House of Commons

Public Accounts Committee

Mathematics performance in primary schools: getting the best results

Twenty-third Report of Session 2008–09

Report, together with formal minutes, oral and written evidence

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The Public Accounts Committee

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Summary

Understanding basic mathematics is an essential life skill, and a good start at primary school paves the way for success at secondary school and beyond. Since the late 1990s, the Department for Children, Schools and Families (the Department) has had a specific National Strategy to improve performance in primary mathematics. In 2007–08, this strategy cost some £104 million to implement. The Strategy aims to raise performance through extensive teaching and learning resources, supported by professional development programmes for teachers. In 2006–07, based on average teaching time devoted to the subject, some £2.3 billion was spent on teaching mathematics in primary schools, out of a total expenditure of £10 billion on primary teaching and teaching support staff.

Despite this expenditure, improvements in the mathematics results of primary school pupils have levelled off since 2000. In 2008, 79% of pupils met the Government's expected standard at Key Stage 2 (age 11) in national tests; the highest recorded results, but well short of the Department's ambitions of 85% by 2006. This means that 21% of pupils—over one in five—are starting secondary school without a secure foundation in mathematics. In common with other subjects, there are persistent gaps in the mathematics performance of primary school pupils from different backgrounds and with different characteristics. In contrast to other subjects, boys are making more progress than girls. The biggest attainment gap—18%—is related to deprivation.

In 2008, 1,648 schools were deemed to be underperforming in mathematics compared with 3,570 in 2003, a reduction of 54%. However, there is still a big gap in performance at school level that is partly linked to deprivation. Performance varies across England and between local authorities, with the percentage of pupils achieving the expected standard at Key Stage 2 ranging from 70% to 87%.

The Primary National Strategy has contributed to improvements in primary mathematics teaching and learning but weaknesses persist in vital areas such as the use and application of mathematics to real-life situations and the assessment of pupils' progress.

Teaching quality is important, with pupils rating a good and enthusiastic teacher as the greatest influence in their enjoyment of mathematics. The lack of depth in subject knowledge of many primary school teachers and the lack of take-up of continuing professional development in mathematics are major concerns which the Department has only recently begun to address through a ten year programme to train 13,000 specialist teachers.

On the basis of the Report by the Comptroller and Auditor General,[1] the Committee took evidence from the Department on mathematics performance in maintained primary schools in England.

1 C&AG's Report, *Mathematics performance in primary schools: getting the best results*, HC (2007–08) 1151

Conclusions and recommendations

1. **Since the late 1990s, the Department's Strategy to raise performance in primary mathematics has contributed to improvements, but more recently pupil attainment has levelled off.** While the Strategy has led to better planning and delivery of primary mathematics teaching, only very small improvements are being made to pupil attainment despite the £2.3 billion spent each year on teaching the subject. The Department needs to radically re-think its strategy for improving pupil attainment, otherwise we seriously doubt that the Department will meet its 2011 targets.

2. **It is disgraceful that over one-fifth of pupils are still leaving primary school without a secure grasp of essential mathematical skills, and that, as a result, only one in ten of these children are likely to attain the expected standard by age 16.** We recently reported on Skills for Life, a programme to improve adult numeracy, which is attempting to tackle the legacy of decades of schooling which did not equip enough young people with basic numeracy skills. Helping more children to become more confident and able at mathematics at an early age is the most certain way to avoid the unacceptable financial and human costs of having to provide so many people with remedial education when they are adults.

3. **Some 5% of 11-year olds (30,000 in 2008) leave primary school with mathematical skills that are, at best, at the level of those expected of a seven year old.** The Department's mathematics recovery programmes are targeted at pupils making the slowest progress. It is too early to assess their impact but the difficulties that some schools are already experiencing in recruiting enough specialist tutors are disturbing. The Department should monitor progress closely, and identify and tackle any differences between areas that might indicate ineffective local implementation.

4. **Nationally, there is a large and persistent gap in mathematics attainment between primary school pupils who receive free school meals and those who do not. In 2008, the gap was 18%.** This cannot be allowed to continue and the Department must address the gap urgently. While primary schools that serve disadvantaged areas face considerable challenges in raising attainment, some are clearly meeting these challenges more effectively than others. The Department should identify local authorities whose activities to help schools raise performance are resulting in marked improvements in the progress of pupils from disadvantaged backgrounds. It should support them in disseminating effective practices to those authorities where schools are doing less well for these pupils.

5. **Some schools are failing to develop pupils' mathematical knowledge and skills sufficiently between the ages of seven and 11.** It is very disappointing that in 2007, 24% of pupils made progress of just one national curriculum level or less. These included 66,000 relatively able pupils and, within that number, nearly 38,000 who had been among the most able at Key Stage 1. The Department and local authorities should raise the expectations on schools where a greater than average number of pupils are not making at least two levels of progress between the ages of seven and 11. They should provide help such as specialist support from teachers who have skills

in maintaining pupils' motivation in mathematics. Improving the progress of these pupils would make a big contribution to the extra 12,000 pupils each year required to make at least two levels of progress, if the Department is to reach the target that 84.5% of all pupils should achieve two levels or more by 2011.

6. **Mathematics is the only core subject where boys are doing better than girls, and the gap is growing.** The Department is planning to review the reasons for this gender gap this year. This review should identify any teaching and learning approaches that are hindering the progress of girls, and, through the Primary National Strategy's website, the Department should promote and disseminate guidance on what works well in helping girls to make better progress in mathematics.

7. **"Mathematics is boring" is a common refrain of pupils who do not like mathematics in primary school.** Through the Primary National Strategy's website, the Department should better signpost schools to the resources that are proven to engage pupils most effectively in meaningful mathematics learning. It should consider establishing a panel of pupils to identify what they consider to be the best resources and to comment on the most engaging ways they can be used in the classroom.

8. **The Department's ten year programme to train 13,000 specialist mathematics teachers will result in some primary schools not benefiting until 2019.** The Department should review the relative priority of this programme and, as part of its current piloting, seek to identify ways in which the programme could be accelerated.

1 Progress in meeting the Department's ambitions to improve performance in primary mathematics

1. Early achievement in mathematics is essential to provide pupils with a platform to make good progress with further studies in a range of subjects. Pupils who do not make progress in mathematics at primary school are less likely to progress subsequently, and there are implications for the nation's economy because they are more likely to be disadvantaged in the labour market. The strong link between achieving a good level of performance in mathematics by the end of primary school and continuing success through secondary school is measurable. In 2007, of pupils who had not reached the expected standard by the end of primary school, only 10% went on to achieve at least grade C in GCSE mathematics at age 16. In contrast, 57% of pupils who had achieved the expected standard by the end of primary school, and 94% of those who achieved above the expected standard, achieved at least a grade C.[2]

2. In 2006–07, out of the total primary school teaching budget of some £10 billion, an estimated £2.3 billion was spent on teaching mathematics, an average cost per pupil of some £570. Since the late 1990s, the Department for Children, Schools and Families (the Department) has also had a specific National Strategy to improve performance in primary schools. The Strategy's mathematics programme cost approximately £104 million to implement in 2007–08, and provides schools with free teaching and learning guidance—web-based since 2006—as well as materials for local authority-led teacher training events.[3]

3. The Department sets national standards of achievement for primary mathematics. **Figure 1** shows significant early increases in pupil attainment after the Strategy was introduced, part of which was due to schools getting used to the new method of national assessment. Since 2000, results at both Key Stages 1 (age seven) and Key Stage 2 (age 11) have levelled off. In 2008, 79% of pupils attained the expected standard or above in mathematics at Key Stage 2 in national tests. While this was the highest ever recorded result, and 2% higher than the previous year, it fell well short of the target of 85% that the Department set to achieve by 2006. 21% of pupils started secondary school without a secure foundation in mathematics. In 2008, 30,000 (5% of 11-year olds) left primary school with mathematical skills that were, at best, at the level of those expected of a seven year old.[4]

4. While continuing to try and increase the absolute numbers of pupils reaching the expected standards, the Department is putting greater focus on the progress that pupils make in mathematics. In addition to a new attainment target—that 78% of pupils should achieve the expected standard in both English and mathematics by 2011—the Department

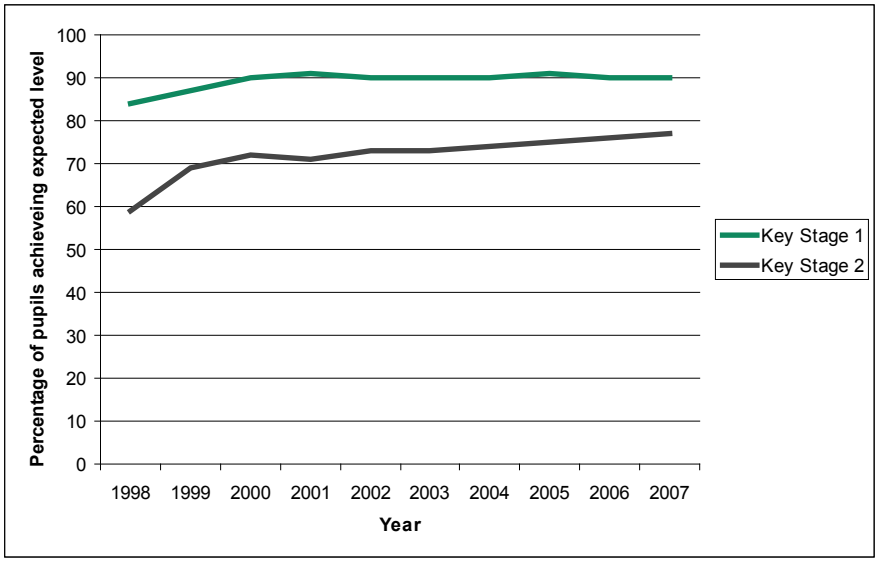
2 Qq 26, 71, 77–79; C&AG's Report, para 1; Ev 14

3 Qq 2, 27–30, 69, 71; C&AG's Report, paras 5, 1.4, 2.3–2.4

4 Qq 3, 31–33; C&AG's Report, paras 1.9–1.10; Dept for Children, Schools and Families' statistical first release 01.04.09, *National Curriculum Assessments at Key Stage 2 in England 2007–08* (revised)

has set a target that by 2011, 84.5% of pupils should make two or more National Curriculum levels of progress between Key Stages 1 and 2.[5]

Figure 1: Percentage of pupils achieving the expected standard in mathematics at Key Stage 1 and Key Stage 2 (1998–2008)



Note: 2008 attainment data for Key Stage 1 is provisional
Source: C&AG's Report updated to include 2008 national attainment data

5. In 2007, 76% of pupils made two levels of progress. Performance will therefore need to improve considerably to meet the target of 84.5% by 2011; an extra 12,000 pupils each year will need to make at least two levels of progress. Pupils who find mathematics relatively difficult at Key Stage 1 make up the largest proportion of those making slow progress, but a further 66,000 more able pupils did not move on sufficiently in mathematics given their prior attainment. This included nearly 38,000 who were among the most able pupils at Key Stage 1.[6]

6. According to an international survey testing the mathematics performance of ten year olds, England was the highest placed European Union country in 2007 and has continued to improve over time. However, as **Figure 2** shows, England is still some way behind the Pacific Rim countries, Hong Kong, Singapore, Chinese Taipei and Japan. In terms of pupil enjoyment of the subject, almost two-thirds of ten year olds in England have very positive attitudes to mathematics, though this represents a fall of 14% since 1995.[7]

