that a Level 4 at Key Stage 2 is equivalent to a Level 4 at Key Stage 3, although the value added models do not rely on vertical equating or measure 'growth' on a common scale. At Key Stage 4, there are a range of qualifications which can be compared using a common scale, but this scale is not related to the Levels at earlier Key Stages. Further information on the tests can be found in Ray (2006) and on the website of the QCA.

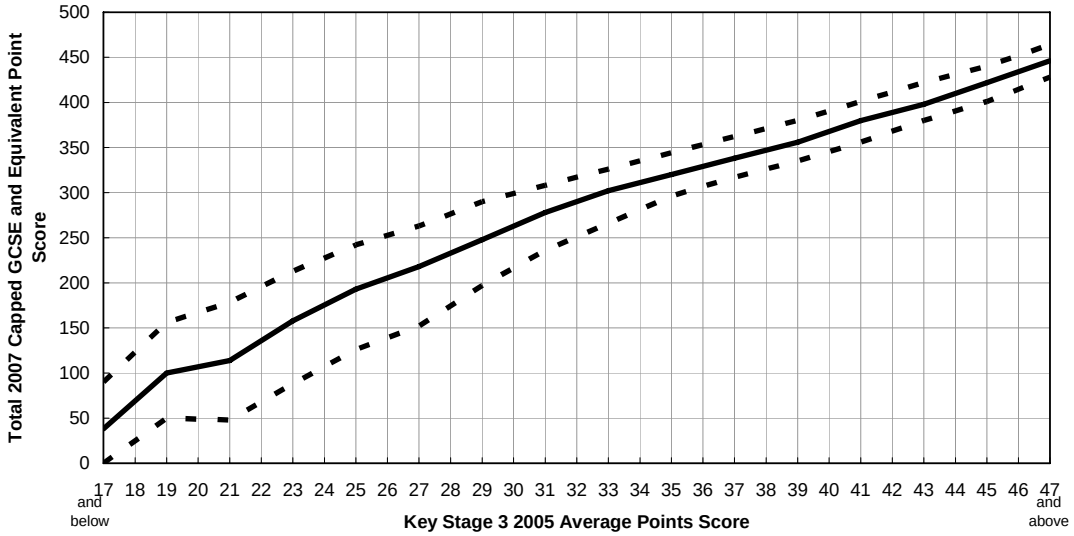
It is possible to use school-level data, for example on the proportion of pupils achieving a given standard, to look at both national patterns and local differences in school performance. However, the basis for analysis in recent years has been *individual level* test data on pupils, where their outcomes at a given Key Stage are linked to prior attainment at an earlier one. Once nationally comparable tests were established and systems set up to collect the results, it became possible to create linked datasets, where the progress of an individual pupil or group of pupils could be measured.

The Development of School Improvement Analyses

Prior to the national collection of linked test data, it was possible for groups of schools to use value added analysis for school improvement if their pupils took specific tests, such as in the programme developed by the CEM centre at Durham University (Tymms & Coe, 2003) and in studies like Mortimore et al (1988) and Goldstein et al (1993). There is a summary of these early studies in SCAA (1994). However, not all schools had access or made use of this kind of data. To fill this gap, the first Autumn Package was produced in 1998, with national patterns of value added and statistics for groups of schools. This allowed individual schools to benchmark their performance and set targets[1]. An interactive software version was also developed, where schools could input their data and see a range of useful analyses on pupils or pupil groups.

([1]) See DfEE (1998). Limited value added information was made available one year earlier (QCA, 1998); prior to this there was no possibility of matching pupil level prior attainment to outcomes for the Key Stages in schools.

FIGURE I. Example Autumn Package value added chart



The national charts and figures in the Autumn Package, of which Figure I is an example, did not require complete coverage and accuracy in matching. However, for the provision of data on value added to individual schools, it was important to use correctly linked data for all pupils. In 1997 the government had set in train the development of better pupil-level data and consulted on the introduction of a unique pupil identifier (UPN) that would help data to be matched throughout the school system. These UPNs were introduced in 1999, following work to consider the practical and data protection issues. Although linked data had become increasingly complete, this development made it easier centrally to calculate and provide simple value added indicators for all maintained primary and secondary schools. These were developed following consultation and introduced into the annual Performance Tables between 2002 and 2004. They were also used by the schools inspectorate, Ofsted, and by the external organisation tasked with raising standards in schools through the National Primary and Secondary Strategies. For a more detailed discussion of this initial phase of national value added indicators see Ray (2006).

