Ian Thompson is well known for his thinking and writing about children's numeracy. Here he expresses his opinion about some of the recent changes to the framework.

THE REVISED PRIMARY FRAMEWORK: an exercise in consultation?

A recent TES article entitled "Outrage at return to 'dark ages'" (1) described the extent to which some senior academics, numeracy consultants and practising teachers were angry about the government's proposals that all children should be using traditional standard methods of calculation for the four basic operations by the time they leave primary school. The editors of Equals (2), a Mathematical Association publication, wrote:

We urge that the Primary Strategy should not go back over a quarter of a century to 'Decomposition and all that rot'.

and the Association of Teachers of Mathematics (ATM) (3) argued that:

The methods suggested are outdated and have been superseded by more understandable methods that help pupils to move forward with confidence.

The TES article suggested that the strength of the backlash may well force a U-turn, and concluded with a response from Tim Coulson, the then director of the mathematics section of the primary national strategy, in which he stated categorically that his team would be addressing the concerns expressed and would not ignore them.

Now that the new *Primary framework for literacy and numeracy* has been launched in electronic form on the Standards website (4), it is possible to read the revised core position paper, renamed 'Guidance paper – calculation' (5).

This article constitutes an attempt to answer the question 'To what extent have the widespread concerns about the teaching of standard written methods actually been addressed in this document?'

Before attempting an answer, it might be worth clarifying what is generally understood by 'standard written methods'. It is very likely that every reader of this article was taught some such method at school. Think for a few seconds how you would add two three-digit numbers together on paper. Your method probably involved 'carrying a ten' (or a hundred) to the next column on the left (maybe you now say 'exchanging'!). Repeat this exercise for subtraction. This calculation probably involved 'exchanging' or

'borrowing a ten' and 'paying back', plus some crossing out of digits. Incidentally, it always bothered me as a child that we seemed to be 'borrowing' from one place and 'paying back' to another: something that didn't seem to happen in real life!

Think next about how you did 'long multiplication'. It probably included more 'carrying' and deciding when and where to 'put down a nought (or 'zero')'. Finally, consider your method of long division. Now many people recall struggling somewhat with this procedure – some at the mechanical level of remembering the sequence of steps, others, who were competent with the mechanics, at the level of understanding what was really going on. The procedure seemed to involve a lot of guessing (and re-guessing) how many times one number went into another and repeatedly 'bringing down the next digit'.

The difference of opinion between the writers of the framework and those who have to interpret it when working with trainees, teachers or children revolves around the statement in the consultation document that children should be taught 'one efficient written method of addition, subtraction, multiplication and division, referred to as the standard method'. One of the strengths of the original 1999 framework in many educators' eyes was the range of different written calculation methods included, thus allowing schools to decide on which to focus. (The Guidance paper's argument about possible problems for children changing schools suggests a lack of confidence in teachers' ability to deal with such a situation). This same lack of confidence is evident in the Primary National Strategy's decision to downgrade or remove these alternative methods, describing them as 'staging posts', and thereby inferring that their only purpose is to lead the child to the ultimate destination of the 'standard methods'.

The greater emphasis on mental calculation in the 1999 framework was welcomed by almost everyone. Children have become much more capable and confident in their use of a wide range of mental strategies, particularly when they are encouraged to utilise a method that matches their way of construing number or one that suits the specific numbers in the calculation at hand. It is also the case that the concepts involved in the mental methods that they have mastered actually underpin most of the non-standard written methods. This renders them easier to understand than traditional standard methods which are based on different concepts. Using non-standard methods children manipulate 'quantities': when adding 346 to 457 they add 300 to 400... and when multiplying 432 by 7, they multiply 400 by 7... However, when using standard methods they manipulate digits: they add 3 and 4 – even though these digits represent hundreds, and they multiply 4 by 7. This manipulation of digits bears little or no relation to the concepts underpinning all of the mental calculation strategies that children are known to use.

What are seen by the Primary National Strategy as the strengths of the standard methods, namely, the fact that they are 'efficient and compact', are seen by others as their weaknesses. The document argues that their compactness 'consequently helps children keep track of their recorded steps'. However, these compact methods – being compact – inevitably conceal much of what is actually going on in the calculation. They summarise several steps that involve specific laws of arithmetic – those self-same laws that the consultation document devoted four pages to explaining! Because they contain more detail, non-standard methods record the successive stages of the calculation, allowing children to keep track of where they are and enabling them to easily ascertain where they have gone wrong if the answer is incorrect.

There is also an unwritten assumption in the Guidance paper that only standard methods can be efficient and generalisable. This is patently not the case, as almost all of the non-standard methods can be used for calculating with larger numbers or decimals. These methods also have the advantage that they can usually be adapted to suit different ability levels. For example, 'complementary addition' can be performed successfully at five different levels of sophistication, thereby allowing for differentiation (and even 'personalisation'). Standard methods are, by definition, standardised, i.e. everyone completes the calculation in the same way, regardless of the individual's current level of confidence and competence. These are 'one size fits all' methods.

Returning to the question posed above about the extent to which educators' concerns have been

addressed, a thorough reading of the text reveals that some changes have been made to the language used in the original consultation document. When discussing addition, "the standard method" has been modified to the "column method" or "column addition". In connection with subtraction it has become "an efficient method" or has disappeared altogether as the paragraph in which it originally appeared has been deleted. In the multiplication section 'A step on the way to the standard method' has become 'a staging post'. The 'standard method' for multiplication and division are re-named 'short multiplication', 'long multiplication', 'short division' and 'long division', which are, of course, really just synonyms for the standard methods.

It is logical to expect that the changes in terminology would be accompanied by changes in the content and structure of the original document. Unfortunately, this is not the case. Not a single example used in the progression to the ultimate goal of what were originally called the standard algorithms has been changed. It is also the case that, even though the phrase 'standard method' has been expunged from the body of the text, the following statement is still baldly expressed on the third page of the document:

This guidance seeks to promote wider and more consistent use of what are commonly known as 'standard' written methods: compact, efficient methods that work for any calculation...

We can therefore conclude that those changes that have been made are purely surface changes, and that consequently the answer to the question: 'To what extent have the widespread concerns about the teaching of standard written methods actually been addressed in this document?' must be 'Hardly at all'. Plus ça change, plus c'est la même chose!

References

1 W. Mansell (2006), Outrage at return to 'dark ages', *TES*, 26 May 2006, p. 12.

2 Gibbons, R., Adhami, M., Marsh, M., Gabb, J., Peacey, N. (2006), Renewing the primary mathematics framework, *Equals*, 12, 2, pp. 3 - 6.

3 ATM (2006), The primary strategy: the approach to teaching calculation, *Mathematics Teaching*, 197, pp. 33 - 35.

4 http://www.standards.dfes.gov.uk/primary frameworks

5 http://www.standards.dfes.gov.uk/primary frameworks/mathematics/Papers/resources

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