

Public service productivity: Education

UK Centre for the Measurement of Government Activity
Office for National Statistics

This article first shows the estimated change in productivity in public expenditure on Education from 1995 to 2004, consistent with the figures in the current National Accounts. Recognising that further progress in improving the measurement of output is needed, the article goes on to look at the productivity estimates implied by the new methodologies for measuring output published by DfES on 14 October 2005.

The article also presents a wider set of evidence that helps build up an overall picture of Education performance. The article is based on the latest information available to the Office for National Statistics (ONS); as more data become available estimates of output and productivity will be updated. This is the second article in the Public Service Productivity Series following the Health Productivity article published in October 2004.

Key findings

- Education productivity is estimated by dividing Education outputs by Education inputs. Key to this calculation is the appropriate quality adjustment of outputs and the deflation of inputs.
- Education outputs and inputs have been increasing over 1995 to 2004. Using currently published National Accounts data on Education outputs and figures for deflated inputs based on improved methodology, Education productivity has been falling since 1995 but less markedly since 2002.
- Productivity figures are also presented using new measures of output designed to take better account of quality changes. These are based on educational attainment as measured by GCSE results and on progress between the four Key Stages in the education system (in England).
- Another factor is the value of Education output which is increasing over time because of rising real earnings in the economy. The Atkinson Review recommended adjusting for this, though suggested this should be used cautiously pending further debate. Accordingly the article presents estimates both with and without this adjustment.
- The estimates of productivity need to be interpreted with caution. They are sensitive to the quality adjustment of Education outputs and there are many Education outcomes for which there is currently no quality adjustment factor.
- However, on the measures presented here, productivity growth could have averaged around +2 per cent a year since 1998 on the methodology giving the highest estimates. The methodology giving the lowest growth estimates suggests productivity could have fallen by around -2 per cent a year over the same period.
- Finally, estimates of productivity also need to be interpreted alongside other forms of corroborative evidence on the inputs, outputs and outcomes. It is unlikely that a single number for productivity will ever capture all the costs and benefits of the education sector.

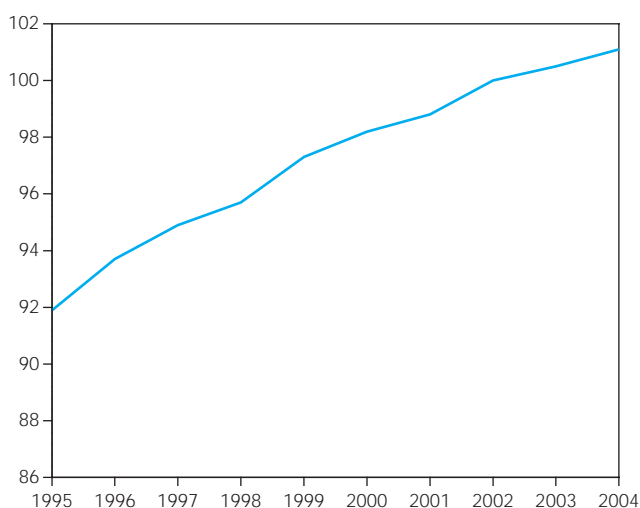
1. Executive summary

1.1 This article examines the change in output and productivity of government expenditure on Education. It is the second article in a new series on Public Service Productivity following a Health article published in October 2004. The articles explore public service productivity within the context of the National Accounts, providing a more detailed picture of output, inputs and productivity than the National Accounts themselves.

1.2 Education productivity is measured as the ratio of Education outputs to Education inputs. Outputs and outcomes are best defined together. Outcomes are the improvements in the educational status of the population, widely defined. Not all of such improvements, even where they can be measured are directly attributable to the public Education Service; they will also depend upon other features such as parental attitude and input, and social circumstances. These improvements in outcomes which, however, can be directly attributed to the Education Service constitute its output. From 1995 to 2004, Education output,¹ as measured in the National Accounts, grew by an annual average of around 1 per cent. The changes in output are presented in Figure 1.

Figure 1
General government Education output: chained volume measure

UK, Index 2002=100

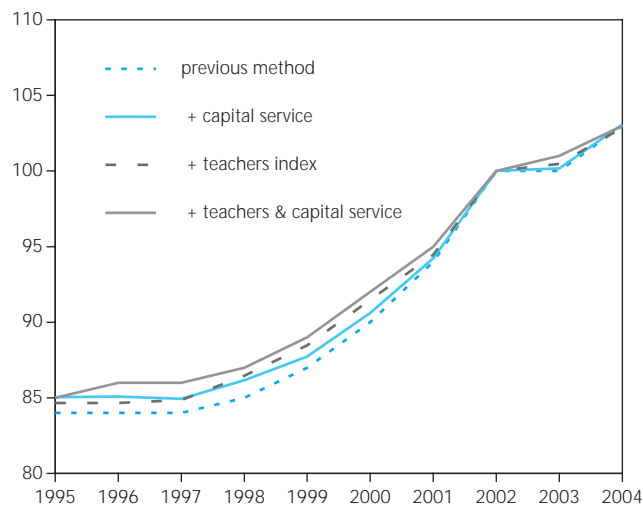


Source: National Accounts, Office for National Statistics

1.3 Deflating published government expenditure at current prices² to account for pay and price increases provides a volume measure of input change over time. Several estimates of deflated inputs are provided in this article to reflect the impact of using new deflators and new measures of capital. The resulting estimates on the various methods, described in more detail in the main text, are shown in Figure 2. They are relatively insensitive to the exact methodology used. Figure 2 shows that the volume of inputs, from 1995 to 2004, is estimated to have increased by an average of around 2 per cent annually.

Figure 2
Education input measures, 1995–2004

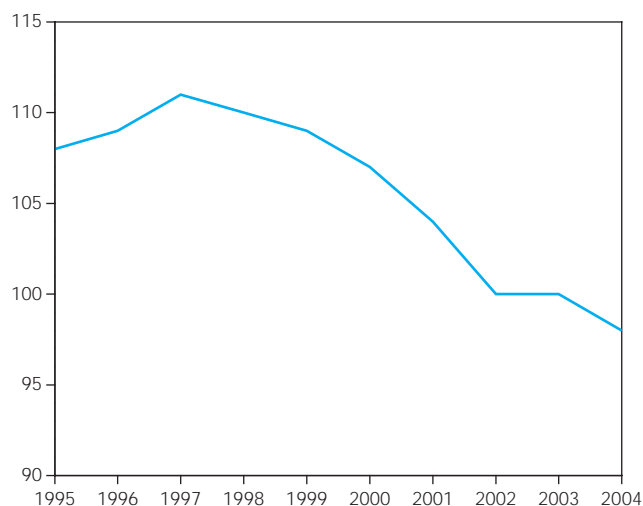
UK, Index 2002=100



Source: Office for National Statistics

Figure 3
Education productivity measure, 1995–2004

UK, Index 2002=100



Source: Office for National Statistics

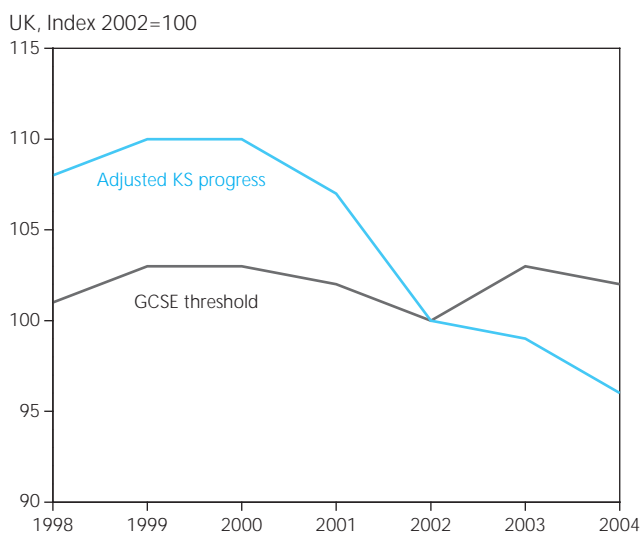
1.4 Productivity is estimated by dividing the output figures by the input figures. Annual changes in this ratio provide annual changes in productivity. Using the output measure published in the National Accounts and the input measure deflated using new estimates of teachers' pay and use of capital, Figure 3 shows a productivity change over the period averaging around -1 per cent per year.

1.5 These estimates, however, need to be heavily qualified. The Atkinson Review of *Measurement of Government Output and Productivity for the National Accounts* recommended that any direct measures of government output needed to capture adequately the changing quality of the output. This is a complex process and still undergoing development. A key challenge is how to quantify Education outcomes, the ultimate results aimed at from education, that are directly due to the Education outputs and how this impacts on output growth.

- 1.6 The current quality adjustment measure published in the National Accounts is based on the trend in General Certificate of Secondary Education (GCSE) results over several years in the mid-1990s which has not been updated. This needs updating and revising, particularly as recent GCSE results show continued improvement over the period 1995 to 2004. In 2004, 52 per cent of pupils in England gained five or more GCSEs (or equivalent) at grades A* to C, compared with 40 per cent in 1995.
- 1.7 Moreover, there are further benefits to education than just pupil attainment. The economic benefits include increased income from higher employment and wages, and education helps build human capital. There are wider benefits: education provides social and communication skills, special provision for special needs pupils, counselling for pupils, home work clubs, sports and art activities, healthier lifestyles and a better quality of life. Schools also provide child care provision for pupils during school hours as well as care and wider emotional support and training. In addition, Education Services are likely to produce lower costs to the NHS from healthier lifestyles and to the criminal justice system, as educated people are less likely to commit crime. However, many of these outcomes are also in part due to factors outside the Education Services, for example, socio-economic status of pupils, the environment, demography, parents' education, parental interest, and private tuition.
- 1.8 This article examines the use of new measures of quality of output, using GCSE results and progress between the four Key Stages of the English compulsory education system. When more measures become available on the benefits of education and how these have been directly influenced by Education outputs, it is hoped that these can be taken more fully into account in the analysis.
- 1.9 A key consideration is the weight to be given to the fact that educational attainment becomes increasingly valuable in a growing and increasingly productive economy. The Atkinson Review recommended that the Office for National Statistics (ONS) should give serious consideration to adjusting the output estimate to account for the trend rate at which real earnings have risen. The Atkinson Review felt that to ignore this effect would miss an important contribution to public output (paragraph 9.34 Atkinson Review Final Report).
- 1.10 At the same time, Atkinson recommended caution in implementing this recommendation before ensuring that the underlying principle receives wide support. ONS will be working with the Department for Education and Skills (DfES) to consult on this point specifically, in the context of wider discussion on improving the measurement of Education output. Consequently, this article presents productivity estimates both with and without the real earnings adjustment Atkinson proposed.

- 1.11 Without the earnings adjustment, productivity growth would be as indicated in Figure 4. The range of estimates is equivalent to productivity having changed by -2 per cent a year on average at the bottom end or having remained fairly constant on average, during 1998 to 2004.

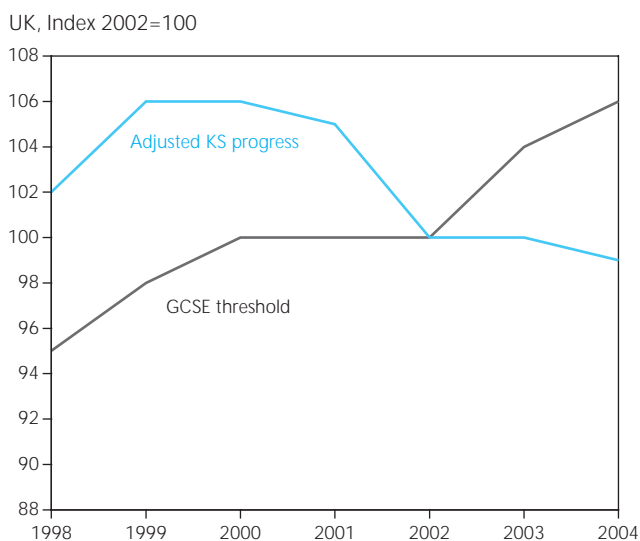
Figure 4
New measures of Education productivity, 1998–2004: no adjustment for earnings growth



Source: Office for National Statistics/Department for Education and Skills

- 1.12 With allowance for the earnings effect, using a rate of 1.5 per cent – the Atkinson Review estimate of the trend in real earnings growth – productivity would be estimated to have evolved as in Figure 5. These estimates are equivalent to productivity having changed within the range of around +2 per cent at the upper end and around -0.5 per cent a year on average during 1998 to 2004 at the bottom end.