The New Relationship with Schools

Several other factors led to the next phase in the development of centrally provided value added information. In 2002, the Pupil Level Annual Schools Census (PLASC) was introduced, expanding the range of pupil characteristics data available centrally from just gender to include other useful information on ethnicity, deprivation, special educational needs and first language. This new data could be useful in its own right, but also offered the possibility of developing value added models that took these 'contextual' factors into account. A programme of development work and consultation was set in train to devise a new set of 'contextual value added models' that could be used to provide additional information on school effectiveness. These were to be a central part of the New Relationship With Schools, launched in 2004.

The New Relationship With Schools also introduced School Improvement Partners (SIPs), experts (often ex-head teachers) who would be able to work with schools on self-evaluation. The approach taken to school inspection by Ofsted was also changed and inspectors were asked to consider a wider range of performance data, including value added. They had previously relied on paper reports (PANDAs) providing a set of key statistics on each school. Now the aim was to develop PANDAs and the interactive Autumn Package into a new software product that would be pre-populated with each school's data and include charts and displays on a

range of statistics, including the new contextualised value added. This product, RAISEonline[2], was introduced in 2006 and is discussed further below.

The Contextual Value Added Models

Once PLASC data matched to information on pupil progress became available, towards the end of 2002, statisticians in the Department began analysing it to understand the relationships between the variables and what they said about national performance. Views of a selection of academics in the field were sought on the future direction of the value added work and, although there was no consensus of opinion, there was strong support from some for the development of more complex models that used the new data. Outside the Department, statisticians had begun building value added models that took into account contextual factors, e.g. the Fischer Family Trust. Advice from the National Audit Office (2003) was to develop performance information for schools that would take into account not just prior attainment, but also 'other external influences on performance', based on the new PLASC data.

In October 2004 a prototype Contextualised Value Added (CVA) model was discussed with schools. The following year a system of CVA scores was piloted for use in Performance Tables and used for the first time in data for school improvement the following year. The 2005 CVA model for secondary schools, covering progress of pupils from the end of Key Stage 2 to Key Stage 4 was discussed in detail in Ray (2006). The equivalent model for 2007 is set out in Table I.

The simplest value added regression model (1) for this, with no contextual factors, would include as the $y_{ij(t_2)}$ Key Stage 4 results for the *i*th pupil in the *j*th school, and as the explanatory variable $y_{ij(t_1)}$, the Key Stage 2 prior attainment average point scores they achieved five years earlier. The a and b are regression coefficients and the e_{ij} and u_j are the random quantities, which are independent, normally distributed deviations with means equal to zero and common variances. The model coefficients could be estimated using Ordinary Least Squares and the mean of the pupil residuals for each school used as a measure of value added.

(1) $y_{ij(t_2)} = a + by_{ij(t_1)} + u_j + e_{ij}$

In the contextualised value added model for maintained mainstream schools we actually use four variables to model prior attainment (as described below), a total of 10 pupil level contextual variables and two school level variables. This is shown in (2), where, for example, x_{5ij} denotes the first of the pupil contextual factors and y_{qj} the first of the two school level factors. (Note that the explanatory variables are measured in 2007 and so could also be given the Key Stage 4 subscript, although most would be equally applicable to the earlier time point, e.g. gender, ethnic classification).

(2) $y_{ij(t_2)} = \beta_0 + \beta_1 y_{1ij(t_1)} + ... + \beta_4 y_{4ij(t_1)} + \beta_5 x_{5ij} + ... + \beta_p x_{pij} + \beta_q y_{qj(t_1)} + \beta_s y_{sj(t_1)} + \varepsilon_{ij}$

Rather than use an Ordinary Least Squares approach, the CVA indicators are derived from a multilevel model (Goldstein, 2003), run in MLwiN, a software package that estimates the fixed effects –prior attainment and contextual factors– and calculates Level 1 and Level 2 residuals[3]. Level 1 residuals show variation in pupils' outcomes in relation to their schools. The Level 2 residuals show schools' outcomes in relation to the national expected results, given the factors measured by the fixed effects. These Level 2 residuals are the value added scores.

