The report, *A world class mathematics education for all our young people*, commissioned by the Conservative Party in 2009, produced by a Task Force chaired by Carol Vorderman, was published in August 2011. The document makes some sensible — one might even say ‘progressive’ — recommendations, many of which will be welcomed by the mathematics education community. These recommendations include suggestions that:

- mathematics be considered a ‘subject of critical importance’;
- the KS2 SAT test be scrapped because it ‘currently brings no benefit to the children who are taking it’;
- enrichment activities be available for all children, not just the most able;
- the unanticipated problems associated with APP (Assessment of Pupil Performance) be addressed;
- there should be two separate GCSE mathematics examinations.

However, I wish to ask three specific questions. This is because I feel that the discussion of primary issues is less coherent than I would have anticipated — although this could be a function of the background of the committee members.

My first question is: Why are we not provided with the same level of detail for the (primary) TIMSS results as we are for the (secondary) PISA results?

The table, *PISA mathematics results* (p.29), shows that the English score in 2000 was 29 points above the OECD (Organisation for Economic Cooperation and Development) average, falling to 4 points below the mean in 2009 and resulting in our being placed 28th out of 65 countries. In TIMSS surveys, England’s 10-year-olds scored 484 scale points in 1995 — 16 points below the international average — and ranked 17th out of 26 countries. However, in 2003 they scored 531 scale points — 36 points above the international average — and ranked 10th out of 25 countries. In 2007 they increased this score to 541 points, 41 above the international average and came 7th out of 37 countries. In 2003 only 6 of the participating countries scored significantly higher than England, and in 2007 only the Pacific Rim countries did significantly better.

Moving closer to home, Scotland scored one point more than England in 1995. However, England made substantial improvements in 2003, gaining 531 points compared to Scotland’s 490, and widened the gap even further in 2007, gaining 541 points compared to 494. I would have thought that rather than the fairly bland comment that ‘England is usually towards the top of a middle-ranking band of countries.’ (p.29) a more detailed set of results might have been considered worthy of inclusion in the report.

My second question is: Why choose to illustrate the constraining effect of levels of attainment in the figure Limitations of the National Levels with such a poor example?

We are informed that: *When describing the development of place value, the levels assume an increasing difficulty as numbers get larger.* (p.42).

The Task Force then attempts to demonstrate the extent to which this is ‘limiting’ by quoting the following from a reception class teacher:

> In my class we count every day and the children get very excited when counting big numbers. We often count up to a hundred all the way through from zero and I’m sure we could go even higher.

(p.42).

However, the fact that the counting described in this statement begins at zero suggests the teacher is talking about children reciting the number names correctly, rather than counting in the sense of assigning one, and only one, appropriate number name to each object in turn in order to ascertain the cardinal value of the collection. Also, even if children were successfully counting a hundred objects, this does not necessarily imply an understanding of place value.
There is research evidence to back up common sense concerning potential difficulties involving the size of numbers. Brown (1981) researched the understanding of place value in secondary children, and one of her conclusions was

One particular area where children seemed weaker than expected was with whole numbers over a thousand. (p.64).

A more relevant criticism of the levels described is that they fail to distinguish between what Thompson and Bramald (2002) call the ‘quantity value’ aspect and the ‘column value’ aspect of place value. The former, which children come to appreciate first, involves knowing that the number 78 is equivalent to 70 and 8; the latter, only really needed by primary children when learning standard algorithms, involves knowing that 78 is 7 tens and 8 ones or 7 in the tens column and 8 in the units.

My final question is: Why the summary dismissal of the written calculation strategies of chunking for division and the grid method for multiplication?

In a section critical of the over-prescriptive nature of the mathematics curriculum a parent is quoted as saying:

The curriculum is very prescriptive and often [my daughter] was forced to follow many different methodologies when she had already found a preferred method that she liked. (p.40).

This would seem to suggest that the Task Force is in favour of ‘preferred methods’ rather than ‘prescribed methods’. Similarly, the following quote from Frank Eade of Manchester Metropolitan University would not have been included in the report had the Task Force not agreed with it:

It would appear that, for many pupils, the imposition in school of procedural routines can be counterproductive; it often encourages students to suspend their ability to apply common sense and intuition to solve a problem. (p.40).

Given these two quotes – both critical of imposed procedures – it is difficult to understand why methods that are more intuitive, easier to understand, reasonably efficient and more naturally related to children’s mental calculation procedures have been given such a bad press both in this document and in ministerial pronouncements. We are informed that these procedures:

...were meant to be staging methods, helping children’s understanding before going on to the more formal methods they will need in Key Stages 3 and 4, but many teachers have seen them as ends in themselves. (p.41).

This seems to suggest the Task Force believes that unless children are using ‘the more formal methods’ by the time they reach secondary school they are going to be at a disadvantage. As a teacher in the 1960s and 70s, I managed to accommodate children using a rather strange subtraction algorithm, decomposition, rather than my own method, equal addition, without much difficulty.

The Cockcroft Committee commissioned a report by the University of Bath in 1980 on the use of mathematics in employment (University of Bath 1981). This document stated that:

It is interesting that we do not find more evidence of ‘school methods’ in people’s arithmetic calculations. (p.110).

In a chapter entitled ‘Idiosyncratic methods’, the authors report observing an example of a real problem dealing with trays of sausages that led to the calculation ‘2820 divided by 30’ (p.106). The idiosyncratic method illustrated is none other than what is currently called chunking, 40 trays is 1200lbs try 80…. Also, the calculation ‘7 hours @ £2.70 per hour’ is achieved by partitioning the £2.70 into £2 and 70p; multiplying each of these by seven; finding a half of £2.70; and adding all three subtotals together, i.e. a mental procedure isomorphic to the grid method of written multiplication. As both methods can be extended to deal with decimals, and as children taught the grid method will, no doubt, be in a better position in secondary school to avoid the common error of expanding (a + b)^2 as a^2 + b^2, I can see no reason why for many children these two strategies should not be considered more relevant.

As Ofsted argued at an invitation conference for primary teachers at Brunel University on 20th March 2002:

In number, pupils are not always supported well enough in the use of informal methods of calculation when they cannot cope successfully with standard written methods. (p.2).

Given that A world class mathematics education for all our young people (Conservative Party 2011) states, as early as page 5, that:

All young people should be entitled to understand mathematics at some level, and to the confidence boost that comes from it, rather than being forced to study topics that ensure failure for many of them.

I would have thought the Task Force would have been less keen on the imposition of standard algorithms that we know (APL 1980; Hart 1981) do ‘ensure failure for many of them.’

On the whole this is a welcome report, full of sound recommendations that, hopefully, the Coalition Government will act upon. It’s just a pity that primary mathematics did not really get the treatment it deserved. 

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References


Www.ianthompson.pi.dsl.ipe.com/index_files/an%20investigation%20of%20the%20relationship%20between%20young%20children’s%20understanding%20of%20place%20value%20and%20their%20competence%20at%20mental%20addition.pdf

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