Figure 5
Earnings adjusted measures of productivity, 1998–2004



Source: Office for National Statistics

1.13 It is important to recognise there is still debate about certain aspects of the estimates of Education outputs and inputs, namely the:

- use of final GCSE results as an appropriate quality adjustment of outputs
- future changes to the examination system and targets
- assumptions used in pupil progress measures needs further investigation
- appropriate measures of 'value added' need further research
- deflators currently used for expenditure on pay and goods and services
- measure of input for capital using capital consumption (depreciation) or capital services (rent)
- impact related to the real earnings growth in the Education output measure needs more consideration and corroborative research and evidence.

1.14 The Atkinson Review also advised that independent corroborative evidence should be sought on government productivity, as part of a process of 'triangulation'. This is because no single estimate of productivity can ever tell the complete story on the relationship between inputs, outputs and outcomes. This article therefore presents additional information on Education activity, outputs and outcomes to provide further context for interpreting the estimates of productivity change, for example, recent statistics on average class size, Ofsted inspections, and public assessments. The evidence gleaned from these sources of information should be considered alongside the productivity estimates provided in this article.

1.15 Finally, ONS must stress the difficulties associated with the measurement of productivity, particularly in the public sector. ONS and the wider international community recognise that significant analytical work is still needed to make progress in this area. With this in mind, this opening article on Education sets the scene in terms of the statistical information currently available. Future Education productivity articles will continue to bring sources together in a way that continually improves understanding of Education Services productivity.

2. Introduction

2.1 Education is the second largest area of Government spending on public services, following Health. In 2004, Current Expenditure³ is estimated at £42 billion. ONS publishes aggregate estimates of government expenditure in *UK National Accounts: the Blue Book*. These estimates form the basis for this article, and are complemented by other sources of information. Whilst

General Government (GG) Education Services covers the whole of the UK, this Education article concentrates on English schools. Future Education productivity articles will extend the analysis to include all GG Education Services in the UK.

2.2 DfES is responsible for education in England. The department states that its aim is 'to help build a competitive economy and inclusive society by creating opportunities for everyone to develop their learning; releasing potential in people to make the most of themselves; and achieving excellence in standards of education and levels of skills'.

2.3 The focus of this article is on the productivity associated with the money spent, by central and local government, in providing Education Services to the public. Productivity is estimated using National Accounts data on outputs and inputs between 1995 and 2004. A discussion of these data and measures is also provided. In addition, productivity measurement is shown in the context of wider information on Education spending and outcomes as recommended by the *Atkinson Review: Final Report, Measurement of Government Output and Productivity for the National Accounts* published in January 2005.

2.4 ONS has drawn this material together from a wide range of sources, complemented by expert advice,⁴ according to the principles set out in the National Statistics Code of Practice, particularly regarding relevance, fitness for purpose and production with integrity in the interests of all.

2.5 In compiling estimates of Education productivity, ONS has aimed for conformity with international guidance, in particular, the Organisation for Economic Co-operation and Development in *Measuring Productivity* (OECD, 2001); and Eurostat in the *Handbook on price and volume measures in national accounts* (Eurostat, 2001).

2.6 The rest of this article is as follows:

- Section 3 covers Education output measurement
- Section 4 considers Education outcomes
- Section 5 considers alternative ways to measure quality of Education output
- Section 6 provides alternative ways to measure Education inputs
- Section 7 presents the results for estimates of Education productivity
- Section 8 provides further evidence to support the process of 'triangulation' to corroborate the measures of output, input and productivity, and the work of government in improving the quality of education
- Section 9 sets out the next steps to be taken in developing Education productivity analysis.

3. Education output in the National Accounts

General government Education Services

- 3.1 Total Education includes government and private schools, nursery schools, Further Education (FE) and Higher Education (HE). This article examines only those areas of Education Services provided or paid by central and local government, which is approximately 70 per cent of total Education expenditure. Education funded through grants and transfers, FE and HE institutions are excluded (a fuller description of the range of Education Services is provided in the glossary).
- 3.2 General Government expenditure on Education is classified as expenditure by local and central government to provide, or pay for, Education Services in the United Kingdom. This includes government purchases from the public and private sector. The classification includes: government maintained schools and nursery schools, publicly funded nursery places, NHS expenditure on higher education for health professionals and education expenditure on Initial Teacher Training (ITT) courses.
- 3.3 Table 1 shows the percentage of spend on GG Education Services by type of activity or institution. Most expenditure is on maintained schools so this provides a focus of investigation into quality and outcomes in later sections of the article.

Table 1
Percentage of general government expenditure on Education by type of activity

UK, 2002

General Government Expenditure	Percentage of total
Government maintained schools:	
Secondary	43.4
Primary	41.3
Special	6.4
Nursery schools and classes	5.7
City Technology Colleges (CTC) & City Academies (CA)	0.4
Government funded HE courses:	
Health Professional Courses	1.6
Initial Teacher Training (ITT)	0.6
Government funded private nursery places:	
Private, Voluntary, Independent (PVI) Nursery	0.7
Total	100.0

Source: Office for National Statistics

National Accounts volume measure, 1995–2004

- 3.4 Prior to 1998, the methodology used to measure the volume of Education outputs was based on the assumption that outputs can be estimated as the sum of input costs. This methodology therefore assumed there was no change in productivity over time.
- 3.5 Direct measurement of government Education output (GGFCE⁵) was introduced into the National Accounts in 1998 and then backdated to 1986. The measure relates to the output of the Education Services for England, Wales, Scotland and Northern Ireland. Initially, the output measure used was the number of pupils, with an adjustment of 0.25 per cent each year for quality based on GCSE exam success. Since then the quality adjustment has not been changed and further work is under way to update and improve this methodology. This section examines the estimate of change in Education output over the period 1995 to 2004.
- 3.6 Changes to the original direct measure of Education output include Higher Education courses for health professionals, purchased by the National Health Service (NHS), included in 2004; and in 2005, implementing the recommendations from the Atkinson Review⁶ (see Box 1).

Box 1

Atkinson Review recommendations

Recommendation 9.1 We recommend that pupil attendance, rather than the number of pupils, should be used as the volume measure of output, and that school cost weights should be updated annually.	Implemented in National Accounts 2005.
Recommendation 9.2 We recommend that ONS should update and revise the quality adjustment factor for schools, using later information about GCSE results, and if possible also information from all parts of the UK.	Ongoing review, no change to National Accounts.
Recommendation 9.3 We recommend that ONS and the four Education departments should continue to work on a longer term revision of the quality adjustment for the schools output measure. This should take full account of results from throughout the UK, measure if possible the quality of education delivered at younger ages rather than relying on examinations at age 16 to proxy the whole Education output, include information about attainment of school pupils who are 16 and over, and consider an adjustment to reflect the value of education for future earnings. We regard the sources of information on quality of teaching and class size as useful for assessment in productivity articles rather than the National Accounts measure.	Ongoing review, no change to National Accounts.

Recommendation 9.4 We recommend that ONS should introduce a new output measure for Initial Teacher Training courses, using a cost weighted index of student numbers. This should, as soon as possible, include information from the Devolved Administrations, and further work should be done to develop a quality measure.	A new output measure for ITT has been introduced, based on the number of students. Rest of UK included when possible.
Recommendation 9.5 We recommend that the health professional Education output measure is updated by using total student numbers, cost weighted by type of course, with UK data added as soon as possible, and working towards a quality adjustment based on Quality Assurance Agency for Higher Education or Higher Education Statistics Agency information.	Output measure implemented in National Accounts 2005, no quality adjustment. Rest of UK included when possible.
Recommendation 9.6 We recommend that a new output measure should be introduced for publicly funded private nursery places, including inclusion of information for all parts of the UK and consideration of how to develop a quality measure.	Output measure implemented in National Accounts 2005, no quality adjustment. Rest of UK included when possible.
Recommendation 9.7 We recommend that ONS and the four Education departments should continue to work together to improve accuracy, timeliness and classification of figures for Education spending, and suitable deflators to measure volume of spending in a way which takes account of changes in the quality of inputs.	Ongoing review.
Recommendation 9.8 We recommend that ONS and the four Education departments should continue to work together on analysis of Education output and productivity change, using National Accounts and other sources, to be published in ONS productivity articles and through development of a satellite account for human capital resource formation.	Ongoing review and future development needed. First productivity article.

3.7 The changes that are incorporated in National Accounts *Blue Book* 2005 (BB05) were pre-announced in May 2005, together with the impact of the revisions, in the ONS article 'Improvements in the methodology for measuring government output'.⁷ The changes, backdated to 1995, both widen the coverage and improve the methodology to the existing volume measure of Education and can be summarised as follows:

- Previously, pupil numbers had been used to measure Education output. This is now changed to pupil attendance, on the basis that this is a better measure of pupils being taught in schools.
- The output of educational training of health care staff is improved by including all students. Previously, it had been based on new entrants only. The coverage by type of course and unit cost weights is also improved.
- An output measure is included for government-procured places within private nurseries, based on the number of places filled.
- An output measure is included for Initial Teacher Training (ITT), based on the number of students.
- An output measure is included for City Academies and City Technology Colleges. These are schools classified to the central government sector.
- Scotland and Northern Ireland data are included when possible, where previously England was used as a proxy for UK.

3.8 A number of shortcomings and recommendations not yet implemented remain. The main outstanding issue is the need to revise the quality adjustment of output estimates. The current school quality measure is based on England GCSE exam results, which is then used as a proxy for UK. Actual exam results for Scotland, Wales and Northern Ireland therefore need to be included. Also, there is no quality adjustment measure for the nursery and adult Education outputs.

Measurement of general government Education Services

3.9 The National Accounts Education output figures 1995 to 2004 used in this article are those published in July 2005. The volume measure is constructed by direct output measures, principally of government maintained primary, secondary and special schools, but also nursery schools, under-five provision, Initial Teacher Training and Health Professional courses (Table 2). A quality adjustment based on GCSE exam success is applied to schools. The outputs of these activities are added together and each type of school or course is weighted by cost, producing a cost-weighted index of direct output measures for Education.

Table 2
Education output measures

UK

Government Expenditure on:	Volume Measure used:
Schools	Pupil Attendance Quality Adjustment
Nursery Schools and Classes	Pupil Numbers (fte ¹)
Nursery free places	Number of places filled
ITT ²	Number of students
Health Professional Courses	Number of students

1 fte: full-time equivalent pupil numbers

2 ITT: Initial Teacher Training courses

Source: Office for National Statistics

Trends in pupil numbers, absence and attendance

3.10 In this article, and in the National Accounts published in 2005, the volume measure of output for schools is based on pupil attendance. Previously, the output measure was based on full-time equivalent (fte) pupil numbers. The change is made in line with international guidelines⁸ on the basis that this provides a better measure of pupils who are being taught in school. The measurement of pupil attendance is derived from information collected on pupil numbers and total pupil absence, authorised and unauthorised.

3.11 Over the period 1995 to 2004, the total number of pupils in UK government maintained schools (primary, secondary, nursery and special schools) has increased by 2 per cent. However, in the last three years total numbers have started to decline, by 0.5 per cent in the latest year. This is due to the decline in primary school numbers, pupil numbers in secondary schools continue to increase. Over the period from 1995 to 2004, pupil absence levels have fluctuated from one year to the next but have fallen overall. Pupil attendance, therefore, has

Table 3
Index for pupil numbers (fte) and attendance

UK, 1995/96–2003/04

Index 2002/03=100

Academic year	Number		Attendance	
	Index	Change on last year (per cent)	Index	Change on last year (per cent)
1995/06	97.6	0.0	96.8	0.0
1996/07	98.5	0.9	98.0	1.3
1997/08	99.1	0.7	98.6	0.6
1998/09	99.5	0.4	99.3	0.7
1999/00	100.0	0.5	100.0	0.8
2000/01	100.2	0.2	99.8	-0.3
2001/02	100.2	-0.1	100.0	0.2
2002/03	100.0	-0.2	100.0	0.0
2003/04	99.6	-0.5	99.8	-0.2
Change 2003/04 on 1995/06 (per cent)		2.0	3.1	

Source: Office for National Statistics

increased at a slightly greater rate than pupil numbers, increasing over the period by 3 per cent for the UK. Table 3 shows the annual trends.