([2]) This can be seen at https://www.raiseonline.org
([3]) For more on MLWin see http://www.mlwin.com/features/index.html.

Factors Controlled for in the Model

The dependent variable being modelled is the capped total point score achieved at KS4, based on each pupil's grades in their best eight qualifications. This gives a continuous measure of attainment ranging from the most able pupils scoring eight or more A* grades, right through to pupils achieving smaller numbers of G grades, and includes lower level qualifications (such as in basic literacy and numeracy) taken mainly by pupils with special needs.

The point score outcome measures was chosen rather than simple thresholds (such as whether a pupil has achieved five or more A*-C grades) so that the resulting model reflects under –or over– performance of pupils at all parts of the range rather than focusing only on pupils at the C/D grade borderline. It also gives useful diagnostics at pupil level, showing what each pupil has achieved in comparison to 'similar' pupils nationally. Furthermore, capping the point score at the best eight qualifications aims to capture both the quantity and quality of subject grades, without providing incentives for schools to enter pupils for excessive numbers of qualifications.

The most important explanatory variable is each pupil's prior attainment and this has been modelled as accurately as possible. Average point score (APS), based on the marks achieved in English, Maths and Science, is used, along with two extra terms measuring the *difference* between the English and Maths results. This is mathematically equivalent to including each of the subjects separately but has advantages in coping with missing data as well as simplifying presentationally. A quadratic APS term is also included, reflecting the fact that the relationship between KS4 outcomes and KS2 prior attainment is non-linear. We also make a *post hoc* adjustment for floor and ceiling effects to deal with a very small group of pupils at the extremes of the range where the model predictions are out of line with the achievements recordable by the testing scale. Making the ceiling adjustments is important as, although only 2% of pupils are in this range, their treatment has a disproportionate effect on the small number of selective 'grammar' schools which exist in certain areas. Further information is available on the DCSF Achievement and Attainment Tables website: http://www.dcsf.gov.uk/performancetables.

The decisions over which contextual variables to add into the model after controlling for prior attainment were based on a mixture of statistical, educational and practical considerations. Given the need to provide value added information for every school, it was necessary to restrict the choice to information for which there is national data. Since the aim was to generate estimates of schools' effects on learning from the model residuals, the explanatory variables needed to cover factors that are outside the school's control. The choice of pupil level contextual variables took into account what was known from previous internal and external research about factors that explain variation in test results. Table I provides the full list of explanatory variables and their coefficients.

No data on social class, family income or parental education levels is collected nationally for all pupils. However, some information relating to deprivation is available. Children whose parents receive the social welfare benefit Income Support, and some related benefits, are entitled to claim free school meals (FSM). In addition to FSM, the models use another measure of deprivation that takes advantage of the fact that the School Census collects pupils' home postcodes and that these can be linked to data on their local area. Various possible local indicators have been tried but at present the models use a measure called IDACI –the Income Deprivation Affecting Children Index. This is the percentage of a local area's children under 16 who are living in families in receipt of certain benefits or on low incomes.

Special Educational Needs' (SEN) covers a wide range of needs that are often inter-related as well as specific needs that usually relate to particular types of impairment. Children with SEN will have needs and requirements which may fall into at least of one of four areas: communication and interaction; cognition and learning; behaviour, emotional and social development; and sensory and/or physical needs. The model distinguishes between two levels of SEN: School Action (where the class teacher or SEN Co-ordinator provides additional help) and School Action Plus, where the intervention at School Action has not resulted in improvement and

external advice is sought.