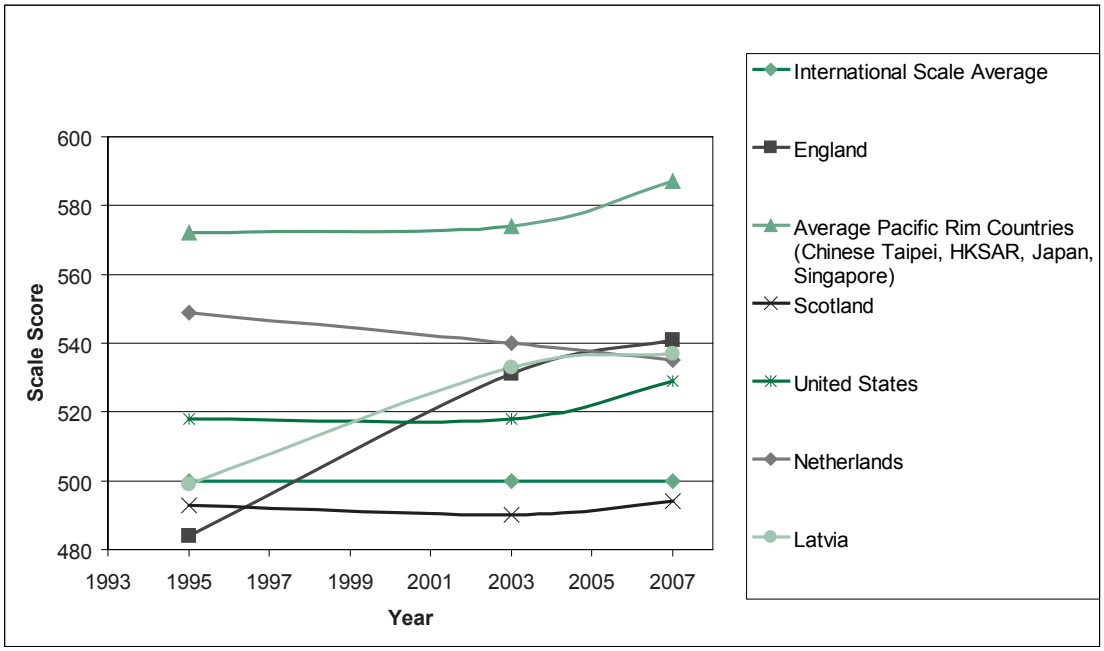
7. At school level, many more primary schools in England are now meeting or exceeding the Department's minimum expectation that at least 65% of their pupils achieve the expected standard in mathematics at Key Stage 2. In 2008, 1,648 schools were deemed to be underperforming in mathematics compared with 3,570 in 2003, which represents a reduction of 54%. There is still considerable variation in performance across England, with the percentage of pupils achieving the expected standard at Key Stage 2, ranging from 70% to 87% across local authorities.

5 Qq 4–5, 21–22; C&AG's Report, para 8; Figure 4

6 Qq 4–5; C&AG's Report, paras 1.12–1.14, 3.2

7 Qq 27–28, 32, 66–68; Ev 14; Dept for Children, Schools and Families' statistical first release 01.04.09 *National Curriculum Assessments at Key Stage 2 in England 2007–08* (revised)

Figure 2: England's achievement in primary mathematics compared to other selected countries

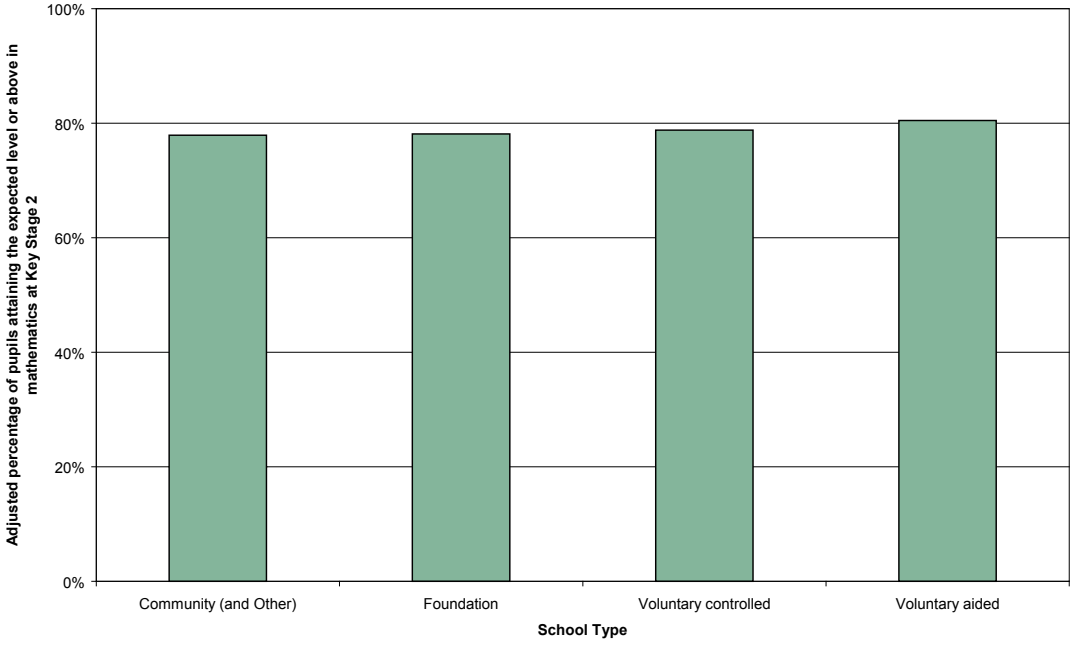


Note: The Trends in International Mathematics and Science Survey (TIMSS) is a four yearly international comparisons study that started in 1995. In 1999, the survey did not test pupil performance in mathematics at age ten. For the 2007 study, the results of which were published in December 2008, 37 countries participated in the tests and in England 143 primary schools took part. The international scale average score has been set at 500 for each year to allow longitudinal comparisons

Source: Trends in International Mathematics and Science Survey

8. In over 600 'hard to shift' schools, mainly located in disadvantaged areas, fewer than 65% of pupils achieved the expected standard at Key Stage 2 every year for at least four years to 2007. Voluntary-aided schools, which are largely faith-based, have more pupils achieving the expected standard in mathematics than other types of school when prior attainment at age seven, the proportions of pupils with special educational needs, and those taking free school meals are taken into account (**Figure 3**).

Figure 3: Attainment by school type after adjusting for prior attainment, special educational needs and free school meals: 2007



Source: National Audit Office

2 Narrowing the gaps in mathematical achievement

9. One of the Department's overriding objectives is to narrow the gaps in educational achievement between children from low income and disadvantaged backgrounds and their peers. Educational achievement is the biggest single predictor of a successful adult life and the Department's new approach in schools, looking at the progression of every pupil, is intended to help all achieve their best and to ensure no-one, of whatever class, ethnicity or gender, is left behind.

10. Unacceptable differences nevertheless persist between the mathematics outcomes of primary school pupils from different backgrounds and/or with different characteristics. The reasons are complex but, as for other subjects, there is a clear and long-standing link between deprivation and under-achievement in primary mathematics. In 2008, there was an 18% gap between the proportions of pupils taking free school meals who achieved the expected standard in mathematics at age 11, and their peers who did not receive free school meals. This gap is similar to results in English and has narrowed by 4% since 2005.[8]

11. In recent years, schools with the highest proportion of pupils taking free school meals have made a faster rate of improvement in the percentage of all their pupils reaching the expected standard in mathematics than those with the lowest proportion. This difference has not, however, translated into any significant narrowing of the attainment gap between pupils, indicating that only part of the relative improvement represents the more disadvantaged pupils catching up with their peers.[9]

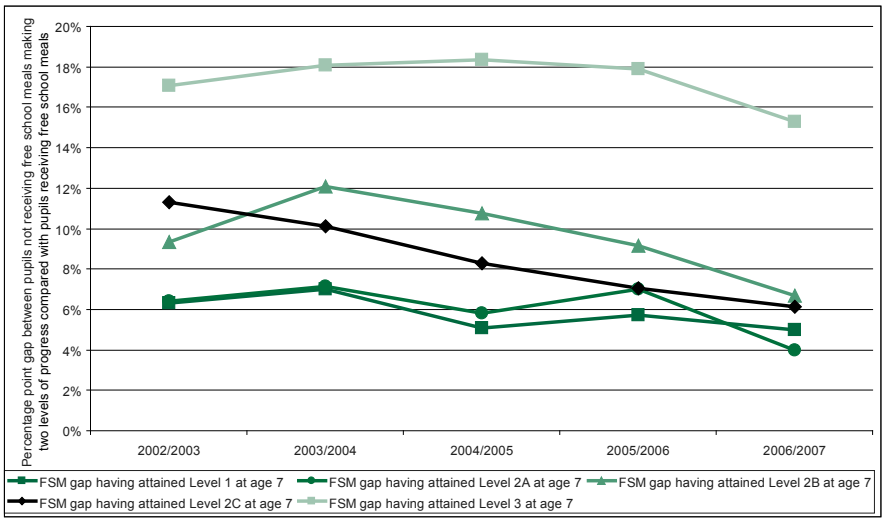
12. To narrow these attainment gaps, it is vital that pupils from disadvantaged backgrounds make comparable progress in mathematics to their peers between Key Stage 1 and Key Stage 2. **Figure 4** shows the differences in the percentages of pupils not receiving free school meals making the expected two levels of progress, compared with pupils receiving free school meals, between 2003–2007, starting from the four main levels of attainment at age seven (Key Stage 1). The downward trend since 2004 shows that these 'deprivation gaps' have been narrowing, but they are still unacceptably large. The gap for the most able pupils (who had already achieved level 3 in mathematics by age seven) is the most stark, with a difference in 2007 of around 15% in the progress made by age 11 between pupils receiving and not receiving free school meals. These achievement gaps persist into secondary school, and the proportion of children receiving free school meals not making the expected rate of progress to GCSE at age 16 is disproportionately high.[10]

8 Qq 21, 52–53, 59–60; C&AG's Report, para 1.20; Dept for Children, Schools and Families' statistical first release 14.03.09, *Key Stage 2 Attainment by Pupil Characteristics in England 2007/08* (provisional)

9 Qq 53, 59–62; C&AG's Report, para 1.24

10 Qq 59–62, 78–79; Ev 15

Figure 4: Percentage point gaps between pupils receiving and not receiving free school meals (FSM) making two levels of progress in mathematics between Key Stage 1 and Key Stage 2: 2003–2007



Note: At primary school, National Curriculum levels range between levels 1 and 5, broken down into sub-levels 'C' to 'A'. Most seven year olds are expected to achieve level 2. Most 11-year olds are expected to achieve level 4. National data is collected by sub-level only at level 2

Source: National Audit Office

13. Relative disadvantage also explains, to a significant extent, the considerable variation in performance of pupils from different ethnic groups. Pupils of Chinese and Indian ethnicity consistently attain above the national average in mathematics at Key Stages 1 and 2 whereas pupils of Pakistani, Bangladeshi, black Caribbean and black African ethnicity attain below. However, the effect ethnicity has on achievement is far less pronounced or even reversed after adjusting for socio-economic circumstances. For example, pupils of black Caribbean ethnicity do better on average when compared with pupils from most other ethnicities with similar socio-economic backgrounds, including white pupils. Family and community attitudes to education appear to influence pupil achievement across social and ethnic groups.[11]

14. Mathematics is the only core subject where at Key Stage 2 more boys achieve the expected standard than girls. More significantly, there are large gaps in the progress that girls make compared with boys between Key Stages 1 and 2. At certain lower levels of attainment at Key Stage 1, the gaps between boys making the expected rate of progress over girls more than doubled in 2007 compared with 2004. The Department does not have full information on why the gaps have widened, or whether certain teaching approaches may be hindering the performance of girls, but will be giving greater attention to this issue over the coming year.[12]

15. The Department is attempting to narrow the gaps in achievement through a combination of approaches. For pupils slipping behind, it is introducing intensive and specialist tuition designed to help them catch up with their peers. At Key Stage 1 it plans to improve the rate of progress of pupils who find mathematics difficult through the *Every Child Counts* programme. This programme is being piloted and will not reach all the

11 Qq 18, 44–46; C&AG's Report, para 1.17

12 Qq 6–7, 25; C&AG's Report, para 1.16; Figure 7

targeted 30,000 pupils, who are in the lowest 5% of achievement nationally, until 2011. It is a high cost programme, amounting to some £2,600 per pupil.[13]

16. After our hearing, the Department announced that initial funding under the *Making Good Progress* programme will be targeted at 36,000 Key Stage 2 pupils falling behind in mathematics and/or English. A total of £15 million is being allocated to schools and local authorities to deliver up to ten hours of extra one-to-one tuition in each subject in the spring and summer terms of 2009. Early evidence from pilots suggests some positive impact on progression rates, but there is a large shortfall in the numbers of pupils expected to receive the support; for mathematics some 3,500 pupils, compared with the 11,500 targeted. This is largely due to the difficulties schools are facing recruiting specialist tutors, particularly in mathematics.[14]