Quality adjustment

3.12 In 1998, when Education was first estimated by direct measures, a quality adjustment to the volume measure of output was included. Its basis is that the quality of Educational Services delivered can be proxied by exam success. Based on the trend in GCSE results over several years in the mid-1990s, an estimated quality improvement of 0.25 per cent has been added each year to primary and secondary school measures. Table 4 (as provided in the executive summary as a chart) shows the volume measure published in National Accounts.

Table 4
General government Education output: volume and growth rates (Chained volume measure index)

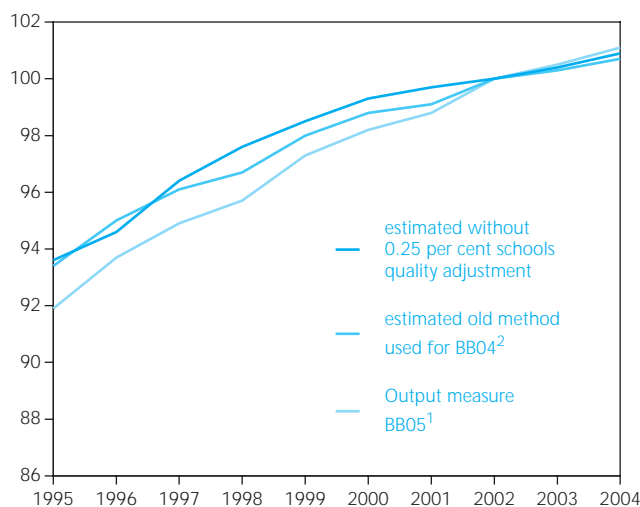
UK, 1995–2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total growth (per cent) 1995–2004
Volume of GG Education output index (2002=100)	91.9	93.7	94.9	95.7	97.3	98.2	98.8	100.0	100.5	101.1	10.0
Growth in GG Education output (per cent)	1.9	1.3	0.9	1.6	1.0	0.6	1.2	0.5	0.6		

Source: National Accounts, Office for National Statistics

Figure 6
Education output measure, 1995–2004

UK, Index 2002=100



1 BB05 refers to UK National Accounts Blue Book 2005

2 BB04 refers to UK National Accounts Blue Book 2004

Source: Office for National Statistics

3.13 For comparison, Figure 6 shows the Education output measure without the quality adjustment and the measure that would have been used if the 2005 revisions had not been made.

3.14 The quality adjustment has been added each year, but the estimate of 0.25 per cent has not been updated. The Atkinson Review recommended that any direct measures of government output needed to capture more adequately the changing quality of the output. DfES and ONS have been examining ways to update and improve the measure of quality. Section 5 reports on the work published by DfES which looks at various ways to measure the quality of school output for England. Future work by ONS will also investigate using full UK data and extending the measurement of quality adjustment in the outputs.

4. Education outcomes

4.1 Education systems aim to improve the level of education of the population and government aims to achieve this outcome through expenditure on Education Services.

4.2 Immediate benefits stemming from qualifications provided by the education system are economic rewards such as better employment opportunities and higher wages. Outcomes from Education Services include also a variety of wider benefits accruing to society. Among the activities carried out by education systems are, for example, sports, non-exam education, social and communication skills, art, music and drama, special provision for special needs pupils, counselling for pupils, and home work clubs. Schools also provide a range of functions: tuition, care and wider emotional support and training that help pupils become productive adults. They also deliver secondary services,

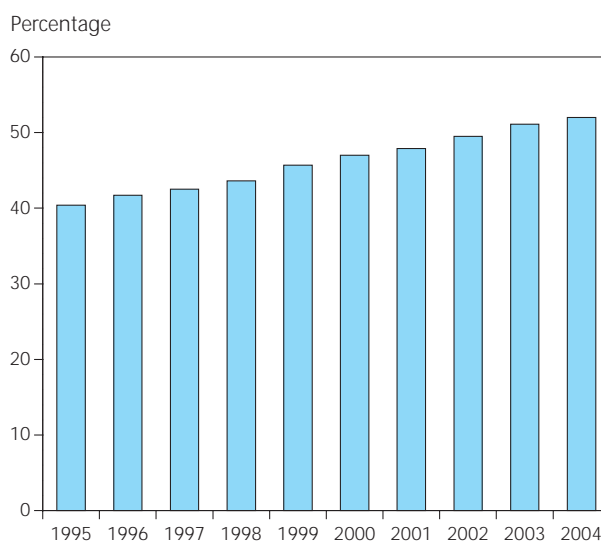
in particular child-care provision for pupils during school hours. All these activities can deliver wider benefits, for example, a healthier lifestyle and better quality of life, lower levels of crime, which in turn can lead to lower costs to the NHS and the criminal justice system. All these activities are delivered in government maintained schools using school resources financed by general government expenditure and are not reflected in the measured output.

4.3 In order to understand more fully the productivity of Education Services, it is useful to consider the outcomes that Education Services activities are designed to achieve. In the DfES publication *Every Child Matters: Change for Children in Schools (2004)*, the department states that 'Pupil performance and well-being go hand in hand.' and aims towards 'helping each pupil achieve the highest educational standards they possibly can.' This section sets out some information on Education outcomes that the education system is targeting. The following is a brief review of key England Education outcomes – it is not intended to be comprehensive – as measured by pupil attainment and pupil attendance.

4.4 *Pupil attainment.* DfES, ONS and other authorities publish a range of education statistics which can provide contextual information on Education productivity. Achievement in GCSE results is a key measure and has improved each year. Figure 7 shows the trend for GCSE results in England from 1995 to 2004. The percentage of pupils achieving 5+ A* to C grades has increased steadily, from 40 per cent to 52 per cent over the nine years. Figure 8 shows that GCSE Average Point Scores (APS) have also increased, from 34 points to 41 points over the period.

Figure 7
GCSE trend, percentage of pupils achieving 5+ A* to C grades¹

England, 1995–2004

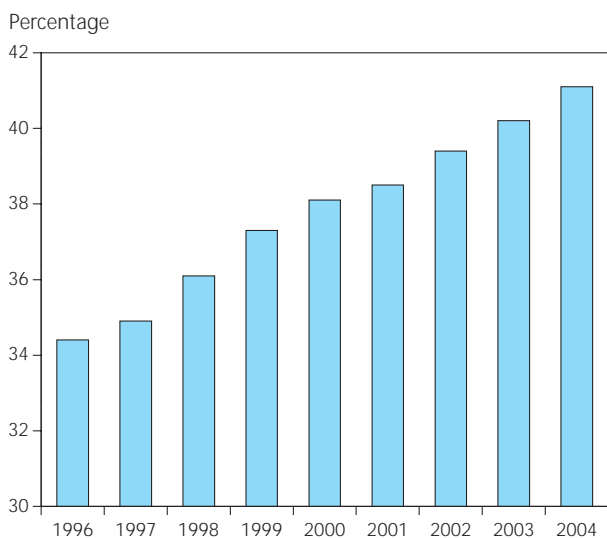


1 Figures for 2004 are for GCSE and Equivalent qualifications. Figures for 2003 and before are for GCSE and GNVQ only. Figure for maintained schools includes LEA maintained schools, CTCs and, from 2003 onwards, Academies

Source: Department for Education and Skills

Figure 8
GCSE trend, Uncapped average point score per pupil at GCSE and GNVQ¹

England, 1995–2004



¹ Uncapped APS includes all GCSE results. Figures are for GCSE and GNVQ only. Figures for 2004 were also published on a new points score basis that included approved equivalent qualifications. Maintained schools includes LEA maintained schools, CTCs and, from 2003 onwards, Academies. Average Point Score per pupil was not published in 1995.

Source: Department for Education and Skills

4.5 Key stage test results from 1998 to 2004 are shown in Table 5. The three tests show similar patterns in the average point scores over the years, with a low but steady increase. (For information on Key Stages, see paragraph 5.10).

Table 5
Key Stage 1, 2 and 3 test results

England, 1998–2004

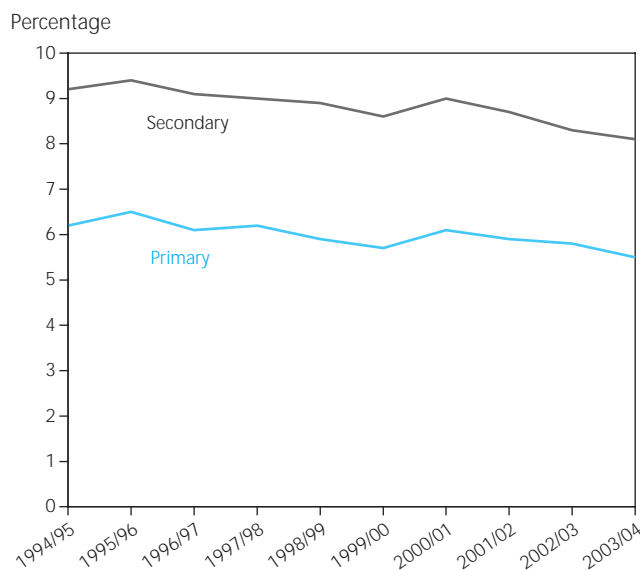
Year	Average point score		
	KS1 attainment	KS2 attainment	KS3 attainment
1998	14.6	25.6	32.5
1999	14.9	26.6	32.4
2000	15.2	27.2	32.9
2001	15.4	27.2	33.5
2002	15.5	27.3	33.8
2003	15.5	27.3	34.3
2004	15.5	27.5	34.1

Source: Department for Education and Skills

4.6 *Pupil attendance:* Reducing pupil absence is another key issue. One of the 2004 PSA targets is to improve levels of school attendance so that by 2008, school absence is reduced by 8 per cent compared to 2003. Figure 9 shows pupil absence rates at maintained schools over the past nine years. The figure shows absence has fluctuated up and down over the years but improvements in the last three years have taken absence in 2004 to the lowest levels since 1995. The Education Service has contributed to these improved outcomes but, in part, they may also be due to external factors such as improved social conditions, greater parental interest, out of school education and other changes.

Figure 9
Absence trends

England, 1994/95–2003/04



Source: Department for Education and Skills

4.7 To conclude this section, a final remark on the complexity of Education outcomes is in order. On the one hand, government expenditure in Education contributes to wider benefits than increasing the general level of education and exam results, such as healthier lifestyle and better quality of life. On the other hand, there are a number of factors in addition to government expenditure in Education Services which ultimately affect those wider benefits.

5. Measuring the quality of Education

Guidelines for quality measures

5.1 The Atkinson Review set out five principles to be applied in the measurement of government outputs.⁹ One of these stated that the output of the government sector should be measured in a way that is adjusted for quality. The Eurostat Handbook on price and volume measurement acknowledges the practical difficulty in defining a unit of output. It also recognises the problem of distinguishing output from outcome. The Handbook provides guidance for measuring Education output, stating that it can be defined as ‘the quantity of teaching received by the students, adjusted to allow for the qualities of the services provided, for each type of education’. The guidance recognises a number of possible indicators based on ‘outcome’ and ‘output’ measures of quality could be used. However, no single recommended method to adjust for quality is made as different education systems can lead to different models for taking quality properly into account.

Quality measures

5.2 DfES and ONS have examined the potential for using alternative approaches for measuring quality, based on:

- quality of teaching assessments
- class size
- pupil attainment

5.3 Arguments against using teaching assessments or class size are discussed below. Pupil attainment is considered to be the most appropriate measure of Education output.

5.4 One hypothesis is that quality of teaching could be measured through school inspections. In England, this would mean using the quality judgements made about schools in inspections undertaken by the Office for Standards in Education (Ofsted). An advantage of this approach is that inspections cover all aspects of education, not just examination scores. However, there are difficulties using Ofsted results. The inspections are not designed with the intention of producing national results suitable for National Accounts long time series. As Ofsted often reviews and changes its inspection procedures, this makes longer term comparisons difficult.

5.5 An alternative approach for measuring quality in education might be to use class size, or an adult/pupil ratio, on the assumption that the smaller the teacher/pupil or adult/pupil ratio the better the quality of learning. However, clear evidence of these relationships would have to be established, which does not currently seem to be the case.