The school census collects data for 18 main ethnic groups, with a 19th code available for 'unclassified' since provision of this data is voluntary. All of these groups were included in the model as individual flags. One non-significant ethnic category *was* included because it was felt that for practical and presentational reasons it would be better to include *all* the categories rather than combine two of them with other groups on the basis of the one year's data (including these variables makes very little difference to the overall model). In addition there are interaction terms for the ethnic groups and FSM status.

The other pupil level variables covered a range of other factors that are associated with different rates of progress. Although in England almost all pupils within a year group are born within the same year, their month of birth is significant: pupils born later tend to have lower results but make faster progress. Another variable associated with lower outcomes but faster progress due in part to 'catching up' is the first language of pupils –English or 'other than English'. We now include an interaction term as well for English as an Additional Language (EAL) and prior attainment levels. Mobile pupils tend to make less progress and the CVA model takes this into account using data from the School Census on the date of entry into the school for each pupil. Finally, there is flag for pupils who are in the care of their Local Authority, living with foster parents or prospective adopters, placed in children's homes or some other form of residential care, or placed at home with their parents.

There are advantages and disadvantages in including school level contextual variables. For example, they can control for additional issues that affect all pupils in the school, but they may also be partly endogenous, measuring factors that have themselves been influenced by the school's effectiveness. They put schools on a more equal footing so that the value added estimates can provide a fairer indicator of school effectiveness, but in doing so make an adjustment that may not be useful to parents or others who are less interested in making comparisons on this basis. The CVA models are used for a variety of purposes and the decision was taken to include two school level factors in the models for secondary schools, describing the overall prior attainment of the intake, but not additional factors like the school's ethnic mix, level of deprivation and so on. These variables were the overall level and spread (as measured by the standard deviation) of APS prior attainment.

Multilevel modelling (MLM), in taking account of the structuring of the educational data, offers a more complex set of modelling options than Ordinary Least Squares (OLS). The added complexity is sometimes seen as a disadvantage, particularly when the models that result are fairly similar, both in terms of estimated fixed effects and value added residuals. In England both OLS and MLM versions of the models have been calculated and compared (Ray, 2006). The main practical difference is that the MLM value added estimates incorporate 'shrinkage'. The degree of shrinkage depends on the size of the school: smaller schools are 'shrunk' towards the national mean. There is no easy solution to the problem of interpreting value added for small schools. Restricting value added to schools above a certain size means that school improvement and accountability systems leave some schools out. Averaging over more than one year may provide more robust figures but prevents annual comparisons.

The Model for Primary Schools

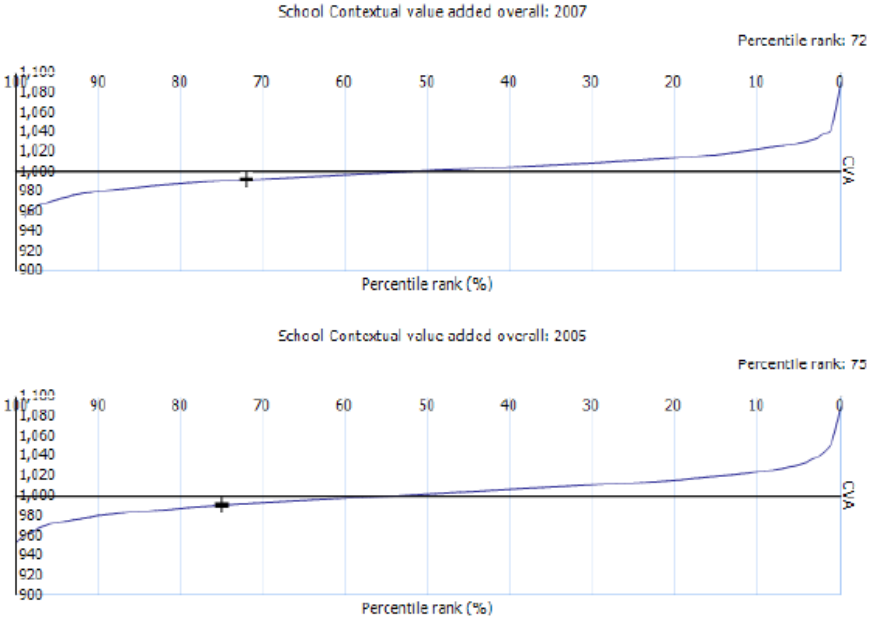
The model used for Primary Schools is broadly similar to the KS2-4 model outlined above. The main difference is that the school level terms are omitted: this is because the pattern of intakes is less variable than for secondary schools, and also because with the small numbers of pupils in each primary cohort, the use of the same prior attainment variable at two levels can lead to model instability.

