

# **The A Level Content Advisory Board**

Mr Hardip Begol  
Department for Education  
Sanctuary Buildings  
Great Smith Street  
London, SW1P 3BT

8 July 2014

Dear Mr Begol,

## **WIDER ISSUES ARISING FROM THE WORK OF THE ALCAB PANEL ON A LEVELS IN MATHEMATICS AND FURTHER MATHEMATICS**

We have pleasure in submitting our report upon the content of A level and AS level mathematics. As you will be aware our remit was quite narrowly focussed upon content, and content alone; however, naturally this is intimately intertwined with assessment, structure and delivery. There are several wider issues of importance that have arisen and we now take the opportunity to alert you to them.

The remit of this panel was to suggest content that would be appropriate given the new A level framework. That is what we have done. However, that does not mean that we are confident that all the measures we suggest will result in an improvement on the present provision or, crucially, that they will sustain the present level of uptake. We therefore feel the need to sound some notes of caution.

Notwithstanding wider benefits of the Government's proposed structural changes, they seem likely to have particularly difficult consequences for mathematics: the move to linear syllabuses, the changed relationship between AS and A level and the loss of the January examinations. All these make mathematics A level a higher risk option for 16 year olds choosing their subjects, higher than now and higher than other subjects because of the sequential nature of mathematics.

The threat to further mathematics is even greater. It is not only that any loss of mathematics students will reduce the pool of potential further mathematics students, but also that the present structure was specifically (and successfully) designed to encourage students to dip a toe in the water; this is particularly true of AS further mathematics. That structure is being removed; a key feature being that a limited number of applied units can be taken in either mathematics or further mathematics. I understand that consideration is being given to the basis for funding students studying for four A levels. This is of crucial importance for further mathematics, which is almost universally taken as a fourth A level.



Particular thought and planning needs to go into maintaining AS and A level further mathematics, the AS being particularly valuable to many students aiming for quantitative degree programmes. Decreases in uptake for AS further mathematics could have unintended consequences in terms of widening participation as the very best universities are exactly the ones requiring further mathematics as an entry requirement for many courses. The proposed reduction of UCAS points for the AS in further mathematics and mathematics to 40% of an A level is yet another serious concern and would again adversely affect participation.

The changes we suggest are quite far-reaching in terms of teaching practice and it is important to note that there have been no pilot schemes, no sample assessments from awarding organisations, nor trialling with teacher panels. We know, from the consequences of changes initiated by Curriculum 2000, that the introduction of significant changes requires time and careful planning in order to prevent serious damage to uptake across mathematics A level. Proposed changes to GCSE, and the introduction of Core Maths, could all put a downward pressure upon student uptake of A level, particularly from the state sector, and impact upon the capability of some schools to provide adequate teaching.

Although we recognise that the Government plans to move to linearity in all A-level subjects, this is a serious concern for the mathematical community. There are many ways in which mathematics differs from other subjects and it could well be that it is not best served by a strictly linear syllabus.

The work of the panel has led us to believe that these changes could be better implemented in a staged manner, with the effects on uptake, and the overall quality of the provision, piloted in such a way that it is possible to adjust if something proves not to work. Similar concerns for mathematics regarding the large scale of change required to move to linear qualifications were also noted by the recent Review of Specification Content of July 2013. It will be informative to see whether responses to the consultation – particularly from teachers – support these concerns.

### **Continuing Professional Development**

The suggested changes to content and style of A level mathematics may present challenges to existing teachers of mathematics and we strongly advise that continuing professional development courses in mathematics are adequately resourced so as to ensure that all teachers are equipped with the skills they need. The Further Mathematics Support Programme has done a magnificent job: the situation would have been far worse without its influence, and it is important that it is both supported and extended.

### **Monitoring and future development**

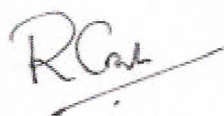
The panel views the continued scrutiny of A level Mathematics as essential in order to prevent a recurrence of the problems highlighted in our main report



and to see through the implementation of these proposals. It is also important to allow examinations to develop in response to technological changes and also to developments in the subject itself. It is not desirable to have content fossilised at this point in time. There is therefore a need for continuing development to refine and improve the specifications and assessment. There is, for instance, value in having at least one developmental A level specification which has more innovative approaches to content and assessment and tests pedagogy that can later become mainstream (more embedded use of technology, discrete mathematics, etc).

I have noted that the recently-published Royal Society "Vision for science and mathematics education" states that "new, independent, expert bodies that draw on the wider STEM professional community need to be created in England and Wales to determine curricula and assessment in STEM subjects" (page 7). The ALCAB panel which I have chaired would like to see arrangements of that kind made for mathematics, as in our view it is essential for the matters raised in this letter to be kept under continuous review.

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'RCraster', with a horizontal line drawn underneath it.

**Professor Richard Craster**

Chair, ALCAB panel on mathematics and further mathematics