17. The Department's principal lever to narrow the gaps in school performance is the *Intensifying Support Programme* (from 2007 renamed the *Improving Schools Programme*), which it wants to see used as the national model for school improvement. Over 2,200 primary schools that have been underachieving in mathematics and/or English took part in this programme to 2007, the majority located in disadvantaged areas. Overall, the results of participating schools have increased above the national average. The Department told us that it has a good understanding of the key factors behind the programme's success. These include supportive relations between the local authority and the school, ensuring the right expertise is brought in to help the school improve, backed by strong school leadership and a stable teaching staff.[15]

18. The Department takes account of levels of deprivation in its funding of schools and does not consider that schools in disadvantaged areas should receive any further extra funding. It acknowledges that high teaching staff turnover and recruitment problems in schools in more disadvantaged areas contribute to the challenges these schools face in raising attainment, though headteachers have the flexibility to pay higher salaries to attract staff.[16]

13 Qq 3–4, 18–19, 78-79; C&AG's Report, para 2.4; Figure 14; Dept for Children, Schools and Families, *Every Child a Chance Trust: The long term costs of numeracy difficulties*, January 2009

14 C&AG's Report, para 2.4; Figure 14; PricewaterhouseCoopers, *Evaluation of the Making Good Progress Pilot–Interim Report*, December 2008

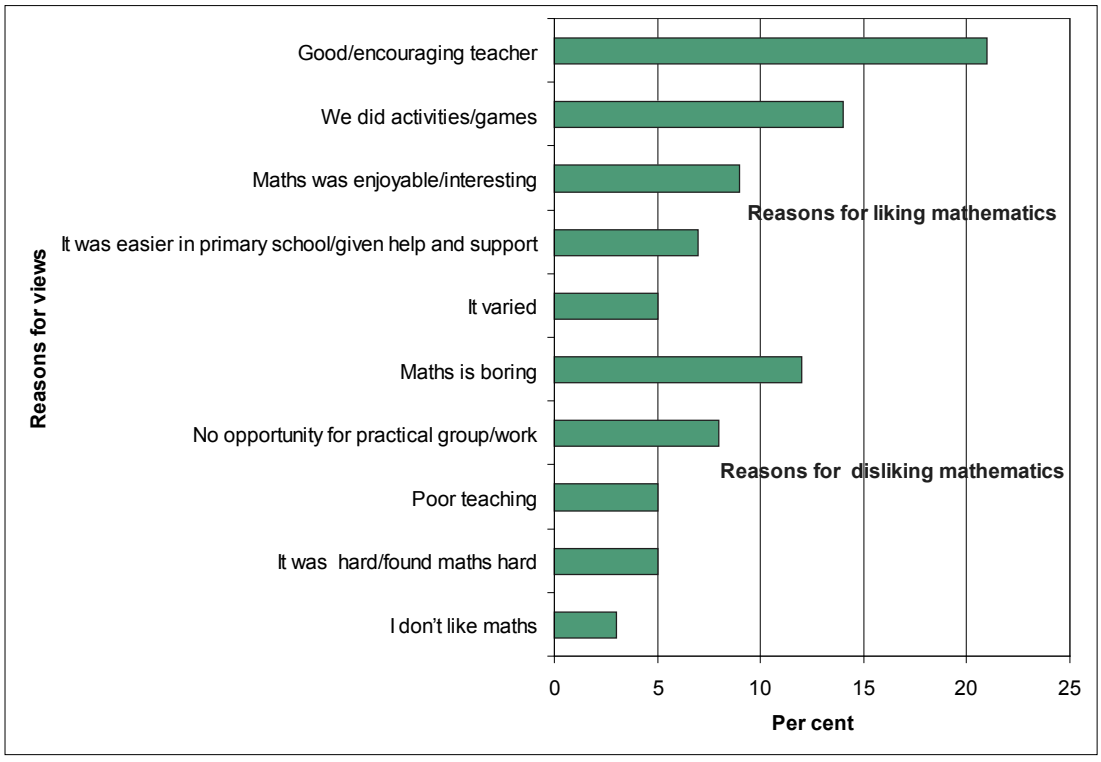
15 Qq 18, 39, 42–43; C&AG's Report, para 2.21

16 Qq 18–19, 39, 43, 51, 53–55

3 Raising the quality of primary mathematics teaching

19. **Figure 5** shows that a good and encouraging teacher was the most common reason given by secondary school pupils for liking mathematics at primary school. Other research similarly demonstrates that teaching quality is a key determining factor in improving pupil achievement. The most common reason given by pupils for disliking mathematics at primary school was that it was boring, indicating that teachers need to combine strong subject knowledge with good interpersonal skills and the ability to engage children in the subject.[17]

Figure 5: Reasons why secondary school pupils liked or disliked mathematics when they were at primary school



Note: The survey was answered by 1,129 11–13 year olds in their first two years of secondary education

Source: C&AG's Report

20. The Department recognises that well qualified and inspirational teachers play a larger part in the successful learning of mathematics than in other subjects. It told us that the *Teach First* programme aims to reflect this in the way it selects top graduates to teach in challenging secondary school settings. However, it has no plans to expand the scheme into primary education or deploy mathematics graduates in primary schools as they are a minority even among *Teach First* applicants, and it would result in fewer of the trainees working in secondary schools.[18]

17 Qq 11, 19, 38; C&AG's Report, para 3.4; Figure 18

18 Qq 38, 82; Ev 16

21. Available evidence indicates that relatively few primary school teachers take up continuing professional development in mathematics, and that take-up has decreased over the last ten years. There may be a number of reasons for this, including the relatively few primary school teachers with a subject background in mathematics, and because some mathematics co-ordinators may take on the role within their schools of helping teachers to develop their skills in mathematics. Much of the training provided for schools concentrates on general school improvement rather than specific subjects and the Department recognises that, alongside improvements in general teaching and learning techniques, there needs to be a rigorous and well established subject knowledge base.[19]

22. The Department has promoted sharing of good teaching practice between schools through local mathematics networks and teacher-to-teacher coaching, but these have had limited effect. The majority of schools are no longer engaged in local mathematics networks, which have proved difficult to sustain in the absence of dedicated funding. Teacher-to-teacher coaching through the Leading Teachers' programme is at an early stage and may grow, providing the opportunity to work alongside an expert teacher and be mentored and coached by them. But with take-up currently low, it remains to be seen whether this programme will have a significant impact on spreading good practice, particularly among schools identified as needing support.[20]

23. There is considerably more that can be done to motivate pupils by making mathematics relevant and practical to their lives outside school. High performing teachers motivate pupils by conveying the essence of mathematics and its relevance to real life, and there are good examples of this approach in countries such as the Netherlands and Latvia. Many teachers need to develop more creative and motivational skills to inspire primary pupils in mathematics or the opportunity to fully demonstrate them. The Department told us that combining traditional subject teaching with the application of the content will be a strong feature of the future primary curriculum. But they acknowledge that it is for teachers to make mathematics fun and enjoyable, supported by teaching resources that help them to do this.[21]

24. High performing teachers also truly understand the stage each pupil has reached, so that they can give all pupils the right amount of challenge and support. There is, however, considerable scope for improvement in pupil assessment, which Ofsted consistently finds to be one of the weakest aspects of mathematics teaching. In May 2008, the Department allocated some £50 million to primary and secondary schools annually to 2011 to support improvements in pupil assessment, and new resources have been added to the National Strategy's website to assist schools. It is too early to conclude on the impact of these resources.[22]

25. Every school is expected to provide particular support to the 5%–10% highest achieving pupils to help them to continue to achieve well. Even so, identifying and stretching the most gifted and talented mathematicians is challenging, possibly more so than supporting

19 Qq 12, 58; C&AG's Report, para 3.7

20 Qq 15–17; C&AG's Report, paras 3.8–3.9

21 Qq 8, 10, 37; C&AG's Report, para 3.10; Figure 18

22 Q 49; C&AG's Report, paras 3.12–3.13

pupils who are struggling in the subject. To do it well, staff require confidence and expertise in mathematics, and to be able to apply their expertise with a good understanding of how pupils learn. The most inspiring teachers, with a strong grasp of mathematics, are best placed to achieve good results with pupils across the spectrum of ability. Good teaching resources and continuing professional development are important to provide them with support.[23]

26. In 2007, the Department commissioned Sir Peter Williams to undertake an independent review of the quality of primary mathematics teaching to identify if and how the quality of teaching needs to improve. Sir Peter's review, published in June 2008, found that nationally teacher subject knowledge was not good enough, and the Department accepted his principal recommendation that 13,000 specialist mathematics teachers should be trained by 2019. The Department expects that by then there will be enough in-school support to assist teachers to improve their teaching of mathematics, and a cadre of leading teachers, some working across schools, who will help to transfer effective practices to other, particularly smaller, schools.[24]

27. Given the importance of this recommendation, we are surprised that the Department has confirmed that it will take ten years to implement. The Department is currently trialling two models for the training of specialist mathematics teachers: a full three-year training programme and a more intensive fast-track, one-year approach, largely focussing on teachers with a current interest in mathematics, such as mathematics co-ordinators in schools or mathematics subject advisers in local authorities. The Department has indicated that it will assess during these pilots whether it will be possible to bring forward the timetable for training specialist mathematics teachers.[25]

23 Qq 8, 49; C&AG's Report, paras 3.12, 3.16

24 Qq 15, 17; C&AG's Report, paras 2.5, 3.5

25 Qq 9–10, 13

Formal Minutes

Monday 27 April 2009

Members present:

Mr Edward Leigh, in the Chair

Mr Richard Bacon	Dr John Pugh
Mr Paul Burstow	Geraldine Smith
Mr Ian Davidson	Rt Hon Don Touhig
Mr Nigel Griffiths	Rt Hon Alan Williams
Rt Hon Keith Hill	

Draft Report (*Mathematics performance in primary schools: getting the best results*), proposed by the Chairman, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 27 read and agreed to.

Conclusions and recommendations read and agreed to.

Summary read and agreed to.

Resolved, That the Report be the Twenty-third Report of the Committee to the House.

Ordered, That the Chairman make the Report to the House.

[Adjourned till Wednesday 6 May at 3.30 pm

Witnesses

Monday 8 December 2008

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Oral evidence

Taken before the Committee of Public Accounts

on Monday 8 December 2008

Members present:

Mr Edward Leigh, in the Chair

Mr Ian Davidson
Keith Hill
Mr Austin Mitchell
Dr John Pugh
Geraldine Smith

Mr Tim Burr CB, Comptroller & Auditor General, **Mr Michael Whitehouse,** Assistant Auditor General and **Angela Hands,** Director, National Audit Office, were in attendance.

Ms Paula Diggle, Treasury Officer of Accounts, HM Treasury, gave evidence.

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL

MATHEMATICS PERFORMANCE IN PRIMARY SCHOOLS:

GETTING THE BEST RESULTS (HC1151)

Witnesses: **Mr David Bell,** Permanent Secretary, and **Mr Jon Coles,** Acting Director General for Schools, Department for Children, Schools and Families, gave evidence.

Q1 Chairman: Good afternoon and welcome to the Committee of Public Accounts where today we are considering the Comptroller & Auditor General's Report *Mathematics Performance in Primary Schools: Getting the Best Results*. We welcome back to our Committee David Bell, who is the Permanent Secretary to the Department for Children, Schools and Families. Would you like to introduce your colleague, please, Mr Bell?
Mr Bell: This is Jon Coles, who is the Acting Director General for Schools in the DCSF.