The Use of Contextual Value Added in RAISEonline

RAISEonline was introduced in 2006. It provides a more extensive range of data than the Performance Tables, including value added for a wider range of outcome measures and for subgroups of pupils within the school. Schools use RAISEonline as part of the self-evaluation and target setting process that they undertake with the help of School Improvement Partners. The data is also available to Ofsted's inspectors for use in judging the extent to which the school is improving or has the capacity to improve. However, the detailed statistics in RAISEonline are not made available to the public more generally.

RAISEonline is interactive and offers the chance to investigate whatever aspects of the school's performance are of particular interest. However, it also provides standard reports which can be printed off and which set out the key indicators in a common format. There is a 'full report' which for a secondary school could, for example, be about 80 pages long. A shorter 'exceptions' report is also available highlighting areas that appear to be strengths or weaknesses, based on statistical tests of significance that compare school figures with the national averages. The full report begins with some information on the school's composition, for example, the percentage from various ethnic groups and a comparison of pupils' prior attainment with the national pattern (schools with relatively high prior attainment would be expected to achieve better results). The report then provides contextual value added scores, first in a table, then in various charts.

FIGURE II. Contextual Value Added Key Stage 2 to 4: Overall



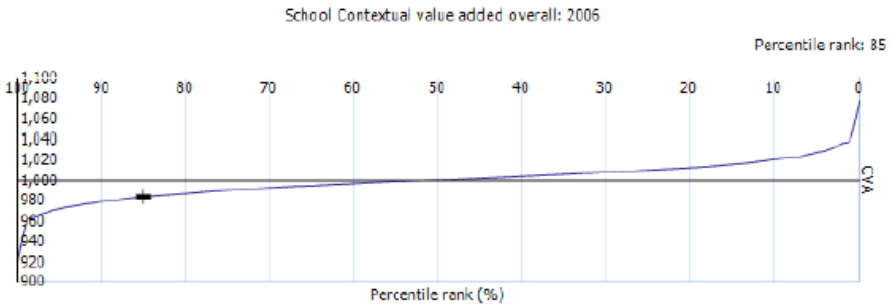
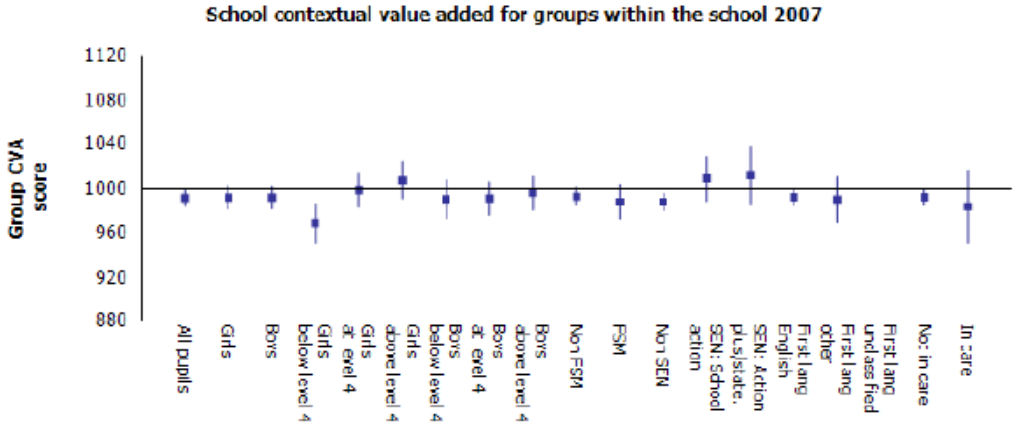


