




Rich collaborations: The case of mathematics

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2010 NATIONAL CURRICULUM SYMPOSIUM



*Rich, Creative, Coherent*

the Cambridge Review about the English National Curriculum

The most conspicuous casualties are the arts, the humanities and **those kinds of learning in all subjects which require time for talking, problem-solving and the extended exploration**

As a member of the mathematics community in England, I want to trace how we too have struggled to maintain **talking, problem-solving and the extended exploration of ideas... in mathematics & beyond**



## Issues that underpin my talk

*Rich, Creative, Coherent*

1. Mathematics can take its part in a rich and creative curriculum agenda but to achieve this there ~~has~~ to be the support of a national

### Health warning

As International Research Fellow in the International Centre for Classroom Research (ICCR) I am only too aware of the dangers of crossing country boundaries and searching for an idealised curriculum: with thanks to Prof David Clarke

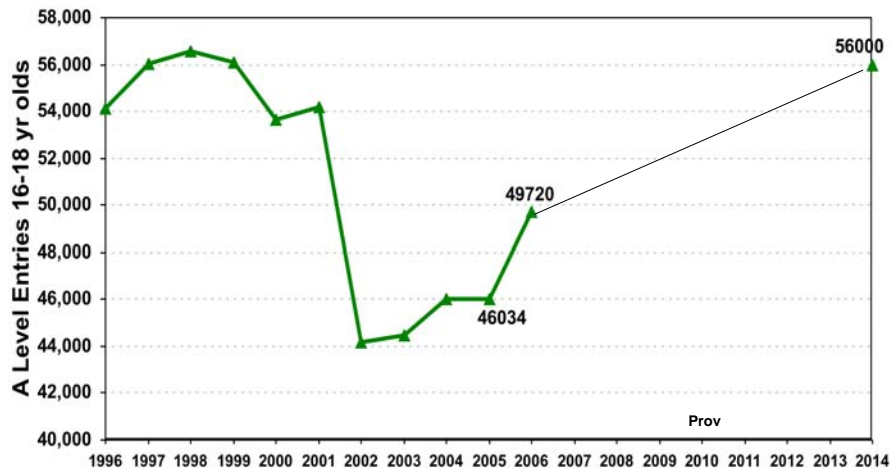
2. How can the standards agenda focussing on performance (in *numeracy*) be aligned with the (*mathematics*) curriculum?

## A snapshot of the English mathematics agenda aiming....

1. to raise *standards* in mathematics:
  - internal performance tables with tests at 7, 11, (14) & 16
  - TIMSS, PISA, and adult numeracy
2. to *increase participation* in mathematics post-16
  - to achieve **BOTH** needs
    - more **success** in mathematics *and*
    - **positive attitude** to mathematics *and*
    - appreciation of the point of mathematics
      - for itself,
      - as a tool in other subjects
      - for its 'exchange value' for individuals and for the country

target for 2014 set in 2005/6

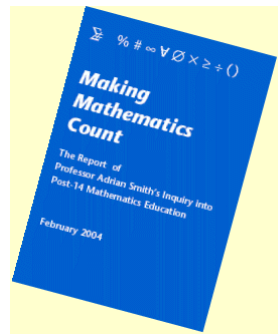
**A level entries** (specialist mathematics examination, 18years)



## Reports drive the agenda...

### Making Mathematics Count, 2004

- Perceived poor quality of teaching and learning experience
- Perceived relative difficulty of the subject
- Failure of the curriculum to excite interest and provide motivation
- Limited supply, quality & take-up of CPD



Government accepted **most** recommendations but not all .....

## Major recommendations

1. there should be post of Chief Adviser for Mathematics to UK Government

I was selected to take up that position 2004-7

2. The need for major initiatives including
  - *to increase uptake* in mathematics pre-16 and post-16
  - *enhance engagement in & motivation for mathematics*
3. **The centrality of CPD and the need to set up a national infrastructure for mathematics-specific CPD**

## Government response:

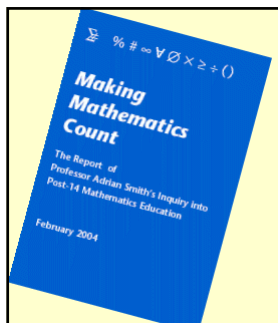
### Continuing Professional Development

## National Centre for Excellence in the Teaching of Mathematics

set up in 2006 in England  
I became Director in 2007

see

[www.ncetm.org.uk](http://www.ncetm.org.uk)



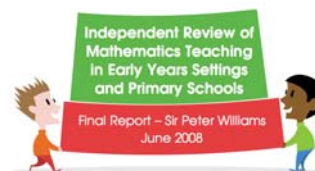
## Another recommendation

This recommendation was **not** accepted and the mathematics curriculum initiatives & work of the National Centre takes place 'alongside' the National Strategies & the Standards agenda

Is there a better way?

Breadth can support high standards in mathematics – but in all schools?