Q2 Chairman: Thank you. I apologise for the later start because of business in the House and for keeping you waiting even longer because of a division in the House. If we look at paragraphs 5 and 7, which we can find on page 8 of the Report, the Main Findings, we see there what we are spending. We spent about £2.3 billion last year on mathematics but a quarter of pupils still do not reach the expected standard by age 11 when they leave primary school. To what do you attribute this? What is the problem? What can we be doing better than we are doing already?
Mr Bell: I think it gets tougher the more students achieve the expected level. We started off about a decade ago with just under 60% of pupils achieving the expected level. We are just under 80% achieving the expected level in 2008 and I think every percentage point that you then accrue after that gets more difficult because you might have students who have some kind of special educational need or you might have those who have more tricky family circumstances. Having said that, Chairman, we absolutely accept the point made in this Report that with the existing resources more children could achieve even more effectively. We know that in many schools students are achieving well above the expected level so we think there are a number of things we can do to drive forward performance, some of which are included in this Report—greater attention to one-to-one teaching when children are at the age of seven, greater attention to those schools which may have a larger percentage of children behind the expected level and supporting them through expert teachers, sharing and disseminating of the best practice using expert teachers and so on. We think there is a lot that can still be done but we would not want to underestimate the progress that has been made, recognising that the progress that is still to be made will probably be tougher as we move on.

Q3 Chairman: I understand that about any project, that it gets more and more difficult, but if we look at figure 2 on page 9 what we are seeing is not a continuous improvement. We see a step change up to 2000 for the percentage of pupils achieving the expected level and then after about 2000 it appears to be flat-lining. Is that not rather worrying?
Mr Bell: Yes, it is. We have had something of a plateau in recent years and that is why some of the new approaches we are taking are so significant. The Report touches on the importance of the *Every Child Counts* approach and that is deliberately designed to target those students at the age of seven who might already be slipping behind, because I think if you can intervene at that stage you are more likely to achieve that kind of step change, to use your terminology. Interestingly, schools themselves have set more ambitious targets for 2009 which put us ahead of the trajectory that we are anticipating for the targets to achieve in 2011; in other words, in the process of setting those targets they have set quite ambitious targets and I think that is because they themselves recognise that some of the approaches we are taking

may well yield dividends with the students concerned. I think there is a recognition in schools that some of the newer approaches, newer activities, are going to have more of an impact because we need to make that progress to move off the plateau.

Q4 Chairman: But you missed your target for Key Stage 2, did you not, by some quite wide margin? These are quite ambitious targets. There is not the slightest chance you are going to meet your ambitions by 2011, is there, not judging by the progress you have made since 2000? Suddenly this graph will have to look completely different. It does not look to me as if you are making much progress at all.
Mr Bell: I think it is because there are a number of changes that have come about. First of all, the ambition of schools is quite significant. I think if schools themselves are recognising that they can have higher ambitions for students they are not doing that on the back of an idle hope. My view is that they are taking account of the progress and the approaches that students are taking and the support that they are getting through programmes like the Intervention for Schools in Difficulty programme, like the use of expert teachers, like *Every Child Counts*, and they themselves are recognising that. The other important difference that has come about since we were looking at the approaches at the turn of the decade is that we are now focusing much more on the progress that children are making, so whilst it is still important to target those youngsters that might be on the level 3/level 4 borderline, in other words those that might just get to the expected level, we are now focusing much more on the progress that children make and schools are looking at setting quite ambitious targets for pupils and supporting them in that progress. These targets are ambitious, and we make no apologies for them being ambitious. We make no apologies for the original targets being ambitious because I think there were many decades of under-expectation in relation to what students and pupils could achieve and now we believe that the combination of the approaches that are in place gives us a very good chance of achieving the targets.

Q5 Chairman: You say that, but if we look in more detail at figure 17 on page 28, "Projected progress in mathematics at Key Stage 2", you can see there "Rate of improvement required to meet target" and you can see "Level of attainment projected using actual rate of improvement . . . ". You are actually losing this battle. This target is moving away from you. You are not getting any closer.
Mr Bell: I think it is very significant that schools themselves are now setting targets for 2009, based on the knowledge they have of the students they are teaching, that suggests that they are on trajectory to meet that target, and I think if you combine that with the approaches that I have described and the extra support that is now going into schools and that schools are using, they and local authorities are optimistic. To be fair, we are pressing really hard on this because we know that the benefits that accrue where children achieve the expected level, not just in mathematics but also in English, are very substantial. We are not just pressing very hard but we are also providing the kind of support that we think schools and local authorities are going to need.

Q6 Chairman: Let us look just for a moment at mathematics teaching for girls. This is brought home very starkly in figure 7 on page 17, and again this gap seems to be getting worse. Why is mathematics teaching proving less effective for girls? It is not other subjects; it is only the mathematics. What is going wrong?
Mr Bell: It is a very interesting question because, as you rightly point out, it is the only core subject at Key Stage 2, the latter part of the primary years, where boys achieve better. There have been a number of studies on this and there are some suggestions that girls perhaps are less inclined to explore jotting down on a piece of paper and trying things out, that girls perhaps find visualisation of number lines more tricky, something as well about the inclination to go for neatness in work and not necessarily innovate or experiment.

Q7 Chairman: But it is a relatively new phenomenon, is it not?
Mr Bell: Obviously we have only had these data for the last decade or so, but we have been looking quite hard at the gender gap in maths, and those issues that I have touched on are amenable to being addressed. For example, if you have girls who are less willing to experiment on paper you can encourage them to use the computer to try things out and to learn concepts. To be fair, we do not have the absolute explanation of why this is a phenomenon that particularly affects girls but what I have described to you is the best assessment on all the research that has been done. We are looking at that also against what I mentioned to you earlier, the progression, so we know that if girls are not making the progress between Key Stage 1, ie, the age of seven, and Key Stage 2, the age of 11, there is an opportunity to target girls, and certainly our *Every Child Counts* approach starting with seven-year olds can look to maximise the progress that girls make. There is quite a bit of knowledge and understanding of why girls achieve the way they achieve, or under-achieve, you might say, but this is one that has not been completely nailed down, to be absolutely frank, and the research does not nail it down entirely.

Q8 Chairman: Let us have a look at school types now. If we look at figure 11 on page 19, different school types and how they are performing at mathematics, you see there that the voluntary aided schools, the voluntary controlled schools, which obviously are often faith schools, do better. To what do you attribute this and how are you spreading their good practice?
Mr Bell: I do not think there is any single factor. There may be a factor to do with the percentage of students on free school meals if you look at the evidence in relation to schools with a high percentage of free school meals and mathematics performance. There is also something about the

general quality of those schools which has been identified in relation to Ofsted reports, and there will be a mathematics benefit or dividend. In relation to sharing the practice, I think that has been done in a number of ways. A number of areas have expert teachers, and I know they include teachers who are working in voluntary aided schools, and those teachers are deployed elsewhere in schools that might need more support. We have got expert headteachers, we have got mathematics consultants and so on. It is not just a sharing of the best practice that you might find in voluntary aided schools; there is also utilising the best of teaching practice elsewhere. As I said when I started the answer to this question, I do not think there is a single factor that would explain the particular achievement in mathematics that is related to voluntary aided schools. There are a number of other characteristics of voluntary aided schools that I think we have commented on previously that have an impact on school performance generally.

Q9 Chairman: A couple of experts have been looking at this and we have had this recommendation from Sir Peter Williams that there should be a mathematics specialist in every primary school within ten years, and you have accepted that should happen. That makes such obvious sense to me that I am surprised it is going to take ten years. To be completely up to date, we have had, and it was widely publicised, the report by Sir Jim Rose; it was in all the newspapers today. He said, "Children may know and have the skills to do sums but they do not understand what sums do when faced with a real life mathematical problem". It is very basic, is it not?
Mr Bell: Yes, it is.

Q10 Chairman: So what are you going to do to try and make sure children understand this?
Mr Bell: I think it is one of the reasons why Sir Jim Rose was very clear today that you had to combine good, traditional subject teaching alongside the ability of youngsters to apply that subject knowledge in real-life settings. I think this is both content and the application of content and I think that will be a very strong feature of what is going to happen in the primary curriculum going forward. To be fair, that has been the case in a lot of the mathematics teaching to date, that you do try to combine the conceptual knowledge, "Do you know how to do sums?", "Do you understand all of that?", alongside, "How do you apply the knowledge?". On Williams, and my colleague, Jon Coles, may wish to comment on this further, we looked very carefully at the ability of the system to train up enough maths specialists, and although we did look at the possibility of doing that on a faster timescale than the ten years, we just felt it was not going to be possible to do it more quickly. We are now starting a pilot scheme this year with a view to rolling it out quite quickly.
Mr Coles: We have two models of doing this, both of which are being piloted. The first is a full three-year training programme for existing teachers to turn them into maths specialists. The other is a more intensive fast-track, one-year approach. We are going to trial both of these. If it turns out that we can move more quickly then of course we will do that, but it means that for very small rural primary schools which may only have one or two teachers we need to provide those schools with access to a maths teacher just as much as to much larger primary schools. That is the challenge at the moment.

Q11 Keith Hill: Mr Bell, if you look at figure 18, which is the survey among secondary school pupils of their experience of maths learning, what that bears out is one's suspicion that well qualified and even inspirational teachers play perhaps a larger part in successful maths learning than in other subjects, and often those teachers can play important mentoring roles *vis-à-vis* other teachers.
Mr Bell: Absolutely.

Q12 Keith Hill: I want to ask some questions which relate to the Williams Review, which was the subject of the Chairman's last question, and to focus on that section of Part Three beginning at paragraph 3.5 on subject knowledge, and it may be up to Mr Coles to go a bit more deeply into the thinking behind the proposals in the Williams Review. I want to ask some questions which arise from paragraph 3.7. First of all, for example, it is stated there that relatively few primary teachers do continuing professional development in maths (CPD). Why should that be the case and what are you going to do about that?
Mr Bell: That is quite a complicated one. Partly it might relate to the subject background of prospective primary school teachers and you will tend to find that maths and science will not be as prominent as other subjects for prospective teachers. I think it has also got something to do with the fact that when they get into schools and start teaching the subject responsibilities that they take up mean that you tend not to have every teacher doing a maths advanced qualification or there are a relatively small number doing it because it will be the maths co-ordinator that might do that kind of in-service work. As Jon said earlier, we do not think that it necessarily makes sense, and neither did Peter Williams, interestingly, to try to get everybody up to exactly the same level in their in-service education, but the Williams proposition and our proposition essentially is that you get those subject specialists trained and then you have a kind of cascading of that approach. Rather interestingly, I think there are some quite important lessons to learn from the 1990s where there was quite an investment in what were called 20-day courses where, as the national curriculum was rolling out in the 1990s, teachers were given a very intensive 20-day course to develop their maths specialism and that was built on by sharing their expertise more widely around the staff in their own school. I think we are going much further a good few years on because, as Jon was saying, we are looking for a more intensive kind of in-service maths education, partly, I think, to address the questions that Williams raised. I think we should be putting that kind of attention into maths specialism but I think we have to be realistic that not all teachers will either need it or necessarily

have the pre-service background, ie, before they became teachers, and that is why the highest quality of subject specialism in our experts is really important.

Q13 Keith Hill: The NAO again in that paragraph suggest that the continuing professional development has tended to shift in recent years towards general school improvement rather than in specific subjects. You are going to cut across the grain by focusing on your 13,000 specialists in this decade of change. How are you going to incentivise them to do these courses?
Mr Coles: This is one of the things that we need to test out fully in the pilot, but on these two models of developing teachers some we will bring through the initial route as maths specialists; others we will retrain from the existing stock. Clearly, we are going to be looking for people who have a focus on maths now whether those are subject advisers in local authorities or whether they are people who are maths co-ordinators in schools. Our experience so far when we have offered professional development opportunities has been that these have been broadly welcomed by teachers, particularly teachers who want to build their expertise in a particular area, so a maths co-ordinator looking to extend their professional expertise I think will see this as a very positive professional development. I do not think we are thinking this needs a huge financial incentive or anything of that sort in order to encourage people to do it, but obviously again this is something we will test in the pilot.