5.6 The effectiveness of reducing class size is the subject of ongoing debate. There is considerable academic research and literature devoted to the subject internationally. Testing for class size effects is a complex problem; different approaches to modelling and lack of good data can lead to different conclusions. Papers by Krueger, Hanushek, Dustmann, Todd and Wolpin published in the *Economic Journal* 2003 (volume 13) highlight the debate on examining the effect of class size. Krueger and Hanushek, two economists in the US, form different views based on their research. Hanushek argues no strong or consistent relationship between school inputs and student performance. In contrast, Krueger's research, based on the STAR¹⁰ experiment, indicates an effect of changes in class size. Results from the experiment on 11,600 students showed primary school pupils in a class size of 12 performed better than a class size of 24. However, these results relate to large changes in class size.

5.7 Modelling the relationship between school inputs, such as class size, and pupil achievements, known as the Education Production Function (EPF), is an area of considerable interest and research. Todd and Wolpin considered methods for specifying and modelling

the EPF. They conclude that the variety of modelling specifications and data limitations can create different conclusions. Dustmann concludes that the evidence seems ambiguous; 'shortcomings of data sources and the lack of a unified conceptual framework' are partly responsible for inconclusive results on class size effects and outcomes from non-experimental studies may be misleading. The current conclusion from research is that large changes in class size have the potential to impact on pupil attainment. For smaller changes, however, the effect may not be material.

5.8 Work in the UK looking at small changes in class sizes generally does not show enough variation for significant effect. DfES studies of maintained schools in England conducted after 1998 take the issues outlined above into account. Their evidence suggests that class size effects may differ according to the year group of the class, and the pupil's ability, as well as the subject taught. An example where class size effects were evident was progress in literacy and maths in reception, with children in smaller classes making more progress than children in larger classes.

5.9 The Atkinson Review recommended (Recommendation 9.3) that ONS and the four Education departments should continue to work on a longer-term revision of quality adjustment for the schools output measure. The review regards the sources of information on quality of teaching and class size as useful for a wider assessment in productivity articles rather than for use in the direct construction of the National Accounts measure. They also provide an important alternative source of evidence of output and productivity which is discussed in Section 8 on triangulation.

5.10 DfES has focused to date on quality adjustment indicators mainly relating to the attainment of pupils in GCSEs and the Key Stage¹¹ tests that are taken at four stages of the compulsory education phase. Several methods have been considered and published in a discussion paper on the DfES website¹² and are summarised here. DfES compares alternative quality-adjustment measures and examines a valuation of Education output in monetary terms. The work described in this article could usefully form the basis for a public discussion to inform a measure that ONS could use in the longer-term.

5.11 DfES considers the following alternative ways of measuring quality using pupil attainment:

Pupil Attainment at GCSE

- Method 1: proportion of GCSE pupils who achieve a threshold level of attainment, taken to be 5 or more A*-C grades
- Method 2: GCSE average point scores (APS)

Pupil progress between Key Stages:

- Method 3: pupils' progress between each of the four Key Stages of the English compulsory education system
- Method 4: adjusted pupils' progress between each of the four Key Stages

ONS and DfES recognise the advantages and drawbacks for each method.

GCSE attainment at the end of compulsory schooling

- 5.12 The main advantage of using Methods 1 and 2 is that they can make use of the long-term trend available for GCSE results. Also, the methods are relatively simple to use, the methodology and data will be transparent and easier for all UK countries to implement. But a concern with using Methods 1 and 2 is that these result in measuring only one of the eleven cohorts of pupils in any year and is only obtained at the end of 11 years compulsory education. Ideally, it is better to have a measure that captures the progress made by all pupils in education in any given year.

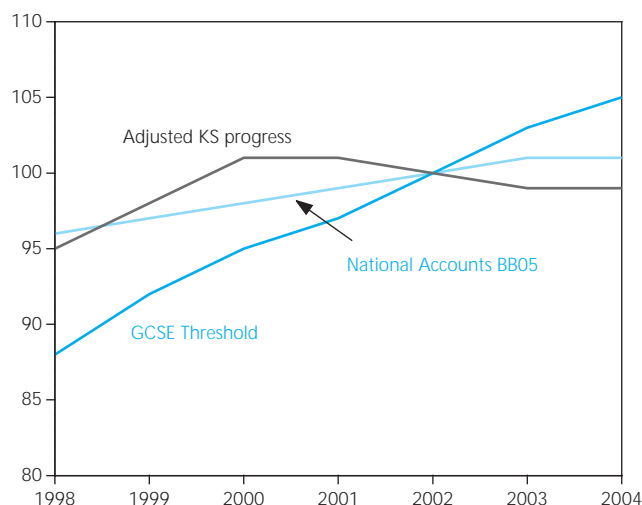
Progress between Key Stages of the education system

- 5.13 An alternative quality adjustment approach is to measure progress at the end of the four Key Stages of compulsory education. The pupil progress method calculates the output of the education system by measuring the progress made by each cohort between the beginning and the end of each Key Stage. Method 3 is a measure of progress derived from the difference between the average points score for a cohort of pupils at one Key Stage and their average points score at the next Key Stage. Method 4 provides one further step, where total progress made at the end of a Key Stage are apportioned back to each year of that Key Stage.
- 5.14 However, whilst Key Stage progress Methods 3 and 4 have possible advantages over Methods 1 and 2, there are some drawbacks too. In particular, they are calculated making a number of possible assumptions that would require further validation work. It also becomes more difficult to produce a UK measure because of the different school examination systems in the different countries.
- 5.15 Figure 10 shows GCSE threshold (Method 1) and adjusted Key Stage (Method 4), and compares them with the current National Accounts measure. Methods 2 and 3 are not shown as they lie between the range for Methods 1 and 4. During the period 1998 to 2004, output increases by an annual average of around 3 per cent for the GCSE threshold measure, but by less than 1 per cent per year for the alternative measures.

Figure 10
Quality adjusted output, 1998–2004

UK

Index 2002=100



Education output in National Accounts compared with new measures which are quality adjusted for GCSE results or Key Stage progress and earnings growth 1.5 per cent.

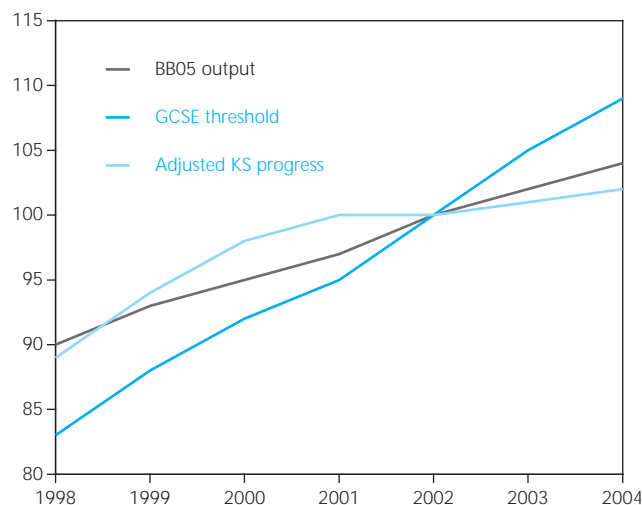
Source: Office for National Statistics

Real Earnings Growth

- 5.16 A key consideration is the weight to be given to the fact that educational attainment becomes increasingly valuable in a growing and increasingly productive economy. This follows the suggestion in the Atkinson Review for an approach based on the general principle that the value of output from government services rises with the real value of private assets and income (see Principle C in section 4.39 and sections 9.33 and 9.34 in the *Atkinson Review Final Report*).
- 5.17 The Atkinson Review therefore recommended that ONS should give serious consideration to adjusting the output estimate to account for the trend rate at which real earnings have risen. The Atkinson Review felt that to ignore this effect would miss an important contribution to public output (section 9.34).
- 5.18 At the same time, Atkinson recommended caution in implementing this recommendation before ensuring that the underlying principle receives wide support, and in particular the fact that no other country has yet to adopt such an adjustment for real earnings growth. ONS will be working with DfES to consult on this point specifically, in the context of wider discussion on improving the measurement of Education output. One of the key considerations will be the extent to which movements in real earnings over time can actually be attributed to DfES, similar to the issues concerning the impact of DfES outputs on total Education outcomes.

Figure 11
Earnings adjusted measures of Education output,
1998–2004

UK, Index 2002=100



Education output in National Accounts compared with new measures which are quality adjusted for GCSE results or Key Stage progress and earnings growth 1.5 per cent.

Source: Office for National Statistics

- 5.19 Figure 11 shows the new Education output estimates if an adjustment of 1.5 per cent a year – the Atkinson Review estimate – was introduced to account for real earnings growth.
- 5.20 Returning back to the main measures of quality adjustment, if pupil attainment at Key Stages and GCSE is used, then discussions about potential grade drift will need to be addressed. An example of concerns is seen in recent work by Tymms (2003), which questions the validity of statutory tests as a way of measuring quality improvements. Two patterns in the data, according to the author, are surprising. First, test score results rise fast and steadily up to 2000, then suddenly they become flat. Second, mathematics and English results show a very similar trend, whereas past research has shown schools have different effects on mathematics and reading. Using the results from independent sources, the author suggests that a possible explanation for the rapid rise in standards over 1995–2000, is the fact that children have been taught test techniques and/or are being taught to the test. The pattern for mathematics and English is questioned using independent data showing diverging results for English (with writing improving more than reading) and for mathematics with some studies showing a rise close to statutory results and some showing no change at all. Tymms concludes that statutory Key Stages exam results are not appropriate for monitoring standards for various reasons, for example as new tests are used every year there is a limit to the accuracy with which standards can be measured.
- 5.21 In England, the Qualification and Curriculum Authority (QCA) is responsible for regulating the public examination system. QCA¹³ maintains and develops the national curriculum and associated assessments, tests and examinations. QCA have published a report on the *Comparability of national tests over time: key stage test standards between 1996 and 2001*, Massey *et al* (2003). According to experimental evidence for Key Stage 1, both reading comprehension and mathematics 1999–2000 tests appear to be at least as demanding as the 1996 version. Evidence shows that the threshold in the 2000 version appear to have made heavier demands on the children than the 1996 version, suggesting that improvement observed at national level are underestimating the learning gains in schools. As for Key Stage 2, outcomes are not consistent across subjects. English tests give evidence of substantial improvement but national results might overestimate the progress because of divergence in standards. For mathematics there is no indication of disparity in standards, validating national improvement; and only a small part of the very large improvement in childrens' performance on Key Stage 2 science tests may be the product of a shift in standards. For Key Stage 3, English tests standards have been successfully maintained; in mathematics there is some disparity due to the introduction of a new element (mental arithmetic) that may have affected results mainly at the lower range of attainment; and quite substantial gains in Key Stage 3 science tests reported nationally were merited. Overall, the report shows evidence that test standards over the period 1996–2000 have been maintained in most subjects/key stages, hence supporting the view that performance levels in schools have risen, reflecting improvements in teaching and learning.
- 5.22 The Atkinson Review report on discussing with the QCA their work on setting, maintaining and monitoring examination standards. The examination bodies have rigorous procedures in place to ensure that standards remain constant year on year and the role of QCA is to ensure the consistency of those standards over a longer period. QCA has in place a rolling programme of standards reviews which looks at the syllabuses, question papers and candidates' work over time. QCA's view was that, over the last five years, standards in England have remained constant. However, in the longer-term it is more difficult to guarantee maintenance of standards, because of major changes in syllabuses. Where QCA's monitoring of examination evidence suggests any changes in standards, action is taken to set appropriate standards in the following year.
- 5.23 Concerns about standards, specifically those raised by Tymms, have been the subject of recent communications between the DfES and the Statistics Commission. The DfES is clear that it does not accept that the rise in test scores overstates a rise in standards. The DfES argues that the standards assessed are the attainment targets of the National Curriculum and none of the evidence cited effectively calls into question the success of QCA in maintaining those standards over time. They are confident that standards have risen substantially and that there is good national and international evidence for the improvements.

- 5.24 Another more complex method, not explored at this stage by DfES, would be to use the National Pupil Database to link the attainment of individual pupils across the four Key Stages. This would allow a measure based on the actual progress made by every pupil to be produced, essentially the sum of individual progress made between stages. This approach may be the most appropriate but the application will require further work and development. It would also be more difficult to produce a UK measure which includes similar results from the different countries.