## Review of teaching of mathematics in Early Years & primary settings June 2008



Cambridge Review: the real breakthrough will come when schools accept that the argument made by the Williams report for using specialists to enhance the teaching of mathematics be made for all curriculum domains outside the current core.....

does mathematics need special consideration or not?

and now to professional learning – an existence theorem

## vision

- to meet the professional aspirations and needs of **all** teachers of mathematics
- to realise the potential of learners in mathematics

## My Personal Vision as Director

The NCETM will provide opportunities **for all teachers of mathematics** to embark on **their own personalised mathematical** CPD journeys *supported by the whole community*

## NCETM activities... ...blended for success



- **face-to-face** events & network meetings
- **personal interactions** with the NCETM portal [www.ncetm.org.uk](http://www.ncetm.org.uk)

## Objectives 2009-2011



### committed to **partnerships**

- within mathematics community including with the Strategies, primary & secondary, subject associations...
- within STEM (Science, Technology, Engineering, Mathematics)
- beyond---ICT, special education, early years
- head teachers, college leaders, local authorities, parents
- academics in Universities: mathematics educators, mathematicians, and .....

## NCETM funded projects

National Centre  
for Excellence in the  
Teaching of Mathematics

### Project leader

“This project really empowered a group of subject leaders to develop mathematical reasoning in their schools. As well as having an impact on the learners in their classes, they found it to be a highly effective vehicle for deep and lasting professional development”

## Funded projects Impact

National Centre  
for Excellence in the  
Teaching of Mathematics

### Changing the culture in mathematics lessons

Being involved with the NCETM has broadened our collaborative work & inspired its development both at Primary and Secondary levels.



## Impact Statistics of the NCETM

70,000 pages viewed per week

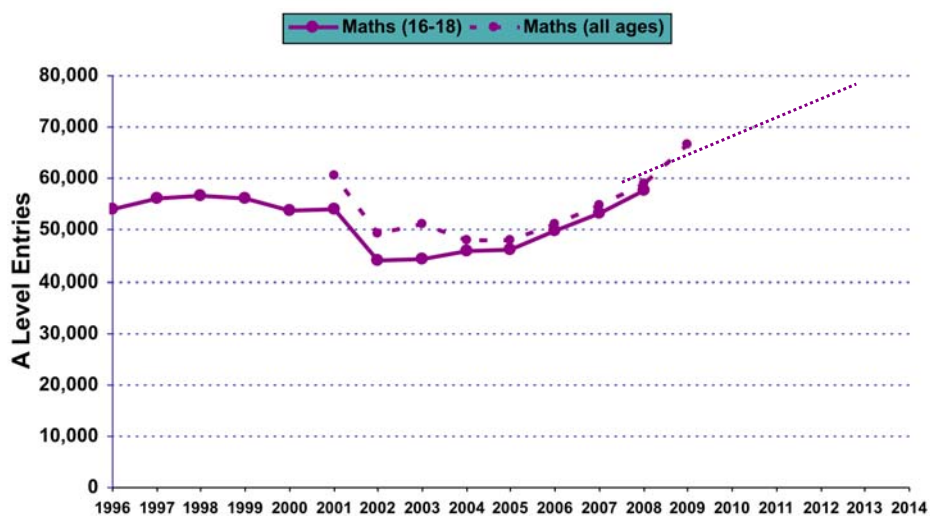
How many countries have not visited the portal?

Only 8

North Korea, Turkmenistan, Western Sahara, Mauretania, Guinea, Chad & Central African Republic

## Participation

large increase in A Level Maths entries 2008 and 2009






**I plug myself into  
the NCETM to recharge**

Head of Mathematics  
Inspiration

Recall this has been achieved 'alongside' the National Strategies & the Standards agenda but.....

## Special challenges for mathematics



“England is still one of the few advanced nations where it is socially acceptable – fashionable, even – to profess an inability to cope with the subject. A parent expressing such sentiments can hardly be conducive to a learning environment at home in which mathematics is seen by children as an essential and rewarding part of their everyday lives”  
Williams report 2008

- **Massive shortage of specialist teachers in all phases that is worst in poorer areas and lower sets**

## Crucial importance of numeracy skills particularly for disadvantaged

findings from study that tracked the progress of almost 10,000 pupils age 7 to 11

- key importance of numeracy for children from poor families
- children from disadvantaged backgrounds given good grounding in numeracy in infant school **more likely to succeed in English as well as mathematics** at age 11

*Wider Benefits of Learning Research Report No 23*

*Institute of Education, University of London*

## More mathematics adds a premium

In USA, mathematics achievement most likely to raise high school completion rates substantially, with especially strong impacts for lower socioeconomic groups & most minorities.

Levin, H. M. & Belfield, C. R. (2009).

What options are closed down if a learner drops out of mathematics?

Issues of social justice and equity

## And finally: yet another report

EMBARGOED until 00:01 Thursday 25th February

National Strategies will be discontinued from end of March 2011

The fate of the NCETM is yet to be decided.....

But Walport calls for its continuing support

“ It is a truism to state that the future of the UK depends critically on the education of future generations. Science, technology, engineering and mathematics must be at the forefront of education. Implementation of our recommendations could help to make our science and mathematics education the envy of the world “ Sir Mark Walport, The Wellcome Trust

## Summary & some questions

National Centre  
for Excellence in the  
Teaching of Mathematics

1. Is it feasible or desirable to build cross-phase **national** infrastructures for teachers' professional learning .....or is mathematics a special case?
2. How will it be possible in Australia to align
  - a Standards agenda (numeracy) that stresses performance .....with a
  - curriculum agenda (mathematics) that stresses participation?
3. How will teachers be supported to do this?