Figure II reproduces for an example school the three charts shown on one page of the full report. The charts show contextual value added in different years –similar charts are available for different subjects. The accompanying text explains 'this section provides the overall contextual value added measure for the school relative to the national mean of 1000. The school is placed within the national distribution to illustrate the range of CVA scores attained by other maintained mainstream schools. If the 95% confidence interval does not cross the national average line the school differs significantly from that national average'. The CVA for this school generally appears to be below average, although only clearly below in 2006. One of the key questions for measures that are based on only one cohort is whether year-on-year changes can really signify changes in school effectiveness? Here, for example, the user might seek to explain the apparent 'dip' in 2006 by considering the nature of the cohort or teaching in that year, or conclude that such a small difference is probably not educationally significant and focus on the broader issue of why the school is not above average in any year.

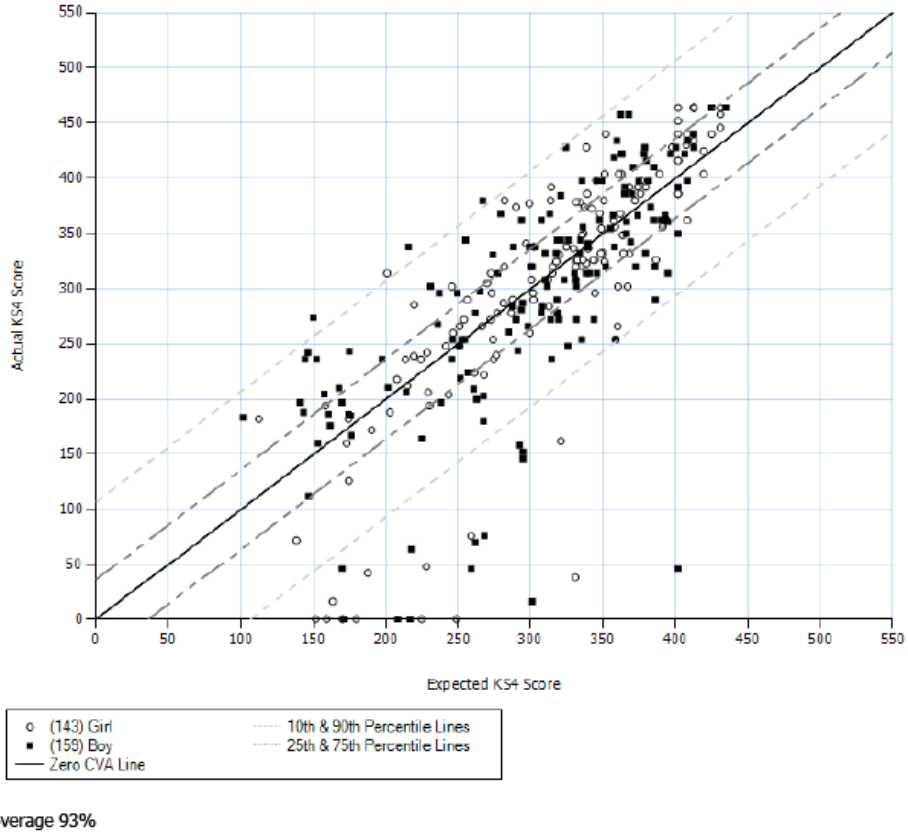
FIGURE III. Pupil Groups –overall CVA



RAISEonline also provides contextual value added for pupil subgroups within the school. Figure III reproduces an example chart from the full report. With subgroups of pupils it is important to recognise that small departures from the national average are unlikely to be statistically significant. This chart shows that girls with low prior attainment made significantly less progress than might be expected (there were 38 girls in this category).

Figure IV provides a third example of the use of contextual value added in RAISEonline. It compares actual results for individual pupils with the results that would be predicted by the regression model. The lines show the national average and the school can identify pupils whose results were higher or lower than expected. Within RAISEonline it is possible to click on one of the dots on this chart and the system will provide details on that particular pupil. The chart can also be 'filtered': it is possible to select a specific group such as pupils entitled to free school meals and RAISEonline will highlight those specific pupils on the chart.