Value of Education

- 5.25 Considerable economic research has investigated the value that can be attached to education. A recent book by Stephen Machin and Anna Vignoles, *What's the good of Education?* (2005), analyses both the private and social returns to education and the different ways in which they can be defined and measured. They consider some of the issues that have been investigated in the literature, particularly the fact that using the simple wage difference between low and high educated employees can overestimate the returns to education in that an inherent higher productivity of those who choose higher education will allow them to extract a higher salary anyway. Also, for a given amount of education, individuals can exploit it differently resulting in non-homogeneous returns to education. The authors present a method that endeavours to take into account these measurement difficulties using the 'British child development study' dataset. Individual returns of education (for men) are calculated as the incremental average wage return from achieving a qualification. Compared with leaving school at 16 without qualifications, the average return to O levels is 18 per cent, to A levels is 24.2 per cent and to HE is 48.4 per cent. These results draw on a previous academic study (Blundell *et al*, 2005).¹⁴
- 5.26 Further evidence is available in the research paper *Skills and productivity in the UK using matched establishment, worker and workforce data* by Haskel *et al* (2003) published by CeRIBA.¹⁵ The authors matched the DfES Employer Skills Survey (ESS), the ONS Annual Business Inquiry (ABI), and the New Earnings Survey (NES). They ask what fraction of variation in productivity is associated with variation in skills. They found that skill measures based on education qualifications affect productivity at work. The preliminary results in this article show that high productivity is significantly associated with higher levels of human capital measured in many different ways, but particularly using skills. They also conclude that the experience part of human capital is less important in determining productivity than the education and other unobservable parts of human capital.

Labour Market Value

- 5.27 DfES also investigated the value of education in terms of future earnings in the paper 'Measuring Output from the Education System', using data from the Labour Force Survey. One approach is to use the labour market value of qualifications over the lifetime of individuals possessing them. In theory, this can be measured as the estimated lifetime earnings of individuals with different levels and combinations of qualifications. The added-value of Education output can then be viewed as the difference in the lifetime earnings of those who have had no education, with those educated or qualified to a particular level. However, there are a number of assumptions and concerns with using such a measure which would need to be investigated. The key points are listed below:
- The wage premium used is based on a comparison of wages for those with O levels and those who leave school without qualifications. But this may underestimate the true return to education since pupils leaving school without qualifications may have benefited from many years of education and may have earned much less if they had never been to school. This suggests a much larger value of education would be required.
 - A key limitation of the method is the time lag needed to detect properly changes in the lifetime value of Education outputs over a 40-year working life.
 - Education confers many other benefits that are likely to be excluded from calculations.
- 5.28 Using the labour market value methodology, DfES have calculated a conservative estimate of the additional lifetime earnings from having five A*-C GCSEs, compared to no GCSEs, (using 2003 data) to be around £275,000 for one individual. However, as National Accounts are concerned with changes over time, any approach would need to reflect accurately annual changes in the value of Education in all combinations of qualifications on leaving school. It would also need to take into account various other factors, such as changes in the probability of being in employment.
- 5.29 Finally, the education system also provides, as a secondary output, a child care service to parents which allows them to return to the work place. DfES provide preliminary estimates of the value of child care service to be in the region of £15bn to £20bn per annum. This is based on school hours and the value parents attach to childcare in terms what they are willing to pay for it on the open market.

Table 6

Expenditure on general government Education inputs, current prices

UK	£ million									
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Labour	17,960	18,224	18,777	19,516	21,015	22,808	25,155	27,269	29,384	31,949
Goods and services	6,495	6,781	6,899	7,287	7,366	7,585	7,576	9,060	9,231	8,765
Capital consumption	1,055	1,054	1,060	1,075	1,103	1,128	1,169	1,206	1,261	1,312
Total	25,510	26,059	26,736	27,878	29,484	31,521	33,900	37,535	39,876	42,026

Source: National Accounts, Office for National Statistics

6. Education inputs in the National Accounts

Current expenditure measure, 1995–2004

6.1 General Government expenditure is divided into three components: labour, goods and services, and capital consumption. These three types of input are defined in National Accounts as compensation of employees, intermediate consumption (or 'other') and non-market capital consumption. This section examines the three categories of expenditure in Education. Table 6 presents the latest estimates of the Education components at current prices, published in the *Blue Book 2005*. In 2004, at current prices, labour accounted for around 76 per cent of Education inputs, goods and services for 21 per cent and capital consumption for 3 per cent.

Labour

6.2 Labour is by far the biggest area of Education expenditure. It accounts for around three-quarters of Education inputs. In 2004, around £31.9 billion current expenditure was on labour.¹⁶ Teaching staff account for a large proportion of the education labour force, but expenditure has also increased on the number of all types of school support staff in England, for example, the number of teaching assistants has doubled in recent years.

6.3 Labour input also includes support for education systems, policy development, management, standards setting, Human Resources, finance, IT, capital investment, research and development, professional education and training. These activities do not all deliver direct education for students, but nevertheless are essential for the effective functioning of the education system. All these activities are delivered using resources financed by general government expenditure. For the National Accounts, expenditure on labour is available from the accounting data maintained by HM Treasury, ODPM, and the Education administrations.

Intermediate consumption of goods and services

6.4 In 2004, around £8.8 billion, 21 per cent of current expenditure in Education was spent on goods and services. Intermediate consumption is goods and services used up in producing Education Services output in any given year. This includes goods and

services such as teaching aids, electricity and other utilities, building maintenance, and transport. Government purchases of ITT, health professional courses and private nursery places are also included here. For the National Accounts, expenditure on intermediate consumption is available from the accounting data maintained by HM Treasury, ODPM and the Education administrations.

Capital consumption

6.5 A small proportion, 3 per cent, of Education current expenditure, is attributable to the use of capital, in 2004 around £1.3 billion. The Education Service buys goods that can be used repeatedly or continuously over the longer-term, such as buildings, computers and vehicles. Goods that last over a number of years are classified as capital items. The value of the capital investment is spread over a longer time period than just the year in which the item was purchased. Capital consumption estimates the amount of capital that is used in a year.

Pay and price indices

6.6 Over the nine years from 1995 to 2004, total current expenditure on Education increased by around 65 per cent. However, the cost of inputs over time also includes changes due to price increases. In order to compare inputs over time, price inflation needs to be excluded from current expenditure by using suitable cost deflators. This produces estimates of constant input prices which will then show changes in the quantity of inputs that are needed for productivity estimates. This section explains how constant input prices are calculated. Several pay and price indices that could be used as deflators are considered.

6.7 Simply applying the GDP deflator is less appropriate than using deflators specific to education and the type of procurement. More detailed and specific deflators provide a better understanding of the change in the quantity of inputs going into Education. Measures of input prices are identified that are more closely related to the individual goods and services used in Education.

6.8 Changes in the quantity of labour are calculated by deflating the current price expenditure figures using suitable labour cost deflators. This section explains which deflators were used and what improvements

can be made. Currently, these deflators relate to the Education Services in England only and are used as a proxy for the whole of the UK. Ideally, indicators for the whole of the UK should be used.

6.9 ONS has reviewed the availability of suitable deflators for pay costs. Labour costs can be deflated by using pay indices, but indices measuring the growth in earnings are preferred to simple pay settlements since the earnings growth also includes any pay drift.¹⁷

Average Earnings Index

6.10 Table 7 shows the different deflators used in producing a volume measure of labour for Education.

- The public sector average earnings index (AEI)¹⁸ is used to deflate Central Government labour costs.
- The local authority education pay index is used to deflate local authority pay.
- Expenditure on teachers pay is deflated using data obtained from the DfES database of teachers records (DTR). The DTR holds information on the average earnings of all teachers in England and was used to obtain measures of changes in the average earnings for teachers.
- The public sector education specific indicator has been recently constructed by ONS. The series only covers the last five years but will provide a better deflator than public sector AEI in the future.

6.11 Two methods are used to deflate labour expenditure:

- Method 1 uses the public sector AEI for changes in central government pay and the local authority (LA) education pay index for changes in local authority pay.
- Method 2 uses a separate earnings index for teaching staff (based on the DfES data on teachers' earnings), which accounts for around half of labour expenditure.

For non-teaching LA staff, the local authority education pay indexes are used. Non-teaching staff includes educational support staff, premises-related staff, administration and clerical staff. Again, public sector AEI is used to deflate central government expenditure.

6.12 Detailed expenditure on labour is currently unavailable for central government. Departments and agencies within central government expenditure include: DfES; Ofsted; QCA/SCAA; Teacher Training Agency; NCSL; BECTA; and Funding Agency for schools.

Improving pay deflators

6.13 The education specific AEI has been recently constructed by ONS. The time series for these data only covers the last five years but should be considered as an alternative in the future. Further improvements would be to produce more detailed employee group deflators, particularly as the number of all types of school support staff in England has increased in the period 1997 to 2004, with the number of teaching assistants doubling. The increased expenditure on these groups as a percentage of total Education has increased the need to deflate each group separately.

Goods and Services Indices

6.14 Deflators are also required for other goods and services consumed in educating pupils and students. Currently, a combination of Producer Prices Indices and the Retail Price Index excluding mortgage interest payments (RPIX) are used as deflators. This composite index is used to deflate the expenditure.

Improving goods and services deflators

6.15 This article reports some progress has been made in finding better pay and price indices but further progress could be made. The ideal method for deflating goods and services would be to apply specific price indices on a product-by-product basis. Also, better

Table 7
Pay deflators

UK, 1995–2004

Pay index 2002=100

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Average annual percentage change 1995–2004
Local Authority Education	77	79	82	85	89	92	96	100	108	110	4.8
Public Sector AEI	78	80	82	84	88	91	96	100	105	110	4.6
Database of Teachers Records	76	78	80	82	85	89	94	100	107	111	5.1
Education AEI						91	96	100	106	109	

Source: Office for National Statistics

Table 8

Annual growth in the volume index of Education use of capital, central government and local authorities

UK, 1998–2004

Annual growth

	Volume index use of capital								
	1996	1997	1998	1999	2000	2001	2002	2003	2004
Capital consumption	-3.7	-0.3	0.3	0.7	0.5	1.4	1.4	2.0	1.8
Capital services	0.5	-0.1	-0.4	0.4	-1.2	0.8	1.0	1.9	1.9

Source: Office for National Statistics

price deflators should be used to measure movement in the cost of the purchase of Higher Education courses and nursery places. The Atkinson Review created a set of criteria for assessing new deflators. One of the criteria was comprehensiveness. Some of the deflators relate to England but are used as a proxy for the whole of the UK. Ideally, in the future, deflators for the UK, not just England, should be used.¹⁹ Future work will focus on the development of improved deflators by product.

Use of Capital

6.16 A small proportion, 3 per cent, of Education expenditure, is attributable to the use of capital. Two approaches are considered to estimate the use of capital. One approach, used in previous estimates of productivity, takes the ONS deflated measure of capital consumption. The annual change is shown in the table below. A second approach, discussed in the Atkinson Review, uses a measure of capital services, that is the 'rent' paid on the use of capital. The ONS experimental estimate of capital services in Education, in local and central government, is shown in the table below. In this article the two approaches are considered.

Estimates of the volume of Education inputs, 1995–2004

6.17 Table 9 presents four estimates of the volume of general government Education inputs, calculated by deflating the current price expenditure on Education using the different sources of information, methods and assumptions explained throughout this section.

- Method (1) uses the local authority pay index for local authority pay, the public sector AEI for Central Government pay and deflated current consumption for use of capital.
- Method (2) is the same as Method (1) except that the use of capital is measured by capital services.
- Method (3) uses a separate earnings index for teaching staff which accounts for around half of all labour expenditure and current consumption deflation.
- Method (4) is the same as Method (3) except that use of capital is measured by capital services.

The overriding conclusion is that these different methodologies make little difference to the estimates overall.