Q14 Keith Hill: You talk about subject advisers in local authorities but again the NAO in the same paragraph suggests that there have been changes in local authority funding and staffing which have led to a decline in the number of senior staff with specific responsibility for maths and a consequential decrease in maths CPD. Why has there been that decline? What have been the changes which have led to it and are you confident that you will be able to counter those changes?
Mr Bell: You have put your finger on one explanation in your earlier remarks, Mr Hill, when you talked about the move towards generic school improvement activity as opposed to single subject specific activity, but—and I think it is a really important "but"—we have in a sense come in behind that through the funding that we have delegated to local authorities for establishing maths consultants, so we know that across the country there are over 400 maths consultants in local authorities. We know that on top of that there are a very large number of teachers who might be out for a day a week or a couple of days a week on the best practice principle that I described to the Chairman, and we know that at a regional level we have got regional directors with a key responsibility for mathematics, so there is quite a strong mathematics focus there. Do not forget too that we have also invested quite a bit of money in a new centre for the teaching of mathematics so again that is another source of developing expertise. It is undoubtedly the case that local authority employed people in the old local authority advisory sense have probably reduced in numbers but there has been no diminution in the amount of mathematics expertise available to local authorities and schools, some of which they directly employ and some of which they get via the national strategies contract.

Q15 Keith Hill: You talk about best practice and in paragraph 3.8 there is a reference to the programme to aid teaching improvement of maths and English between 2004 and 2006 at a cost of £38.5 million, which has been about the development of shared practice and local maths networks, but a survey taken last year suggested that the majority of schools no longer engaged in such networks. Why do you suppose that is the case, is that not a matter of concern and what are you going to do about that?
Mr Coles: This is another reason for wanting to implement the Williams recommendation that there should be this cadre of leading teachers, some of whom would work across schools and be a basis for translating some of the effective practice in one school into other schools and be employed to do that across particularly smaller schools, precisely because some of this networking activity has been quite difficult to sustain in the long term in the absence of ongoing ring-fenced pots of money to do it. This survey did indeed come to the conclusion that this was not something that schools would sustain on their own and therefore the recommendation from Peter Williams that we have a specialist who might work across several institutions I think is an important part of this. We have also, through the national strategies, had a number of leading teachers identified who are precisely there to reach out and provide expertise for other schools, so we have got a continuing networking activity going on just on a rather different basis.

Q16 Keith Hill: In principle I am sure you are right in saying that the leading teachers principle is a very useful approach but let me also draw your attention to paragraph 3.9 which says of the leading teachers programme which was started in September 2007 that at present the take-up is low. What do you have to say about that?
Mr Coles: It is a growing programme so it started on a relatively small scale. It is something which will grow over the next few years.

Q17 Keith Hill: It is not a fair way through; it is just at the beginning of the process?
Mr Coles: At this stage it looks like the early results of that are pretty encouraging so there is a positive impact from that. Certainly that is the strong anecdotal message.
Mr Bell: It is also, if I may say, Mr Hill, based on good research about what is most likely to improve the performance of a teacher, and the opportunity to work alongside an expert teacher in a classroom and have them mentor and coach you is based on very good international research that that is the best way rather than necessarily sending people out on courses. In fact, that is another good reason for the

Williams recommendation, that you have that in-school support, somebody who can come into your class and assist you to improve your teaching of mathematics.

Q18 Geraldine Smith: I am very interested in the differences in the attainment of pupils and particularly pupils in areas of deprivation. What can you do about this because I do not think it is just about sharing best practice? I have got little church schools in my constituency, faith-based schools in rural locations where the pupils get an awful lot of support from their parents and where they get a lot of help at home. Equally, I have got children who are in deprived communities where they struggle at home and they struggle badly and we have seen some horrific reports recently about just how difficult life can be for children sometimes. What can we do to bridge that gap seriously?

Mr Bell: If you had to sum up the differences between those schools that you describe, it may well be that the youngsters who are achieving more are getting a lot of support at home and somebody is really focusing on their work, not just in school but at home, and I think that is one of the underpinning principles of the *Every Child Counts* programme as it is in the *Every Child a Reader* programme, that you have this high intensity support from an adult, a trained teacher, to really work with you to help you not just take those small steps but also take the small steps through because it is consequential—you have to know this, before you know that, before you know the next thing. Getting an adult to work with you all the way through that is really important. At the level of the individual pupil that is what we can do. There is also, of course, the level of the individual school and one of the programmes that has been very important to us in recent years has been the Improving Schools programme where we tackled those schools which fell into the hardest to shift category. The NAO Report talks about 604 schools, so let us assume there are around 600 schools that are in that category because of a new measure we have got under the new PSAs. The reality is that the programme can work really intensively with the headteacher and provide support to the headteacher to make sure that they understand what they should be doing with particular teachers. It can work with the maths co-ordinators on the basis that we have just been describing to Mr Hill and can you ensure that the right expertise is brought in from outside. There are a number of things you can do at the level of the school as well as the child.

Q19 Geraldine Smith: But do those schools in areas of deprivation really get the big enough advantages and funding, because they really need to be funded a lot more? I think teachers can make a huge difference. I think a teacher who is passionate about maths and who knows a great deal about mathematics will really inspire children and they will do better and I think we need those sorts of teachers in schools where children are failing the most. I would also ask what sorts of incentives can we give to those teachers that are doing really well.

Mr Bell: I suppose there is a general question, which is maybe not for today's hearing, about funding for schools *per se*, but certainly on the Improving Schools programme it is targeted exactly to the schools that you were describing. There is additional funding there, there is additional staff support, there is additional expertise from outside. As far as incentives are concerned, I do not think people will necessarily say, "Give me an incentive to do better". People themselves want to do better by the children that they are serving and I think we can target that through things like the Intensive Support programme, through the *Every Child Counts* programme, which is going to be focused largely on those students who are not making the best progress and therefore will be concentrated on the schools that you describe. We are giving a lot of support to those schools and therefore to those teachers to enable their pupils to make the best progress.

Q20 Geraldine Smith: But are you getting enough teachers coming through that have that commitment to mathematics and want to do it, and if you are not do you not need to give them more incentives to get those teachers?

Mr Bell: I think we are back now to the recommendations of the Williams Review, which we absolutely accept, about getting expert maths teachers and training up those maths teachers. Pending that and, given that that is a ten-year programme, that is why we have had these bespoke programmes to provide mathematical expertise. Yes, it is not the same as having it in your own school, and some of those schools will not have the maths specialist teacher that will probably make the most difference, but using the kinds of programmes that we have described we are able to make as much of that kind of support available as we can. We know that in a number of schools there are pupils who might be achieving, say, at level 4, the expected level in English, but might not be doing it in maths. We know where these schools are. We can target our activity and effort and we can say why is it the children doing particularly well are doing well in English but are not doing as well in maths and then we can focus on that. It may often be down to a lack of confidence and expertise in the teacher, so we have a number of techniques and tools to identify where the need is greatest so that we can deploy the support accordingly.

Q21 Geraldine Smith: In my own experience of talking to teachers I think the teachers working in the schools with the greatest levels of deprivation feel that they work extremely hard but they often feel that their hard work is not taken into consideration because they are the ones whose results just appear the lowest because of the nature of the children they work with. Education is the best chance for those children so it is not acceptable for those children to fail, but equally it is not acceptable to look like we are blaming the teachers when sometimes it is really not their fault.

Mr Bell: One of the reasons we continue to focus, absolutely rightly, on the raw results, what percentage of pupils are achieving the expected level, is that in a sense without that expected level you are not going to make the progress, but we are also putting greater focus now on the progress that pupils make. If you are starting from a lower base and you make a couple of levels of progress or even more, that is a worthy achievement. We want to recognise that as well, but the raw results, frankly, are still there.

Q22 Geraldine Smith: Teachers always complain to me that you do not take enough notice of value added.
Mr Bell: Certainly in terms of the target for 2011 we are taking account not just of the raw data, which are still crucial because they tell you what your level of attainment is; we are also trying to recognise through the progress that schools are making that if you are starting from a lower base and you move children on, that can be in itself a significant achievement. We have to get the balance right by keeping the focus on the raw attainment at the same time as giving the incentives to the schools that are having to tackle youngsters that might be starting from a lower base.
Mr Coles: It is probably worth adding that in most schools where there is a disproportionate number of children coming in having not reached the expected level at Key Stage 1 and may not be progressing as fast, what we are aiming to do from next year is to have a real targeted effort and make sure all of those children who are below the expected level in Key Stage 2 and are not progressing have some one-to-one tuition to help them accelerate their progress and catch up during the course of Key Stage 2. We hope that that focus on progression with one-to-one tuition to support it, is going to really make a difference.

Q23 Geraldine Smith: So if there were 20 pupils in one school who needed that support there would be funding for 20 pupils?
Mr Coles: Yes, there would.

Q24 Geraldine Smith: And at another school if there was only one there—
Mr Coles: The way that we have tried to frame the guarantee to parents to say, "Your child is behind and not progressing", is designed precisely to do that, so if in some schools all the children are behind expectations and not progressing all the money is targeted to them.

Q25 Geraldine Smith: That is encouraging. Can I turn to the difference between girls and boys at maths? Have you any evidence or information about girls-only, single sex schools, how they do? Do girls do any better if they are taught separately?
Mr Bell: It would be very unusual at all to get single sex schools in primary education. In fact, I do not think there are any primary schools in that circumstance. It is a pretty contentious issue afterwards, as you know, in terms of what happens in secondary education, but I suppose if the focus here is primary education we want to ensure that all girls make the right progress. As I said to the Chairman earlier, we do not have this one completely nailed down is the frank and honest answer to this, but there are a number of things we are doing now. We are increasing the focus on the performance of girls in the next year or so which I hope will give us some more lessons to understand quite how they might make better progress.

Q26 Geraldine Smith: It is also very important at primary school level because there is that link with the science subjects when they then go on to secondary level where I think we need to encourage more children to progress in the sciences.
Mr Bell: It is hugely significant and as part of our department's wider approach to science and technology, engineering and maths, the so-called STEM subjects, we understand the amount of importance to place on primary education for precisely the reason you have stressed, because if you are worried about youngsters taking STEM subjects at 15/16 up to A-level you should also be worrying about that with the young and getting the motivation there. The figure that worried me most there was the "Do you think maths is boring?" question. Too many children think that maths is boring and if you are going to encourage them to take maths on inside the school and beyond you have to get them out of thinking maths is boring.

Q27 Geraldine Smith: I think that is the problem with teaching methods because I think mathematics can be more exciting if it is taught correctly. Finally, have you learned anything from other countries about what works well?
Mr Coles: The Report quotes a couple. In the original design of the National Numeracy Strategy, which in a sense has underpinned all of what we have done on primary maths for the last ten years, there was a very extensive look at all of the international evidence and at all of those countries which appeared to be doing well on this. Of course, a number of Pacific Rim countries in particular do very well on mathematics and there was a look at that, and also at the experience from Scandinavia and from the rest of the English-speaking world as well to understand what the key things were in the whole design of the National Numeracy Strategy and now the primary strategy in maths.

Q28 Geraldine Smith: So what do they do that is good?
Mr Coles: The very good news since the mid nineties has been our improved performance in international studies, comparing maths performance in this country with other countries.

Q29 Geraldine Smith: But you have not quite answered my question. What do they do in the other countries? What is the good practice that we can learn?
Mr Coles: There are key things which were introduced in the National Numeracy Strategy which were taken from other countries and from the

research evidence, so the classic three-part lesson of having a starter, a main activity and a plenary is well researched in this country and abroad, and the professional development approach to supporting teachers in progressing their understanding of pedagogy and their subject knowledge. All of these things in a sense are drawn from the evidence both from this country and abroad.

Q30 Dr Pugh: On page 7 of the document, the initial summary, the figure of £207 million occurs which is used to implement the strategy to improve primary mathematics and literacy. Am I right in thinking that were we to divide that in half £103.5 million a year is spent on boosting attainment in primary mathematics? Is that additional to what is spent?
Mr Coles: Yes. It is not perfect but as a broad estimate I think that is fair.