FIGURE IV. CVA Key Stage 2-4: Overall, predicted versus actual for pupils (2007)



Coverage 93%

Other Uses of Value Added in School Improvement

In addition to the use schools, Ofsted and School Improvement Partners make of RAISEonline, the availability of value added statistics provides a powerful information resource for Local Authorities and central government to support a range of activities and initiatives. For example, it has been possible to identify apparently underperforming schools, using contextual value added, and provide targeted support through the RATL (Raising Achievement Transforming Learning) programme. The availability of value added results also provides useful information for monitoring progress in groups of schools subject to specific policies or administrative arrangements.

The annual publication of contextual value added in the School and College Achievement and Attainment Tables provides consistent accessible national data on the performance of schools, to inform parents and the public more generally, and ensure that schools are accountable for their results. The tables are resource intensive to produce accurately every year and are deliberately kept to a limited range of key indicators. Therefore, they do not, for example, provide the full range of results seen in RAISEonline –users are directed to Ofsted inspection reports for a fuller picture of a given school.

Although value added is not available nationally for the contribution made by individual teachers, it can be looked at within schools where the responsibility for teaching individual subjects is clear. Contextual value added can also contribute to school improvement through an indirect link with pay, since many individual classroom teachers have progressed to a higher pay scale through an accreditation progress. For this, they were required to provide evidence that as a result of their teaching, ‘their pupils achieve well relative to the pupils' prior attainment, making progress as good or better than similar pupils nationally’.

The value added models themselves also have a policy use, such as to demonstrate the relative importance of factors which impact on pupils' progress, and to show that the school effects are in fact a relatively small part of the total variation. Therefore, tackling achievement gaps must not simply focus on the worst performing schools but also needs to consider the underperformance *within* schools.

Conclusions

The availability of national testing data and, since 2002, information on the characteristics of individual pupils in all maintained schools, has allowed the English education system to develop various value added indicators for schools and groups of pupils within schools. These are now central to school improvement policies and provide important information for school inspectors, local and national government, parents and the wider public. RAISEonline provides a means of analysing these statistics and this paper has provided examples of the kind of analyses that this software package can now provide.

The experience in England has shown that value added measures can be developed and implemented and that these go some way beyond raw attainment measures in attempting to capture the contribution schools make to pupils' progress. However, the current system is new and there is still discussion about the best combinations of indicators for use in different situations and for different purposes. Aspects of the implementation in England may be recommended to other countries seeking to develop value added measures, such as the importance of piloting and evaluation, of consultation with schools and educational experts and of providing clear and transparent documentation and tools to help schools, and other users, understand the measures. The optimal model for use in a given country will depend on local circumstances and data.

References

DEPARMENT FOR CHILDREN, SCHOOLS AND FAMILIES/ QUALIFICATIONS AND CURRICULUM AUTHORITY, DfEE/QCA (1998). *The Autumn Package*. London: Department for Education and Employment.

— (2007). Schools and Pupils in England, January 2007 (Final). *Statistical First Release: SFR 30/2007*.

GOLDSTEIN, H. (2003). *Multilevel Statistical Models* (3rd edition). London: Arnold.

GOLDSTEIN, H., RASBASH, J., YANG, M., WOODHOUSE, G., PAN, H., NUTTALL, D. & THOMAS, S. (1993). A Multilevel Analysis of School Examination Results. *Oxford Review of Education*, 19, 425-433.

MORTIMORE, P., SAMMONS, P., STOLL, L., LEWIS, D. & ECOB, R. (1988). *School Matters: The Junior Years*. Wells: Open Books.

NATIONAL AUDIT OFFICE (2003). *Making a Difference: Performance of maintained secondary schools in England*. London: The Stationery Office.

RAY, A. (2006). *School Value Added Measures in England: A Paper for the OECD Project on the Development of Value-Added Models in Education Systems*. London: Department for education and Skills.

SCHOOL CURRICULUM AND ASSESSMENT AUTHORITY, (SCAA) (1994). *Value Added Performance Indicators for Schools*. London: School Curriculum and Assessment Authority.

TYMMS, P. & COE, R. (2003). Celebration of the Success of Distributed Research with Schools: The CEM Centre, Durham. *British Educational Research Journal*, 29, 639-653.