Table 9

Estimates of Education Input

UK, 1995–2004

Method	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Average annual percentage change 1995–2004
1: Previous method	84	84	84	85	87	90	94	100	100	103	2.5
2: Include capital services	85	85	85	86	88	91	94	100	100	103	2.4
3: New teachers' pay index	85	85	85	86	88	91	94	100	100	103	2.4
4: New teachers and capital services	85	86	86	87	89	92	95	100	101	103	2.3

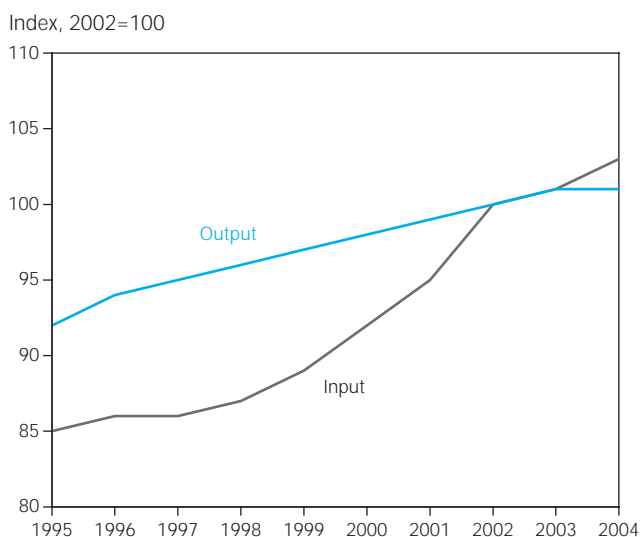
Source: Office for National Statistics

7. Measurement of Productivity

- 7.1 Productivity, the focus of this article, is the ratio of outputs over inputs, all in volume terms. Equally important is how this ratio moves over time to reflect productivity changes. The productivity measure needs to take into account changes in the prices of inputs (to estimate the volume) as well as the appropriate quality adjustment of outputs. This section presents estimates of productivity based on the information already presented in sections 3, 5 and 6 on Education Services outputs and inputs.
- 7.2 Whilst there is a single series on Education Services outputs in National Accounts, a number of output and input measures are discussed in this article. Estimates of the change over time in Education Services productivity are therefore sensitive to the sources, methods and assumptions used to calculate Education Services outputs and inputs.
- 7.3 Over the period from 1995 to 2004, the current National Accounts estimate of output has grown by an annual average of around 1 per cent and Education Services inputs have grown by an annual average of around 2 per cent.

Figure 12
Output and input trends 1995–2004, consistent with the National Accounts output measure

UK, 1995–2004



Source: Office for National Statistics

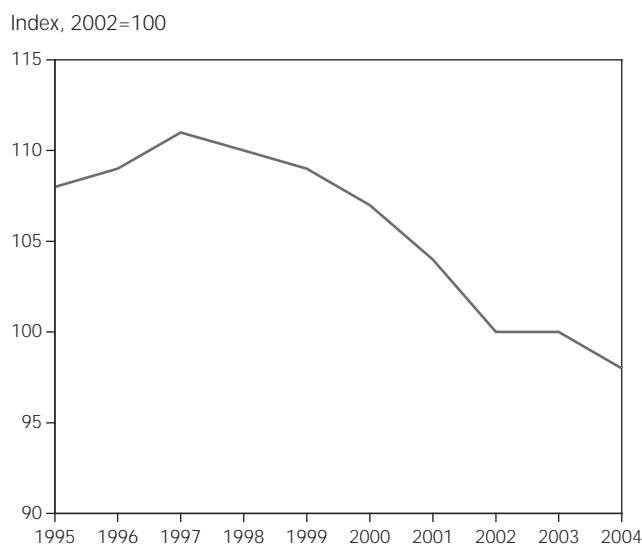
7.4 The output and inputs figures used for estimates of productivity in Education Services are still developing so caution is needed when interpreting these figures (see sections 3 and 6 on Education Services output and input measures).

7.5 Figure 13 shows the productivity estimates for 1995–2004, on this basis. The estimate for productivity change over the period is an annual average of around –1 per cent. The estimate uses the output measure published in National Accounts 2005 and the new volume measure of input described in section 6. This

measure includes a new index for teachers' pay and a new measure of capital services. But as the discussion in section 6 implies, the exact input measure used, of those considered, would make little difference.

Figure 13
Productivity measure 1995–2004, consistent with current National Accounts

UK, 1995–2004



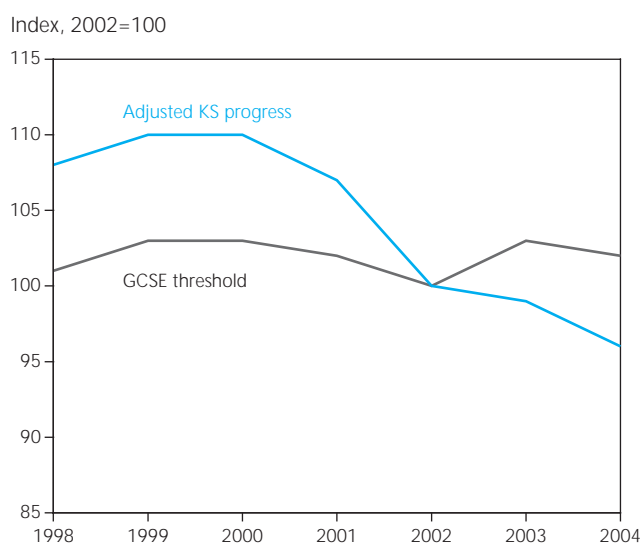
Source: Office for National Statistics

7.6 Figure 14 shows the range of productivity estimates for Education Services using the same new estimate of input for 1998–2004 but using the new output measures proposed by DfES as discussed in section 5:

- one that uses the GCSE threshold method (Method 1)
- the other that uses adjusted Key Stage progress (Method 4).

Figure 14
New quality adjusted measures of productivity 1998–2004: without earnings adjustment

UK, 1998–2004

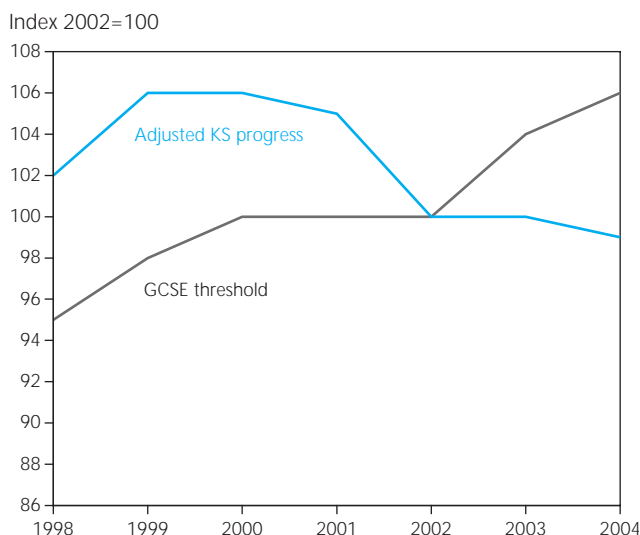


Source: Office for National Statistics

7.7 Figure 15 shows the range of productivity estimates for Education Services using the same new estimate of input for 1998–2004, the new output measures proposed by DfES as discussed in section 5, but now considers the impact when outputs are adjusted for 1.5 per cent real earnings growth.

Figure 15
New quality adjusted measures of productivity, 1998–2004: with earnings adjustment

UK, 1998–2004



Source: Office for National Statistics

7.8 It is clear the results are sensitive to the exact methodology used to measure output. Using productivity measures without earnings adjustment, the GCSE threshold method would be estimated as virtually unchanged over the period. The adjusted Key Stage method would lead to an estimated annual average change in productivity of around –2 per cent. (The other two methods would give intermediate results.) Adjusting these estimates for real earnings growth suggests productivity may have changed by an annual average of around +2 per cent over the period for the GCSE threshold method, and for the adjusted Key Stage method, the change in productivity would have been –0.5 per cent annually, on average.

8. Triangulation

Wider productivity information

8.1 The productivity figures that appear in this article are the best estimates currently available using data from the National Accounts and other sources investigated so far by ONS. As explained in this article, the methodology for compiling these estimates has been improving over the last few years, and work is continuing to improve them further. Triangulation aims:

- to help corroborate the productivity story. Does additional information evidence support or contradict the implied productivity path from the estimated output and input path?
- to help users understand the productivity figures by providing additional information to give a wider picture of productivity in Education Services that has not been shown in compiling the Education productivity figures themselves.

8.2 The Atkinson Review regarded the sources of information on quality of teaching and class size as useful for helping this process of triangulation rather than for direct inclusion in the National Accounts measure (Atkinson Review recommendation 9.3). In this section, class size and assessments on quality of teaching are examined. Other sources of evidence also include public satisfaction surveys, departmental objectives to improve the quality of education, PSA targets and efficiency improvements.

Class size

- 8.3 There are different views and findings from research examining the benefits of class size alone on pupil attainment, as discussed in section 5 above. However, it is recognized that smaller classes and higher adult/pupil ratios can benefit some pupils, in particular younger children and children with learning difficulties (see also Section 5.5 to 5.8). Class sizes have reduced slightly over recent years, but there are no plans to implement further reduction. Infant school (for five, six and seven year olds) class sizes have already been reduced to a statutory maximum of 30 from September 2001 as part of the drive to raise standards in schools in England. Schools in recent years have also taken on a greater number of classroom support staff, increasing the adult/pupil ratio. Support staff can directly help pupil learning and can also take some of the administration work load from teachers to increase teachers' time with pupils.
- 8.4 The average class size in both primary and secondary schools increased from 1995 to 2000 but has reduced since 2000. Figure 16 shows the trend from January 1995 to January 2004 in England. The average size of a primary school class in England, taught by one teacher, increased from 27 pupils in 1994 to 28 pupils in 1998. Since 1998 it has fallen steadily to 26 pupils in 2004. The average size of a secondary school class taught by one teacher has remained steady at 22 pupils over the period.

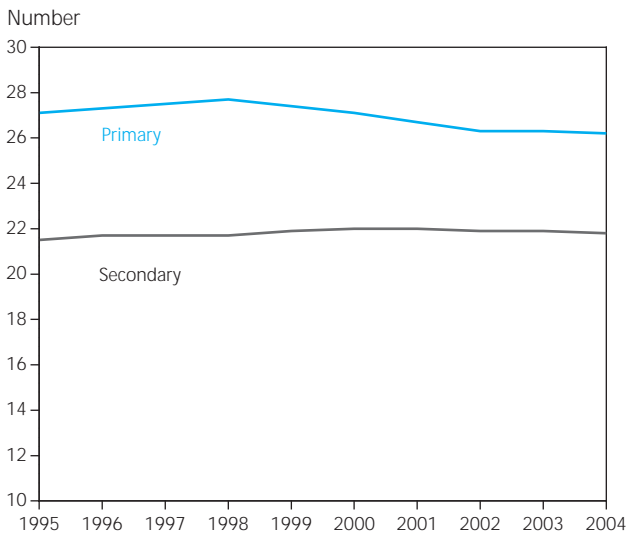
Workforce initiatives

- 8.5 The number of support staff in maintained schools in England who provide additional learning resources within the classroom more than doubled between 1996 and 2004. In 2004 there were 189,000 support staff in classrooms in maintained schools in England. The increase in the number of support staff occurred in all types of school, the largest percentage increase (136

per cent) was in secondary schools. Most support staff work in primary schools, accounting for the placement of 57 per cent of these staff in 2004. An evaluation in 2002 of the impact of teaching assistants in primary schools found that teachers value their support and appreciate the benefits of having another adult in the classroom (source: DfES and ONS *Social Trends*).

Figure 16
Average class size, primary and secondary school

England, 1995–2004



Source: DfES

Ofsted inspections

8.6 The inspections by Ofsted provide an important source of information on the overall effectiveness of the Education system in England. Ofsted inspects all aspects of the Education system in schools, not

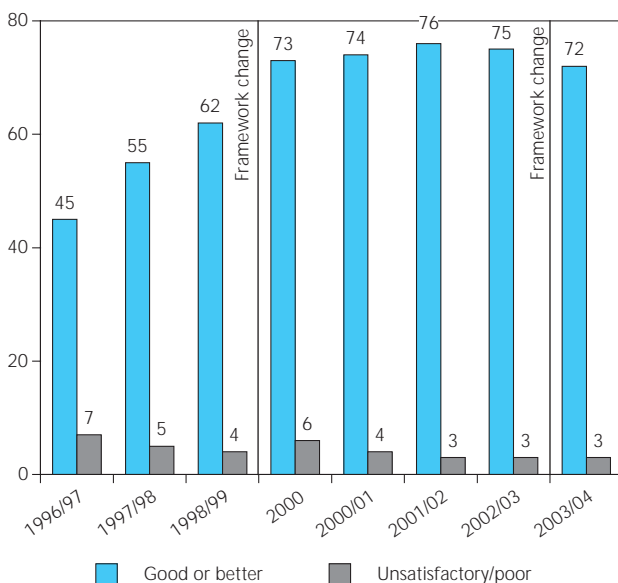
just the GCSE and Key Stage test results. Ofsted inspect a large sample of schools in England each year and the published results are weighted so that they are representative of all schools. The trend in the assessment of schooling can be seen as an alternative source for examining the changes in the quality of teaching in Education. It therefore provides complementary evidence to exam and test results for the quality of output in the whole school system.