Q31 Dr Pugh: The Report makes clear that initially when you started spending this money there was a substantial improvement from 59% of people getting the expected standard at Key Stage 2 to 72% getting the expected standard. However, that initial improvement, a 13% improvement if my sums are right—I hope they are right—could be put down, could it not, to the fact that there was a new method of assessment and schools just wised up in a couple of years? It is quite phenomenal to see such a sharp improvement in such a relatively brief period of time. Could that initial improvement be partly due to the schools simply getting the hang of the tests or learning a little about gaming?
Mr Coles: If you look at the progress there is definitely a test effect which happened in 1998 when there was a dip in the results from 62% to 59%, which was effectively to do with the tests being made harder and mental maths being introduced into the tests, and some of the recovery from that dip is certainly about getting used to that element of the test, but if you look at the focus on the introduction of a daily maths lesson, some of the materials that were produced through the National Numeracy Strategy, the very sharp focus on professional development of every single primary maths teacher, I think—

Q32 Dr Pugh: I presume the figures generally reflect the fact that children got better at doing the sums, not simply that the teachers got better at dealing with the tests?
Mr Coles: I think that is true and I think the TIMSS international evidence, where we have a sequence of results which goes back to 1995 and every four years looks at performance—in 1995, 1999, 2003 and published tomorrow the 2007 data—shows at each stage an improvement in the quality in England in maths, not just at ten but at 14 as well. I think we can have confidence in that.

Q33 Dr Pugh: Post-2000 two things happened. One was that this improvement plateau'd out. Am I correct in thinking that, the rate of improvement plateau'd?
Mr Coles: Yes.

Q34 Dr Pugh: And it mentions on page 8, paragraph 9, that "A significant minority of pupils of all abilities could make more progress in mathematics during their time at primary school". It is a staggeringly banal conclusion in some ways, is it not? I do not want to accuse the NAO of stating the obvious, but has it not always been so?
Mr Coles: Yes.

Q35 Dr Pugh: In other words, there is a section of pupils which will always struggle a little bit in mathematics and the NAO Report simply identified them?
Mr Bell: I think that is where it is probably worth challenging the assumption. You are absolutely right: there will always be some students that will have a specific difficulty. It might be a general learning difficulty, it might be a specific difficulty in learning maths, but one of the reasons why, in answering the Chairman's question I wanted to keep pushing that level of ambition was that we know, for example, as I said, that there are schools where children are achieving level 4 in English but not in maths. If you crack those youngsters you will move the performance up very substantially. We know too that even amongst schools that are otherwise similar, the performance at the top half, if you got everyone to move their performance up you would get those levels of improvement. I think that whilst it is right and it is in one sense, to use your phrase, Dr Pugh, staggeringly banal to say some youngsters will always not do as well in maths as others, it cannot be right that we accept that that is 20% not achieving level 4. That is why we keep pushing very hard on the ambition on this because there are schools that are doing it, there are schools in difficult circumstances that are doing it, and if they can do it for some youngsters why can they not do it for the majority of youngsters?

Q36 Dr Pugh: I once shared a platform with a minister of education who bemoaned the fact that nearly half of pupils in the country got below average marks in maths. However, clearly part of the reason why they do is that they do not enjoy it, and the NAO very strangely seems to be all up for enjoyment in this particular Report although it is not at all obvious how you make maths more enjoyable. Is there not a kind of conflict here because enjoyment exists when, as it were, creativity is exercised by teachers and pupils and so on and at the same time you chaps have been wanting to improve standards with structures and systems and tests and so on? In other words, how do you, from the position you are at higher up the education hierarchy, prompt enjoyment across the education system?
Mr Bell: I am always bound, Dr Pugh, to defer to my colleague, Jon Coles here, who has got a first class Honours degree in mathematics, so presumably he could tell you all about the enjoyment of mathematics. There is a serious point, of course, and it is a serious point that he has got a 1st Class Honours degree, but the serious point is that we

know from Ofsted research that schools can combine very demanding and challenging subject teaching and achieve very high standards in their pupils at the same time as giving the youngsters a very exciting and enjoyable experience. If I can refer to my past as an ex-primary teacher and headteacher, I know that is the case as well. There is no contradiction between demanding, challenging, rigorous work for pupils at the same time as making it enjoyable. Perhaps I might even challenge your assertion that maths cannot be made to be interesting.

Q37 Dr Pugh: No, I did not say that. I said it is difficult for you from your position to make it interesting.

Mr Bell: It is. I would go further and say it is impossible for us to engender that sitting where we are sitting. What we have to do through the approaches that are taken regionally and through the national strategies and others and principally through teachers themselves is recognise that maths can be fun and enjoyable. There are a huge number of materials out there for teachers that can stimulate that kind of interest. I am really optimistic that teachers can find huge fun to transmit to their pupils in the teaching of maths.

Q38 Dr Pugh: If I can move to the training of teachers, clearly there is this kind of aspiration to have all teachers with splendid mathematical qualifications and so on. I have a slightly heretical stance on this insofar as I find that people who are very good at maths, who understand maths very easily and do not understand why other people do not, therefore do not necessarily make absolutely brilliant teachers. Is there any research that shows what best prepares an individual to be a good and effective primary school teacher?

Mr Coles: It is probably not the moment to admit I am also a qualified maths teacher, but the Teach First organisation, which is bringing some very good graduates from some of the country's most prestigious universities into secondary teaching in particular, has a very interesting approach to this because I think they would contest very strongly, and I think rightly, the contention that being an effective mathematician is in some way antithetical to being an effective teacher, but it needs to be combined with a range of other things, including very good interpersonal skills, the ability to engage and listen to children and young people, the ability to manage a range of conflictual situations and so on. So in the way that Teach First select their teachers they look for the combination of both of those two things—very high academic and intellectual capacity and very high capacity interpersonally, and they have demonstrated extremely powerfully just what a good model that is for selecting teachers to go into often very challenging inner urban settings. Whilst, of course, issues of primary education are a little different from that, they are, I think, analogous to a significant extent, so I think we should not assume that there is a contradiction although I think you are absolutely right to say that academic ability alone is insufficient.

Q39 Dr Pugh: My last question is about local authorities. I looked very carefully on the maps on page 20 for my local authority and I was very glad to see it performed very well at level 4. Then I looked at the surrounding local authorities and then I looked at the map showing deprivation and so on, the proportion of pupils receiving free school meals. My local authority does really pretty well at maths while being a relatively deprived area, certainly as deprived as some of the other areas locally that do not do as well. Is there not just a simple move we could make to understand what local authorities are doing well in producing that across-the-board effect and bottle it and spread it across the piste? If I could follow that through with another question, is it because they are teaching maths differently there, or is there something else about them that makes them probably better at teaching maths and other things as well?

Mr Coles: I think it is a combination of those things. What we have seen through what was called the Intensifying Support programme and now the Improving Schools programme is that there is a set of things which, predictably, if they are done by a local authority and done very rigorously, particularly with lower performing schools, can shift performance really quite quickly, but I think it is the classic combination of effective leadership providing a setting in which good teachers can teach well backed by the appropriate support through professional development and in other ways to do this. You do see some correlation between deprivation and disadvantage in this map of attainment but there are also places which are very clearly breaking it down, and I think that is typically to do with good relationships between local authorities and schools backed by skilled professionals working with the schools, highly effective leadership of schools and good quality teaching not suffering too much from difficulties with recruitment and so on. Those are in a sense the structural things that are affecting a number of these things. I think we should not underestimate the importance of well-managed, well-led schools providing a context in which mathematics and other subjects can be taught well.

Mr Bell: We have got a pretty clear idea of the six or seven characteristics that make local authority support particularly affect the performance of mathematics in schools, and that is something that we do via the national strategies. We use it as a kind of check list for looking at local authorities that are not performing quite so well, so I think we are trying to distil the lessons of the best and shame the rest.

Q40 Mr Mitchell: Why do faith schools do better?

Mr Bell: Do you mean in mathematics according to the Report here?

Q41 Mr Mitchell: In terms of the improvement in maths. They have on average more pupils achieving the target level in mathematics than the other school types. Why?
Mr Bell: As I said to the Chairman, I do not think there is a simple or single explanation for that. Some of that might be to do with the socio-economic distribution of pupils which is touched on, but there are wider questions about the performance of faith schools that go beyond mathematics. I do not have a simple or single explanation for why the maths might be better.

Q42 Mr Mitchell: Are there correlations between the performance of schools and the turnover of teachers?
Mr Coles: We do not have the data to do that at school level at the moment.

Q43 Mr Mitchell: Should you not? The turnover of teachers must be a major factor in affecting the performance of schools.
Mr Bell: We know that.
Mr Coles: We are just in the process of introducing a school workforce survey which over time should give us much better information about that and then we can interrogate that question properly. At the moment we do not have the data to be able to do that at school level.
Mr Bell: I think the basic point would be right, that if you have a stable teaching staff performing consistently at a good level you are more likely to achieve consistent results with the pupils than if they are turning over all the time.

Q44 Mr Mitchell: In terms of ethnic groups, the figures in 1.17 and the table on page 18, I would have predicted that the Chinese would do better and the Indians would do better. I would not have predicted that Pakistanis and Bangladeshis would be worse. Is that because they are two different groups lumped together?
Mr Coles: Yes, we can disaggregate that. There were two effects here though. One is ethnicity, which is analysed simply like this, but if you were to break that down between those eligible for free school meals and those ineligible for free school meals, the pattern would look rather different. If you take Bangladeshi pupils as an example, and I would have to check the figures for Key Stage 2 maths which I assume is the focus of this table, typically you would find that Bangladeshi pupils eligible for free school meals do much better than white pupils eligible for free school meals and Bangladeshi pupils not eligible for free school meals do about the same as white pupils not eligible for free school meals, so what this is concealing is a deprivation effect, with the Bangladeshi population being much more deprived on average than the white population.

Q45 Mr Mitchell: How far does the less than adequate performance of black African and black Caribbean pupils reflect the fact that they go to more deprived schools?
Mr Coles: To some extent.

Q46 Mr Mitchell: Have you broken that down?
Mr Coles: Yes. When you come to look at our contextual value added model, being from a black Caribbean or a black African model I think is a positive term. In other words, compared to other pupils in precisely the same socio-economic circumstances they are doing slightly better on average. I will have to check that to be certain,[1] but there are very strong deprivation effects as well as effects around their ethnicity in the primary age group.

Q47 Mr Mitchell: And again, just to pursue the turnover point, do deprived schools have a bigger turnover? Do we know?
Mr Coles: We do not know for certain. All anecdotal evidence would suggest so.

Q48 Mr Mitchell: I see at 1.22 that there are 600 schools which have not met the targets and have been persistently below the mathematics target for at least four years. Are those mainly deprived schools?
Mr Coles: Yes.
Mr Bell: And the Report says that. It is very clear.

Q49 Mr Mitchell: What measures are you taking to deal with that? It is a signal, is it not, that if they are consistently below the level you require there is something wrong, so what are you doing about it?
Mr Coles: There is a range of things. The Improving Schools programme is one of the most important, trying to get a focus on the right leadership in those schools, the right systems internally in those schools for tackling performance, making sure that schools are on top of the performance of pupils and that they are progressing properly, and a focus on assessment within the school so that teachers' professional judgment of where students are in their learning is supported by the best possible assessment materials. For example, a student making very good progress on numbers may not be very good on data handling and analysis. It may be much more refined than that. They may be good on elements of using and applying maths but very weak on other elements, so it is about trying to get a much better sense from teachers of their ability to assess people, the so-called APP materials, assessing pupils' progress materials, which are designed to help teachers make a good sound judgment of exactly where pupils are in their learning so that they can plan their teaching much better.

Q50 Mr Mitchell: Does that work? They are still below the level.
Mr Coles: Yes. APP is very new and is still being implemented but there is very strong evidence that good quality assessment—

Q51 Mr Mitchell: Is there anything in the Report that surprised you, like, "My God, we never thought of that"?

[1] Ev 13

Mr Bell: I do not think there was anything that surprised us, but I think it is important, as I suggested earlier, that the re-assertion of the argument that more students and pupils could do better, even with the existing level of resource, is a powerful signal from the NAO not just to the department but it is also a powerful signal to the system. This is not simply a case of extra money because there has been very substantial extra money that has gone in to raise attainment and achievement.

Q52 Mr Mitchell: In the main the findings, that deprived schools do worse and good teachers make a big difference, were fairly predictable, were they not?
Mr Bell: They are predictable but they are not something where we would just say, "That is the way the world is and we have just got to accept that". As we have tried to demonstrate tonight, and I hope the Report to some extent demonstrates as well, there is a whole set of strategies and approaches in place to try to raise attainment. Going back to one of the answers that we gave to Dr Pugh, there are substantial improvements and I hope tomorrow the TIMSS survey will reflect that, so this has made a difference but can continue to make a difference because we certainly would not want to give up on the 20% of students not yet achieving level 4.