Electronic Resources

DCSF ACHIEVEMENT AND ATTAINMENT TABLES WEBSITE, de http://www.dcsf.gov.uk/performancetables
MLWin GUIDANCE, de http://www.mlwin.com/features/index.html
RAISE ONLINE WEBSITE, de https://www.raiseonline.org

Contact: Andrew Ray. Department for Children, Schools and Families. School Analysis and Research Division. Sanctuary Buildings. Great Smith St, London, SW1P 3BT, United Kingdom. E-mail: Andrew.RAY@dcsf.gsi.gov.uk

Table I The 2007 Key Stage 2-4 CVA regression model

Dependant variable = capped KS4 point score

-2logL = 6304400

Number of pupils = 563,908

Explanatory factor	Variable	Estimate	Std. Error
	Intercept	162.1	13.1
	KS2 student APS	-5.94	0.24
	KS2 APS (using fine grades) – squared	0.38	0.01
	KS2 English PS deviation	1.4	0.07
Prior attainment	KS2 Maths PS deviation	-0.11	0.07
Deprivation	Does student have FSM?	-22.9	0.33
Deprivation of pupil's local area	Deprivation indicator – IDACI score	-59.51	0.67
	Does student have SEN Statement/ Action Plus?	-65.76	0.38
Special Educational Needs	Does student have SEN – school action?	-34.37	0.31
In care	Has the student ever been in care at this school?	-27.1	1.17
	Student joined other than Jul/Aug/Sep?	-23.43	0.42
Mobility	Student joined within last 2 yrs?	-73.55	0.63
Gender	Is student female?	14.52	0.19
Age	Age within year	-12.94	0.3
Language	Is English not the student's first language?	-8.32	8.25

English as Additional Language * Prior Attainment	EAL interacted with prior attainment	4.93	0.68
	EAL interacted with prior attainment squared	-0.14	0.01
Ethnic group	White Irish	-3.61	1.56
	White Irish Traveller	-64.92	7.66
	White Gypsy/Roma	-54.15	5.25
	White Other	10.52	0.79
	Mixed White/Black Caribbean	-3.08	1.03
	Mixed White/Black African	8.03	2.19
	Mixed White/Asian	10.81	1.38
	Any other Mixed ethnic group	6.03	1.08
	Indian	24.08	0.83
	Pakistani	17.53	0.92
	Bangladeshi	22.91	1.47
	Any other Asian ethnic group	24.76	1.35
	Black Caribbean	13.31	0.9
	Black African	29.19	1.04
	Any other Black ethnic group	11.16	1.62
	Chinese	32.78	1.77
	Any other ethnic group	20.68	1.39
	Unclassified ethnic group	-7.42	0.74
Ethnic group * FSM	White Irish and FSM	2.56	4.04
	White Irish traveller and FSM	11.36	11.98
	White Gypsy/Roma and FSM	25.62	7.79
	White other and FSM	26.53	1.79
	Mixed White/Black Caribbean and FSM	8.46	2.08
	Mixed White/Black African and FSM	3.87	4.46
	Mixed White/Asian and FSM	8.27	3.54
	Any other Mixed ethnic group and FSM	11.24	2.48
	Indian and FSM	16.04	1.94
	Pakistani and FSM	17.3	1.24

	Bangladeshi and FSM	19.48	1.89
	Any other Asian ethnic group and FSM	24.71	2.87
	Black Caribbean and FSM	18.2	1.79
	Black African and FSM	20.46	1.65
	Any other Black ethnic group and FSM	8.69	3.19
	Chinese and FSM	34.11	5.12
	Any other ethnic group and FSM	30.83	2.32
	Unclassified ethnic group and FSM	7.14	1.95
Level of school prior attainment	School KS3 APS (using fine grades) for CVA	1.96	0.36
Spread of school prior attainment	School std dev of KS3 APS for CVA	-4.82	0.92

Random components:	**Estimate**	**Std. Error**
Between school variance	319.42	8.77
Within school variance	4135.6	7.81
Variance partition coefficient	0.08	