8.7 The results of the Ofsted inspections are published in the *Annual Report of Her Majesty's Chief Inspector of Schools 2003/04*.²⁰ David Bell, Her Majesty's Chief Inspector of Schools, discusses measuring improvement and how Ofsted's data, looked at over time, could be helpful in coming to conclusions about the progress being made in English education.

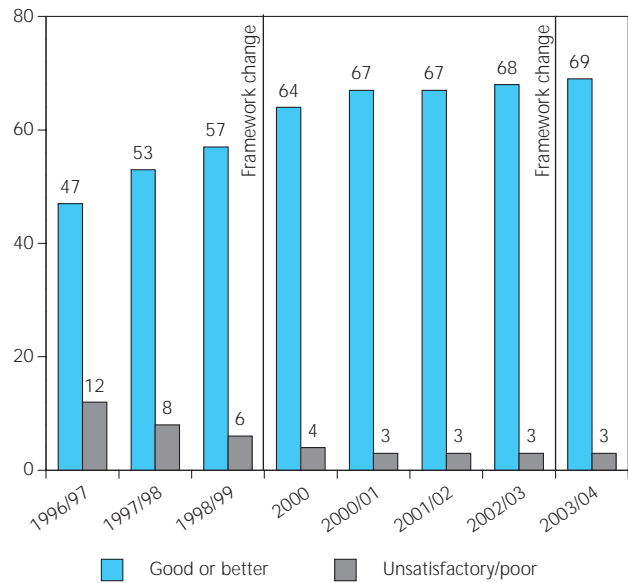
8.8 The overall trends from the report show a small improvement in recent years, with around 69 per cent of schools assessed as good or better in 2003/04 compared to previous years. The assessments on teaching provide valuable evidence on the quality of teaching. The inspection of primary schools found teaching and learning were good or better in just under three quarters of schools and the challenge remains for the rest to improve their teaching from satisfactory to good. Figure 17 shows the judgements on teaching in primary schools over the period 1999 to 2004. Changes that have been made over time in the way Ofsted reports on schools means that long-term trends are difficult to interpret. But it is possible to interpret progress made within each change, or framework period.

Figure 17
Ofsted results – Primary Schools

Teaching over time: school level judgements (percentage of primary schools)



Teaching in lessons over time in primary schools (percentage of lessons in primary schools)



These figures have been rounded and may not add up to 100 per cent.

Source: Ofsted

8.9 Ofsted inspection of secondary schools found:

- Teaching is good or better in almost three-quarters of schools but unsatisfactory in nearly a tenth. Often these schools face particular challenges in recruiting and retaining well qualified teachers, particularly in mathematics and science.
- Leadership and management overall are good or better in three-quarters of schools.
- Almost all school sixth forms are effective and provide successfully for their students, especially those taking A level courses.
- Attendance has risen slightly overall, but despite increased efforts is still unsatisfactory in just over a quarter of schools.

8.10 Figure 18 shows the judgements on teaching in secondary schools over the period 1997 to 2004. Again, changes that have been made over time in the way Ofsted reports on schools means that long-term trends are difficult to interpret. But it is possible to interpret progress made within each change, or framework period.

Public assessment

8.11 The British Social Attitudes Survey 2002 produced some key findings relevant to school level education, including views on priority spending, on tests and class-work, the quality of primary and secondary education, and on the teaching profession. When asked about basic skills, 70 per cent of respondents thought that schools did very or quite well at teaching young people reading, writing and arithmetic, compared

to 15 years previously when 56 per cent held this view. Just fewer than half of respondents thought secondary schools did well in preparing young people for work and bringing out their natural abilities, an improvement from 1987 when only 30 per cent assessed schools positively in these categories. The survey indicated that only a minority believe that schools are getting worse. In 2003, 37 per cent of adults in Great Britain thought that smaller class sizes would be the most useful way to improve primary education. Reducing class sizes was also seen as the best way of improving secondary education, followed by better quality teachers and more school resources.

8.12 The Ofsted report on inspections (2003/04) found that parents are very or highly satisfied with their children's school in over 80 per cent of primary schools, 76 per cent of secondary schools and 90 per cent of special schools. This information is taken from parental questionnaires completed in advance of inspection.

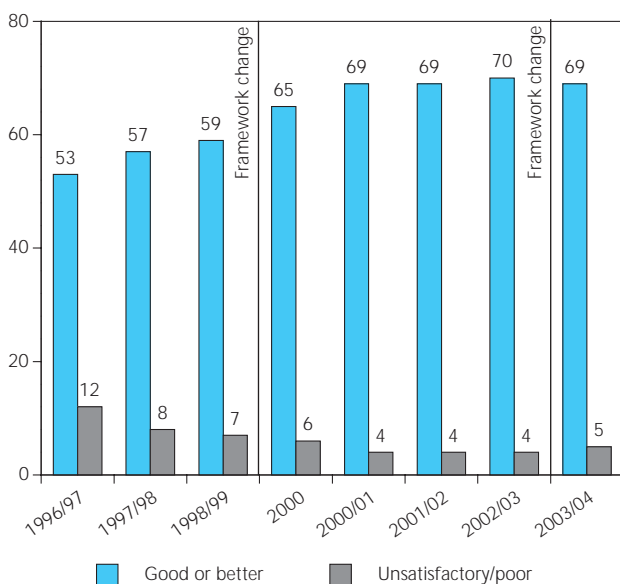
Improving the quality of Education

8.13 The DfES publication *Every Child Matters: Change for Children in Schools* outlines key developments and improvements for a wide range of outcomes in schools. The publication explains how the new Children Act 2004 forms the basis of a long-term programme of change²¹ with key objectives for children to:

- be healthy
- stay safe
- enjoy and achieve
- make a positive contribution
- achieve economic well-being.

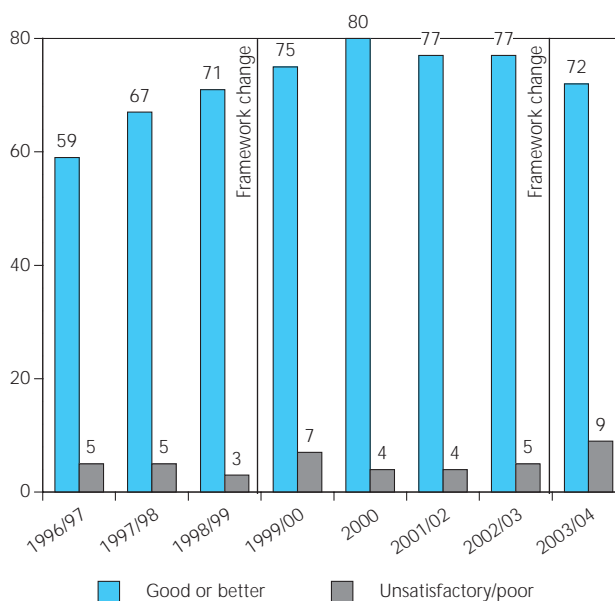
Figure 18
Ofsted results – Secondary Schools

Teaching in lessons over time in secondary schools
(percentage of lessons in secondary schools)



Source: Ofsted

Teaching over time: school level judgements
(percentage of secondary schools)



- 8.14 The changes being promoted include:
- developing extended services in schools to help pupils achieve
 - building stronger relationships with parents and the wider community
 - ‘supporting closer working between universal services like schools and specialist services, so that children with additional needs can be identified earlier and supported effectively’
 - future school assessment to include the importance of pupil well-being
 - workforce remodelling to encourage more integrated working
- 8.15 The policy on extended schools (that open for longer hours and offer a range of services for children of different ages) focuses on the delivery of a range of services and experiences for children that are not just concerned with exam results. In these and similar areas, extra resources have contributed to improvements in student experience, childcare or unmeasured skills development. It is therefore possible for increased investment in these areas not to show up (at least immediately), in exam-based productivity figures. Information is not yet available to examine the results of the changes.

achieving level 5 or above (KS3) in all subjects with mathematics, English and science very close to the target.

- 8.18 As for GCSE results, the Key Stage 4 target has two elements:
- to raise attainment such that by 2008, 60 per cent of those aged 16 achieve the equivalent of five or more GCSEs at grades A*–C
 - in all schools at least 20 per cent of pupils to achieve this standard by 2004, rising to 25 per cent by 2006 and 30 per cent by 2008.

Good progress is being made on both. In 2004, 53.7 per cent of pupils achieved 5 or more GCSEs or equivalent at grades A*–C (in 2005 the provisional figure is 55.7 per cent), and there were 71 schools below the 20 per cent floor target.

- 8.19 The PSAs include commitments to enhance the take-up of sporting opportunities by school age children and to improve their attendance in schools. The Schools Partnership survey published in 2004 found that 62 per cent of 5–16 year old spent at least two hours each week in high quality physical education and school sport against a target of 75 per cent by 2006. Some of these education aims and targets are relevant to the output measures, others are broader than the outputs measured in National Accounts.
- 8.20 The PSA framework includes a considerable emphasis on improving the outcomes for all children in order to improve equity in education. For example, targets are set on the academic performance of certain vulnerable children and floor targets to improve performance in schools which have the lowest attainment rates. Also, public services have a ‘public value’. For example, schools can act as community centres as well as places of learning. The performance framework is, therefore, not just about maximising the aggregate level of education attainment. In addition, not all improvements will produce easily quantifiable outputs, for example on the emotional development of the child and wider skills acquisition. These other objectives may not be relevant to National Accounts measurement and never be fully captured in the productivity figures.

Public Service Agreements (PSA) targets

- 8.16 The Public Service Agreements for DfES include targets for schools ‘to raise standards and tackle the attainment gap in schools: to raise standards in English, mathematics and science and to improve school attendance, and to improve the school level performance of pupils achieving equivalent of 5 GCSEs at grades A* to C’.
- 8.17 For primary schools, substantial improvements towards the targets have been achieved both in English and mathematics, raising the percentage of 11 year old children attaining Key Stage 2 level 4/5 or above (see Table 10). For secondary schools, the figures show a fast increase in the percentage of 14 year old children

Table 10
DfES Performance and targets: Key Stages 2 and 3

	Percentage of 11 years old (KS2)				Percentage of 14 years old (KS3)			
	Level 4 or above		Level 5 or above		Level 5 or above			
	English	Maths	English	Maths	English	Maths	ICT	Science
1995/96	57	54	12*	18	57	57	50*	57
2003/04	78	74	27	31	71	73	67	66
Target for 2004	85	85	35	35	75	75	75	70

Notes: *refers to academic year 1996/67

Source: Department for Education and Skills

Investment in capital

- 8.21 Capital spending on school buildings has increased significantly. The DfES capital programme (found in the 2004 Annual Report), shows investment in school buildings rose from around £1 billion in 1999/2000 to £3 billion (estimated) in 2003/04.
- 8.22 The increase in the profile of investment has been especially pronounced from 2000/01 onwards. DfES expects this increase in investment to affect the quality of student and teacher experience, and to provide improved facilities for extra-curricular activities. Returns to this investment, where they are quantifiable, are expected to appear in the medium/long-term rather than the short-term. The impact of an improved environment on exam outcomes is complex and investment may not deliver immediate gains in attainment in formal exams. In the short-term, therefore, this may retard productivity growth. The benefits of increased spending and the accompanying programme of reform will take time to accrue.

Efficiency measures

- 8.23 The *Efficiency Technical Note* published by DfES as part of the 2004 Spending Review, sets out a range of detailed ways of measuring improvements in efficiency in schools, such as teachers' time spent more productively, enabling institutions to achieve more with their resources. The plan is that benefits will be generated through workforce reform, investment in ICT and reducing administrative burdens. Other improvements include reducing the number of civil servant posts; improved procurement of goods, services and new school buildings; simplifying systems and improvements in policy; funding and regulation, such as the lighter touch process for Ofsted inspection.
- 8.24 Information is not yet available to assess the results of the efficiency plans. DfES will monitor and measure the annual efficiency gains that are achieved across the services funded by the Department between 2005/06 and 2007/08. The Department plans to achieve over £4.3 billion in efficiency gains by 2007/08. At least half of the gains will be recyclable, enabling it to be reinvested in front line activities. The key aim is to help front line organisations make better use of their funds, increasing value for money in Education Services.