Q53 Mr Mitchell: The fact is that though deprived schools have moved up, and the free school meals kids are a proportion of that, there is a 20 percentage points gap and that has remained constant even though they have all moved up, so why does that not just prompt you to chuck more money at the deprived schools?
Mr Bell: There have already been very substantial sums of money spent.

Q54 Mr Mitchell: But clearly not enough.
Mr Bell: That in a sense assumes that it is just a case of more money. We are targeting the money. For example, as we have said, *Every Child Counts* is an additional sum of money going in which will be largely focused on those students in the schools that are having most difficulty, so we are targeting that. I do not think it is just a case of the money.

Q55 Mr Mitchell: Can you pay the maths teachers in those schools more to attract better maths teachers?
Mr Coles: The heads already have that flexibility. In fact, they have it to a very great extent and I think you are right that it is something that could be used much more in the system.

Q56 Mr Mitchell: The number of specialist graduates seems to be going down in primary schools.
Mr Bell: In maths? If I may go back to the point we raised earlier, the general pre-service qualifications of primary school teachers in science and maths will tend not to figure as prominently and that is why we have to think about the training as they are learning to become teachers and then the training beyond that. We have to consolidate the subject knowledge, so we have to develop and consolidate the subject knowledge when teachers come into the profession and we have cited a number of examples of the things that we are doing on that.

Q57 Mr Mitchell: Paragraph 3.7 deals with these features. Is that because of changes in the pattern of teaching, that specialist skills are less in demand and your career prospects are better if you have a more general approach?
Mr Bell: I do not think that argument would apply in primary schools because there teachers will in the main have to be generalists, so I do not think there is any kind of disincentive to pursue your subject knowledge if you want to become a senior leader in a primary school. I think the question here is more about where we wanted schools in previous years to really think about general school improvement and there are a number of things we have done about that.

Q58 Mr Mitchell: It says there, "Much of the training provided to schools now concentrates on general school improvement and has shifted away from subject-specific CPD".
Mr Bell: Yes, and I think we acknowledged that earlier, that there had been a move to ensure that general school improvement, general techniques of teaching and learning, improved. What we accept on the back of the Williams Review is that alongside those general techniques of improving teaching and learning you also have to have a very rigorous and well-established subject base. We accept that point absolutely, that you do need to have a good core of subject knowledge, particularly in a subject like mathematics.
Chairman: Your last questioner is Mr Davidson.

Q59 Mr Davidson: In paragraph 1.19 it mentions that there is a clear correlation between pupils receiving school meals and those who are not, which is a statement of the bleeding obvious, is it not, really. What I am not clear about, however, is the extent to which that correlation in mathematics is exactly replicated in English or in any other way in which pupils are measured. Is there a variation?
Mr Coles: There is a slight variation but it is very close in maths and English at Key Stage 2. What appears to happen is there is a slight widening of the gap during the course of Key Stage 2, so between the ages of 7-11 the gap appears to get wider. One of the things that we have focused on for the next Spending Review period is to begin to narrow that Key Stage 2 gap in both maths and English, so we look at measures which are much more focused on individual free school meal pupils.

Q60 Mr Davidson: But if we look at the other ways of measuring pupils for another subject, like English, then the overwhelming correlation remains that it is poverty and deprivation and all the rest of it and there is nothing particular about mathematics that is any different from anything else at all.

Mr Coles: No. I think I am right in saying it is very slightly less in maths than in English, but it is very similar.

Q61 Mr Davidson: I wanted to be clear about that. If we look at Chart 9, the fact that the attainment gap is coming down marginally, that could be more to do with efforts that an authority is making about the take-up of free school meals, could it not, because it would move people from one side to another and that is a pretty low reduction in the attainment. Does that seem fair?
Mr Coles: I think we can have confidence that we are not seeing a big change in the take-up of free school meals because proportions are not shifting suddenly over time. We think it is a genuine narrowing of the gap, but certainly we want to make that gap narrow very much faster over the next few years. One of the things that is visible in primary education particularly is there has been a narrowing of the gap at school level, so the most deprived schools are performing somewhat closer to the national average than was the case 10 years ago but that has not been reflected in a narrowing of the gap at the pupil level. So what seems to be happening is that the more advantaged pupils at the least advantaged schools are doing better, but those eligible for free school meals in recent years have not been catching up and this is one of the reasons for targeting that very specifically because focusing on the schools has not had the effect of narrowing the gap at pupil level, so that is what we need to do.

Q62 Mr Davidson: That tends to run contrary to the line that you were giving us earlier on about whole school improvement policies being the answer.
Mr Coles: A whole school improvement and the leadership of the schools need to focus on this as an issue. Where we have made this a real priority, for example in London, to focus on narrowing the gaps and we have tried to transmit that through the leadership of schools and make sure that their whole school improvement focus has focused on narrowing the gaps it appears to have had impact. It is also where the new *Every Child Counts* one-to-one tuition initiatives become very important because we will focus those on those young people who are falling behind or are in danger of falling behind and, therefore, use those to be narrowing this gap.

Q63 Mr Davidson: Rather than having to wait until, what, 2027, which it would be on that trend, we should see a considerable improvement in that figure in what, five years?
Mr Coles: That is what we are aiming for, yes.

Q64 Mr Davidson: Is your salary tied to that at all?
Mr Coles: Mm.

Q65 Mr Davidson: Mm, is that a yes?
Mr Coles: Yes, it is. It is one of the PSA targets for which I am responsible. It is one of my objectives, yes.

Q66 Mr Davidson: Compared with elsewhere, Scotland, Wales and Northern Ireland, am I right in thinking that you do not have comparable figures to say whether or not you are improving as fast as, at the same rate as or less well than others?
Mr Coles: We do not have quite directly comparable figures in the way that we would, for example, with Wales and Northern Ireland at GCSE because we have got slightly different curricula and the testing arrangements, as you know, will have changed in those countries. TIMSS, which is the international study comparing countries, provides a comparison between us and Scotland as the other country which is part of TIMSS.

Q67 Mr Davidson: What are those results showing? Allowing for deprivation, is England better and improving more or are neither of those true?
Mr Coles: Obviously there is a new set of figures which will be published tomorrow. The figures between 1995 and 2003 show England as the most improved country in TIMSS over that period and there is a further improvement in the results of pupils in England which we are expecting to see in TIMSS.

Q68 Mr Davidson: I think it would be helpful if we had this brought up-to-date, Chairman, in time for the report to be issued taking account of these latest statistics. To what do you attribute the enhanced improvement in England over Scotland?
Mr Coles: This is a slightly awkward one, is it not?

Q69 Mr Davidson: It is, that is why I am asking it!
Mr Coles: Obviously one of the things that we think has led to a particular improvement in England has been the introduction of the National Numeracy Strategy followed by the National Primary Strategy and the drive for a daily mathematics lesson, support for the professional development of teachers in order to deliver a daily mathematics lesson very effectively backed by the systems of accountability, inspection and resourcing that have gone into schools. Those are the natural explanations.

Q70 Mr Davidson: Some of these things, like resourcing, will have been happening in both, will they not?
Mr Coles: Yes.

Q71 Mr Davidson: What I am trying to identify is what is there that is not common.
Mr Bell: Taking my life into my hands a bit making these comparisons, I do think it is the focused approach to teaching of mathematics, as with the teaching of literacy through national strategies. The Scottish system has tended not to go for that kind of approach and put more of that down to the local authority level. Our view is that in something where you just needed to really ratchet up performance you needed a national drive. I think there is one single explanation that I would offer, and it is not a scientific proposition, and that is the national drive and the very specific and explicit instructions about

how to improve teaching in classrooms that we have got with the National Numeracy Strategy and the National Literacy Strategy.

Q72 Mr Davidson: Maybe you could reflect upon that and, once you have seen those other figures, if there is anything you wish to change in that it would be helpful if you could let us have that as well.[2] Can I just pick up this question of faith schools that my colleagues did in paragraph 1.23. There is a caveat here: "without controlling for other factors". Does that not undermine any credibility that comparison actually has because unless you have done that comparison for issues like class then we do not know whether or not we are comparing like with like. Is that fair?
Mr Coles: Yes. What we do not have here is the data on what was the prior attainment of the children at age 7, for example, which would then say between the ages of 7-11 did the pupils progress faster in voluntary-aided schools than in other schools. We do not know that from this data.

Q73 Mr Davidson: It also does not take account of the point in the previous paragraph about the proportion of pupils with special educational needs either, does it?
Mr Coles: No.

Q74 Mr Davidson: Nor the policy of selection that many of them have. Really that paragraph is completely misleading, is it not?
Mr Bell: We said that one explanation could well be the disproportionately fewer free school meals pupils in these schools and we acknowledge that and the NAO report says that.

Q75 Mr Davidson: You expect that. Because they let in fewer poor pupils—poor in financial terms—you would expect them to have better results simply because that is the main determinant. What we do not know is whether or not they are amongst the schools that could be considered to be, I think "cruising" was your phrase.
Mr Coles: Coasting.

Q76 Mr Davidson: Sorry, coasting. So we do not know whether or not these schools are doing as well as you would expect given the socioeconomic intake or not and, therefore, on the basis of what we have here they might be worse than normal schools.
Mr Bell: We know in general terms, if you take value-added, they do slightly better than other schools. That is a general statement rather than specifically in relation to primary mathematics. On your other point, the issue is about improving admissions and making admissions fair. It is also about ensuring that children, whatever their background because, as John was saying, schools might be appearing to be performing well, are performing as well as they might. We have to treat these figures, as you rightly say, with some caution, but equally we do have to look, as we would in all schools, at maybe doing better in maths is a lesson that we can learn.

Q77 Mr Davidson: The final point I want to make is you have picked up foreign examples. In Malawi primary pupils have to sit an exam at the end of it and if they do not pass they are not allowed to progress, so they do not end up going to the secondary. I am not suggesting that at the moment, but it does seem to me that some of these pupils who are clearly adrift in mathematics, if they are sent to the secondary school and they are behind, what evidence is there that they catch up or is the evidence that they simply fall further behind?
Mr Coles: The evidence on pupils who have not reached age-related expectations at the age of 11 is that they are much less likely to achieve well at 16 than those who have met age-related expectations at 11. It is not always that they fall further behind, but only a small proportion catch up. It is fundamentally important both that we do more to support those students to keep up during the course of Key Stage 2 and—

Q78 Mr Davidson: I wonder, Chairman, if we could get something from you just to expand on that point.
Mr Bell: Sure.

Q79 Mr Davidson: Unless I am mistaken you are saying to us that if pupils are behind in mathematics when they go to the secondary school they disproportionately end up not coming out the other end of the secondary school with the requisite skills and abilities. That clearly is condemning that whole tranche of youngsters to failure, is it not, if you allow them to come through the secondary sector? I would be grateful to have a note expanding on that.[3]
Mr Bell: I can probably give you a quick piece of data on that immediately, Mr Davidson. We know that only 11% of pupils who do not achieve Level 4 in English and maths at primary school will go on to achieve 5 plus A-C grades. If you get Level 4 in English and maths that figure is nearly 70%, so there is a huge difference.
Mr Davidson: My point was slightly different. I understand that, but if you do not quite fail but do not achieve at that level, it is not a question of whether or not you get 5 grades and so on, it is a question of whether or not you effectively end up failing whatever level of mathematical capacity you should have by the time you are leaving secondary. Unless I am mistaken that is the case, so unless you catch these pupils now they are doomed in mathematical terms.
Chairman: I think he was asking for a note. Geraldine Smith has one last supplementary.

Q80 Geraldine Smith: I can understand your concentration on trying to narrow the gap in attainment and bring pupils up, but what do you do about pupils who are excelling and reaching their attainment? Again, I am thinking perhaps in areas of

[2] Ev 14

[3] Ev 14

deprivation where they might be doing okay but if they were encouraged they could end up like you, Mr Coles, with a first class honours degree in maths and going to Oxford or Cambridge. I think it is really important to concentrate on those pupils as well.
Mr Coles: Absolutely, so do I. The phrase "narrowing the gap" is slightly unfortunate in the sense that what we are not trying to do is stop people excelling at the top end, that is absolutely not what we want.