Summary

- 8.25 This section on triangulation has presented a limited amount of information as context to the productivity estimates. In recent years, there has been a reduction in class size and increased adult support in classes. The assessments on the quality of primary and secondary education, and on the teaching profession more generally, provide other sources of evidence on the output and productivity of the Education Services. They show high standards of education and indications of improvement in quality over the period. Over

recent years, policy has focused on achieving a range of outputs, only some of which will be reflected in current output measures and productivity growth. Over time, perhaps, it may be possible to extend the range of information to cover these areas.

9. Next steps

- 9.1 This article has presented a first analysis of Education Services productivity based on the National Accounts and other measures of output and inputs. It has explained the limitations of the estimates due to the sources and methods used and assumptions made. Work is continuing to improve the measurement of Education Services inputs, outputs and productivity.
- 9.2 Future work by ONS will aim to implement further recommendations from the Atkinson Review, investigating more comprehensive use of UK data, and improving and extending the measurement of quality in the outputs. Any revisions to the measurement of output will be subject to ONS quality assurance processes. In line with the National Statistician's undertaking, any fundamental change to the methodology used for National Accounts purposes would be submitted to the internal quality assurance processes only after there had been an opportunity for extensive public scrutiny and debate. The intention is to make further improvements in the measurement of Education productivity including measures of quality, inputs and deflators. These will be the subject of future articles, together with the analysis of a wider range of 'triangulation' information about education. In the future, the Education productivity articles will report on:
- the development of the quality of output measures
 - the development of the deflators used with the current price input expenditure figures
 - the inclusion of measures and wider information from the other UK countries
 - further research into corroborating information to improve triangulation methods
 - further developments more generally, following the recommendations of the Atkinson Review.

Notes

- 1 Education output is the direct output measure for volume of Final Individual Consumption Expenditure of General Government on Education in *Blue Book* Table 6.5.
- 2 *Blue Book* Table 6.4 Current Prices Measure of Final Individual Consumption Expenditure of General Government on Education.
- 3 *Blue Book* Table 6.4 Current Prices Measure of Final Individual Consumption Expenditure of General Government on Education.

- 4 Writing this article has benefited from the advice of a Quality Assurance Panel, chaired by Peter Smith, University of York, also chairman of the UKCeMGA Advisory Board. The Quality Assurance Panel Members were Joe Grice, Director of UKCeMGA ONS; David Caplan and Tony Clayton, ONS; Deborah Garniss, Economist at DfES; Steve Machin at UCL and Mary O'Mahoney at NIESR. ONS gratefully acknowledges their help and assistance, and takes final responsibility for the contents of the article.
- 5 GGFCE: General Government Final Consumption Expenditure.
- 6 Atkinson A B (2005) *Atkinson Review: Final report. Measurement of Government Output and Productivity for the National Accounts*.
- 7 Office for National Statistics (2005) Improvements in the methodology for measuring government output, available at www.statistics.gov.uk/cci/article.asp?id=1144
- 8 Eurostat (2001) *Handbook of Price and Volume Measures of National Accounts* paragraph 4.12. for Non-market Educational Services – 'since prices are not available, the best method is to use 'pupil hours' adjusted for quality... where this measure is not available, the number of pupils is acceptable if it can be shown that the amount of hours that pupil spent being taught is sufficiently stable'.
- 9 *Atkinson Review: Final Report*, Chapter 4: Methodology for the future: The Principles.
- 10 Project STAR: Tennessee's Student Teacher Achievement Ratio (STAR) project was a study of class-size effects on student achievement.
- 11 Key stages: Compulsory education for children in England begins from the September after a child turns five and lasts until age 16. It is divided into four National Curriculum Key Stages, with pupils sitting national examinations at the end of each phase. The Key Stages are referred to as Key Stage 1, 2, 3 and 4 and vary in length from 2 years to 4 years.
- 12 DfES paper available at: www.dfes.gov.uk/research/programmeofresearch/index.cfm?type=5
- 13 QCA: Qualifications and Curriculum Authority, report available at: www.qca.org.uk/95_6300.html
- 14 Evaluating the effect of education on earnings: models, methods and results from the National Child Development Survey (Blundell R, Dearden L and Sianesi B).
- 15 CeRiBA, (Centre for Research into Business Activity), Economic Research Centre for microeconomic analysis of business data, based at the ONS.
- 16 National Accounts expenditure on labour at current prices for education is derived from the accounting data maintained by HM Treasury, ODPM, and the Education administrations.
- 17 ONS Labour Market Trends. The difference between pay settlements and earnings growth. *Labour Market Trends* 113(2), pp 67–72, available at www.statistics.gov.uk/cci/article.asp?ID=1065
- 18 The Average Earnings Index (AEI) is Great Britain's key indicator of how fast earnings are growing. The AEI is based on information obtained from ONS's Monthly Wages and Salary Survey (MWSS) which covers England, Wales and Scotland. It is used to calculate annual rates of increase. Average earnings are obtained by dividing the total amount paid (including bonuses but not including National Insurance or pension contributions) by the total number of employees paid.
- 19 *Atkinson Review: Final Report* Table 5.1.
- 20 Annual Report of Her Majesty's Chief Inspector of Schools 2003/04; available at www.ofsted.gov.uk/publications/index.cfm?fuseaction=pubs.summary&id=3829
- 21 www.ofsted.gov.uk/publications/annualreport0304/2.4.htm
- 21 www.everychildmatters.gov.uk

References

Atkinson AB (2005) *Atkinson Review: Final Report. Measurement of Government Output and Productivity for the National Accounts*. Palgrave Macmillan: Basingstoke, available at www.statistics.gov.uk/about/data/methodology/specific/PublicSector/Atkinson/final_report.asp

Blundell R, Dearden L and Sianesi B (2005) *Evaluating the effect of education on earnings: models, methods and results from the National Child Development Survey*.

British Social Attitudes Survey (BSA) Series British Social Attitudes – The 20th Report – *Continuity and change over two decades* Chapter 6 Pass or fail? Perceptions of education Wragg T and Jarvis L.

Department for Education and Skills (2004), *Every Child Matters*, available at www.everychildmatters.gov.uk

Department for Education and Skills (2005), *Measuring Output from the Education System*, available at www.dfes.gov.uk/research/programmeofresearch/index.cfm?type=5

Dustmann C (2003). The class size debate and educational mechanisms: Editorial. *The Economic Journal*. Vol 113, No. 485.

Dustmann C, Rajah N and Van Soest A (2003). Class size, education, and wages. *The Economic Journal* Vol. 113. No. 485.

Eurostat (2001) *Handbook of Price and Volume Measures of National Accounts*. Office for Official Publications of the European Communities available at http://epp.eurostat.cec.eu.int/cache/ITY_OFFPUB/KS-41-01-543/EN/KS-41-01-543-EN.PDF

Hanushek E A (2003) The failure of input-based school policies. *The Economic Journal*. Vol. 113. No. 485.

Haskel J, Hawkes D, Pereira S (2003) Skills and productivity in the UK using matched establishment, worker and workforce data, available at www.ceriba.org.uk

HM Treasury (2004) *Spending Review 2004: New Public Spending Plans 2005–2008* available at www.hm-treasury.gov.uk/spending_review

Krueger A B (2003) Economic considerations and class size. *The Economic Journal* Vol. 113. No. 485.

Machin S and Vignoles A (2005) *What's the good of Education?* The economics of education in the UK. Princeton University Press.

Miller S (2005) The difference between pay settlements and earnings growth. *Labour Market Trends* 113(2), pp 67–72, available at www.statistics.gov.uk/cci/article.asp?ID=1065&Pos=2&ColRank=1&Rank=1

Office for National Statistics (2004) *Annual Abstract of Statistics*. TSO: London, available at www.statistics.gov.uk/StatBase/Product.asp?vlnk=94

Office for National Statistics (2004) First Release: Productivity, available at www.statistics.gov.uk/pdfdir/pro0704.pdf

Office for National Statistics (2005) Government Output and Productivity, The UK Centre for the Measurement of Government Activity, available at <http://www.statistics.gov.uk/about/data/methodology/specific/PublicSector/output/default.asp>

Office for National Statistics (2003). *Understanding government output and productivity*, available at www.statistics.gov.uk/CCI/article.asp?ID=400

Office for National Statistics (2005) *Social Trends* No. 35, Non-teaching staff: by type of school. Palgrave Macmillan: Basingstoke, available at www.statistics.gov.uk/Statbase/ssdataset.asp?vlnk=7325

Office for National Statistics (2005) *UK National Accounts: the Blue Book*. Palgrave Macmillan: Basingstoke, available at www.statistics.gov.uk/statbase/Product.asp?vlnk=1143&More=N

Office for Standards in Education (Ofsted) Annual Report 2003/04, available at www.ofsted.gov.uk/publications/annualreport0304/

Qualifications and Curriculum Authority (2003) Massey A, Green S, Dexter T and Hamnett L. Comparability of national tests over time: key stage test standards between 1996 and 2001 Research and Evaluation Division University of Cambridge Local Examinations Syndicate

Todd P. E. and Wolpin K. I., (2003). On the specification and Estimation of the production function for cognitive achievement. *The Economic Journal* Vol. 113. No. 485.

Tymms P (2004) Are standards rising in English primary schools? *British Educational Research Journal* Vol. 30, No. 4.

Glossary

BECTA: *British Educational and Technology Agency.* Government agency promoting the use of information and communications technology.

British Social Attitudes Survey (BSA): An annual independent survey charting British social, economic, political and moral values in relation to other changes in society, conducted by the National Centre for Social Research. Around 3,600 respondents are asked about their attitudes and opinions on a wide range of issues, including education. The 20th report summarises the 2002 survey, with some key findings relevant to school level education.

CeRiBA: Centre for research into business activity, Economic Research Centre for microeconomic analysis of business data, based at the ONS in London.

DEES: The Government Department for Education and Skills in England

Devolved administrations: Scottish Executive for Scotland, the Welsh Assembly Government for Wales, and the Northern Ireland Civil Service.

Education or Education Services: In this article 'Education' or 'Education Services' or refers to those services which are purchased by general (central and local) government.

Health education: In this article 'Health education' refers to those Education Services that are purchased by Department of Health for health professionals.

Education Services included in General Government

English Education System	Funding	Classification
Maintained Schools (including Nursery Classes)	Local Education Authority. Sixth form funding received from Learning and Skills Council (LSC)	Local Government
Maintained Nursery Schools	Local Education Authority	Local Government
City Technology Colleges	Although they can generate additional income, their running costs are met by government. so they receive most of their funding from government	Central Government
City Academies	Schools are controlled by, and receive funding directly from, central government.	Central Government
Higher Education for Nurses and Other Health Workers	Direct purchase of University courses for health workers (mainly for nurses) by Department of Health	Central Government
Free PVI places	Government funding of Private, Voluntary and Independent Nursery places	Central Government
ITT	Direct purchase of Initial Teacher Training courses by Department of Education	Central Government

Education Services not included in General Government

English Education System	Funding	Classification
Sixth Forms & Further Education Colleges; All colleges, including Sixth Form Colleges, Further Education Colleges and technical, art, music, nursing and technology colleges	From 1993 the colleges were given independent legal status. Currently funding received from Learning and Skills Council (LSC). Apart from students aged 16–18 in full-time education, colleges may charge fees	Non-profit Institutions Serving Households (NPISH)
Higher Education Institutions (HEIs)	HEIs are independent institutions responsible for managing their own affairs HEIs are partially funded by government grants	Non-profit Institutions Serving Households (NPISH)
Private Education	Schools and Nursery schools	Household Expenditure

Fte: Full-time equivalent pupil numbers.

ICT: Information and Communication Technology.

ITT: Initial Teacher Training.

Key Stages: the national curriculum is divided into four key stages according to pupils' ages. These are formal curricula for what must be taught in the different key stages:

- Key Stage One – primary school (5–7 years old). Years 1–2
- Key Stage Two – primary school (7–11 years). Years 3–6
- Key Stage Three – secondary school (11–14 years). Years 7–9
- Key Stage Four (GCSE) – secondary school (14–16 years). Years 10–11

NCSL: National College for School Leadership.

ODPM: Office of the Deputy Prime Minister.

Ofsted: Office for Standards in Education.

Productivity: Defined as the ratio of a volume measure of output to a volume measure of input.

PSA: public service agreement, an agreement between a government department and the Treasury, as part of the Spending Review, including objectives and targets.