Q81 Geraldine Smith: What do you do to make that happen?
Mr Coles: What we are trying to do is make sure that the most deprived children can narrow the gap with the least deprived children, in other words they catch up. We have got gifted and talented programmes now in every school in the country essentially and we are asking all schools to identify their highest achieving 5-10% of pupils in English and maths, and those with other talents outside those subjects, and to give them particular support and make sure they are achieving as well.
Mr Davidson: This is to ask for another note.[4] It relates to Table 8, which is the attainment by ethnicity. Mention has been made of the picking up of the gender differences and mention has been made about the social class background. Can we have a note about migrants, as it were, by generation, so to speak, the difference between children from first generation as distinct from others and is there a correlation there. I was going to relate some experiences from my own constituency but I can think of how they might be mixed elsewhere. Is there anything there? Also, can you say there is an ethos in the community? Again, my clear impression is that there is at least one of the groups where there is a clear ethos in favour of education which shines through the statistics and another one where there is a clear ethos of hostility to it. I wonder whether or not you can confirm that.

Q82 Chairman: I also want a note because I have got children at university and I know how popular the Teach First Programme is and how difficult it is to get on. I want to have a note about how you are going to expand it. It seems an excellent way of getting very bright graduates from the best universities into the most difficult and deprived areas. I want to know how you are going and how you are going to expand on that.[5]
Mr Coles: We can do that.

Q83 Chairman: Lastly, will all our people now pay attention! There is a question here on page 40 which is set to Level 5. Do not look it up yet. The first person to put up his hand will get a star from the Committee of Public Accounts. "Which is larger, 3/7 or 4/9? Make sure you show your working!" Who is going to put their hand up? Which is larger, 3/7 or 4/9? Anybody in the public gallery can answer and they get a star from the Committee of Public Accounts.
Ms Diggle: It is 4/9.

Q84 Chairman: Well done! Paula gets the star. You, Mr Bell, fail!
Mr Bell: Not for the first time in my life, Chairman!
Chairman: Thank you very much.

[4] Ev 15

[5] Ev 16

1. Supplementary memorandum from the Department for Children, Schools and Families

Question 44–46 (Mr Mitchell): *The performance of black Caribbean and black African pupils*

The 2008 Key Stage 2 data are not yet available. The data for the summer 2007 Key Stage 2 examinations are:

Category	*% getting Level 4 + (English)*	*% getting Level 4+ (Maths)*	*% getting Level 4+ (Science)*
All Black pupils	67 (boys)	66 (boys)	78 (boys)
	84 (girls)	66 (girls)	82 (girls)
Black Caribbean	66 (boys)	65 (boys)	79 (boys)
	82 (girls)	64 (girls)	85 (girls)
Black African	67 (boys)	67 (boys)	78 (boys)
	77 (girls)	66 (girls)	81 (girls)
National average	76 (boys)	78 (boys)	87 (boys)
	84 (girls)	76 (girls)	88 (girls)

These results show that:

— Black African boys outperform Black Caribbean boys in all subjects except Science; and

— Black Caribbean girls outperform Black African girls in all subjects except Maths.

Question 68–72 (Mr Davidson): *To what do we attribute the enhanced improvement in England over Scotland?*

Findings from the Trends in International Mathematics and Science Study (TIMSS) 2007 on the primary mathematics performance of England and Scotland were as follows:

	Mean score (2007)	*Country ranking (2007)*	*Mean score (2003)*	*Country ranking (2003)*
England	541	7th out of 36 countries	531	10th out of 25 countries
Scotland	494	22nd out of 36 countries	490	18th out of 25 countries

This represented a significant improvement between 2003 and 2007 for England but no change for Scotland.

We believe the enhanced improvement of England over Scotland is due in part to the England's nationally focused maths strategy in contrast to the Scottish system which emphasises local authority leadership. The English approach, led by DCSF and the National Strategies, has improved teaching by giving specific and explicit instruction through the National Numeracy Strategy.

2007 TIMSS Key Results

The relative performance of England against other countries was as follows:

— Statistically significantly outperformed by four countries (Hong Kong, Singapore, Taiwan and Japan);

— Statistically similar to four countries (Kazakhstan, Russian Federation, Latvia and The Netherlands);

— Statistically significantly higher than 27 countries (including, in order of mean score, USA, Germany, Denmark, Australia, Hungary, Italy, Austria, Sweden, Scotland and New Zealand).

England was also the highest placed EU country and second-highest placed OECD country.

Question 78–79 (Mr Davidson): *What is the position later on in secondary school for children who are falling behind at age 11 in mathematics-cohort analysis*

2007 Progression Data for Key Stage 2 (KS2) to Key Stage 4 (KS4)

The table below shows 27% of those pupils who did not reach expected levels for KS2 maths made three levels of progress to GCSE maths, compared with 63% of pupils who achieved the expected level or higher at KS2.

	Key Stage 2 Level	*% making 3 levels of progress*
Pupils below expected KS2 maths level	A, D/T, W, Level 1, Level 2, Level 3 (A- Absent from the test, D- Disapplied from the National Curriculum, T- Unable to take the test, W- working towards level)	27
Pupils at or above expected KS2 maths level	Level 4, Level 5+	63%

Key Stage 2 Level	*1*	*2*	*3*	*4*	*5*
Equivalent of 3 levels progress in GCSE grade	Grade F	Grade E	Grade D	Grade C	Grade B

2007 Progression Findings for Pupils at KS2 who reach a Grade C in the Maths GCSE

The table below shows GCSE results across all pupils and shows 54% of pupils reach at least grade C in the maths GCSE. Only 10% of pupils with Level 3 at KS2 maths achieve grade C or above, compared with 57% of those getting Level 4 and 94% of those getting Level 5.

Level at KS2	*% reaching at least grade C*
Level 3	10%
Level 4	57%
Level 5	94%
All pupils	54%

What do we Know about the Pupils below Level 4 who Might not make 3 Levels of Progress?

— The proportion of Free School Meal (FSM) children and children in disadvantaged areas who are not making 3 levels of progress is disproportionately high.

— There are also a high proportion of Special Educational Needs (SEN) children not reaching expected Key Stage 2 levels and then failing to make 3 levels of progress to GCSE.

Interventions to Help Pupils Catch-up

— Those who are falling behind at Key Stage 2 need considerable personalised teaching to reach Grade C at GCSE and many of them may not be capable of making the progress needed.

— DCSF and the National Strategies are currently developing interventions to help those pupils falling behind in maths. The two main interventions are the Every Child Counts programme (ECC) and the Maths Specialist (MS) programme.

— ECC is a mathematics intervention programme targeted at year 2 primary pupils in the bottom 5% of the national cohort. The programme provides teachers with specialist training which enables them to work on a one-to-one basis with those children who require additional support with early numeracy skills. ECC is currently in a pilot development phase.

— The Maths Specialist (MS) programme aims to train 13,000 teachers within 10 years to give every primary schools access to a Maths Specialist. Using a cascade approach, the trained maths specialist will improve maths teaching across the school through coaching, mentoring and developing the programme of study. The programme is currently running a pathfinder to test issues relating to the training for maths specialists.

— In addition, One to One tuition is currently available for both primary and secondary pupils across 10 local authorities in 386 Primary Schools via the Making Good Progress pilot that runs from 2007–09. By 2010–11, One to One tuition in maths will support 300,000 children a year in Key Stage 2 and Key Stage 3.

Question 81 (Mr Davidson): *The difference in performances between first and second generations of immigrants*

As this data is not collected it is therefore not possible to make a robust statistical comparison between first and second generation immigrants. No research has been commissioned to gauge any difference in performance or quantify the impact of immigration on pupil attainment.

However, we do have some current research which relates to these issues.

We recently commissioned research which will examine the reasons why Bangladeshi pupils perform better than other minority ethnic groups, in particular Turkish and Somali pupils. The results are due to be published in April 2010 and may indicate that the performance improvement of Bangladeshi pupils is due to factors such as the level of integration and the time since immigration.

Also, a paper produced by DCSF Schools Analysis and Research Division on pupil mobility referred to research which indicated that mobility at primary and secondary school is associated with low attainment. In one piece of research it was acknowledged that the association observed between mobility and low attainment in the raw data may be a result of one-third of mobile pupils arriving from outside of England, ie refugees, asylum seekers or economic migrants. These pupils accounted for the major part of the effect ascribed to "pupil mobility", and the low attainment of this group of pupils was due to a broad range of factors including substantial cultural, educational and social adjustment rather than "changing school".

Evidence is not conclusive but the timeline between 2003 and 2008 that tracks the attainment of 5+ A*-C grades at GCSE shows that some minority ethnic groups in maintained schools have performed at a greater pace and at a higher level than White pupils with Indian and Chinese pupils being the highest performers at Key Stage 4. If one goes back further to 1989, Youth Cohort Study statistics show varying rates of improved performance for the main ethnicity categories.

Question 82 (Chairman): *Information on the Teach First programme and its expansion*

Teach First is an employment-based route for training secondary teachers. It was inspired by *Teach for America*, which has been running in the US since 1990. Teach First is an educational charity that aims to alleviate some of the problems associated with educational disadvantage by placing high-quality graduates into challenging secondary schools.

The programme lasts for a minimum of two years. In the first year participants are trained to become qualified teachers in challenging urban secondary schools. In the second year they continue to teach in challenging schools as newly qualified teachers. Beyond the two years, participants decide whether to stay in teaching or pursue careers elsewhere. Currently around 40% stay in teaching.

The funding arrangements of the programme differ from those of other teacher training schemes. Teach First is a registered charity and receives approximately half of its annual budget from business and charitable sources and the other half from the government. DCSF is paying £8.65 million towards these costs in 2008–09. Participating schools pay a £3,000 fee for each trainee and pay the trainees on the unqualified teacher scale.

Since it began in 2003 the programme has attracted almost 1,000 graduates into teaching. The programme was extended to Manchester and the Midlands in 2007; to Liverpool in 2008 and will extend to Yorkshire in 2009. In June the Prime Minister announced an expansion in the programme from 370 places per year in the academic year 2008–09 to 850 per year in 2013–14. Notwithstanding all of this, Teach First makes a relatively small contribution to the annual intake (35,000) of teacher trainees via the traditional routes on which we still depend.

The government supports Teach First because it brings high quality, well-motivated graduates into teaching who would not otherwise have considered it. Currently Teach First focuses on secondary teaching because it is a priority to deploy high quality trainees in challenging urban secondary schools where they can make the greatest impact on pupil attainment. Maths graduates are in a minority even among Teach First applicants and to deploy them in primary schools would mean fewer trainees working in secondary schools.

Graduates who are interested in the programme and satisfy the minimum Teach First requirements can register and apply at http://graduates.teachfirst.org.uk/Register--apply.html. It is highly recommended that graduates apply early because there are currently an unprecedented number of applicants for the 2009 deadline. Candidates go through a two stage process of an application form and an assessment centre.

8 December 2008

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2. Memorandum from Charlotte Davies

Dear Mr Leigh

The explanation for the poor performance in Maths in UK primary schools can be linked to children's failure to develop binocular vision.

The most important websites that are currently around on this subject are:

The Behavioural Optometrists www.babo.co.uk

The US work attached http://www.optometrists.org/therapists-teachers/Harvard study literacy.html

Some recent work by Glasgow Caledonia University http://news.bbc.co.uk/1/hi/health/7661998.stm

The leaders in this field are South Africans (Cognitive Visual Therapy and Creative Thinking Ltd, New Malden), who have a larger and more established base in Pretoria, they have treated 5,000 + people for this condition. They sorted out my son's problems, I enclose a small sample of data on children who have undergone their therapy.[1]

If we screened for developmental problems in children at 3.5 years and at 5.5 years and sorted out those problems we would not have a problem with children going on to KS2 with inadequate cognitive sensory skills to learn, the most significant of these being Cognitive Visual links.

Yours sincerely
Charlotte Davies

19 November 2008

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[1] Not printed here.

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