

HoDoMS

Heads of Departments of Mathematical Sciences in the UK

15th July, 2013.

Elizabeth Truss MP
Parliamentary Under Secretary of State for Education and Childcare
Sanctuary Buildings
20 Great Smith Street
Westminster
London SW1P 3BT

Dear Elizabeth,

Thank you for your letter of the 5th June, 2013 which gave an update on current Government initiatives in mathematics. HoDoMS have liaised with the Higher Education Committee Service Area (HeDSA) of the IMA, specifically with Professor PJ Giblin (Chair), in assembling our response to you.

HoDoMS has the view that increasing standards at A-level can be effected by gradual change in the examinations over a period of years within the current syllabus rather than adjustment of curriculum/syllabus. Curriculum changes are not related to examination standards *per se*.

We are also very concerned that the supply of UK graduate mathematicians will be reduced if too many changes are made too quickly. This has happened before with the hasty Curriculum 2000, which took years to remedy, and we should ensure that the mistake is not repeated.

Specifically, we are concerned about the proposed changes to the structure of AS and A level in so far as they affect the potential take-up of Mathematics and Further Mathematics, reversing the current very welcome trend showing significant increases in the numbers studying these crucial subjects. We welcome moves to make the assessment of A level mathematics reflect better the Assessment Objectives, but we are convinced that making several changes at once is not the way forward. There are two principal areas of concern.

1. Decoupling of AS and A level

(a) *AS is no longer 'worth approximately half an A level'*. This is likely to lead to a *devaluing* of AS level, and therefore a discouragement to make an AS part of Year 12, whereas under the current arrangements

(i) AS level Further Mathematics has long been regarded as an excellent course to take alongside A level Mathematics, whether in Year 12 or Year 13;

Chair	Vice-Chair	Secretary	Treasurer
Prof. David K Arrowsmith School of Mathematical Sciences Queen Mary University of London Mile End Road London E1 4NS	Prof. Charles C Taylor Department of Statistics University of Leeds Leeds West Yorkshire LS2 9JT	Dr Toby O'Neil Department of Mathematics and Statistics The Open University Walton Hall Milton Keynes MK7 6AA	Prof. Dugald Duncan School of Mathematical & Computer Sciences Heriot-Watt University Edinburgh EH14 4AS
T: 020 7882 5464 E: D.K.Arrowsmith@qmul.ac.uk	T: 0113 343 5168 E: charles@maths.leeds.ac.uk	T: 01908 652136 E: t.c.oneil@open.ac.uk	T: 0131 451 3244 E: d.b.duncan@hw.ac.uk

(ii) A student taking AS Further Mathematics in Year 12 as an 'experiment' may enjoy the course and decide that s/he wants to continue to a full A level;

(iii) The same applies to AS mathematics: it is currently a valuable course in its own right and can lead to a student's continuing to A level because s/he does well at the end of Year 12.

In principle, students could still follow these routes but if AS is no longer seen as a valuable qualification they are much less likely to do so.

In order for progression from AS to A level to be possible at all it would, of course, be essential that the content of AS strongly reflects the first year of a 2 year A level course.

(b) *Assessment burden, and cost, at the end of Year 13.* While the intention to increase the synoptic content of assessment is valuable, provided it is managed carefully, if all components of A level Mathematics (and Further Mathematics) are taken at the same sitting then either (i) papers must be set which cover the material from more than one component at the same time, resulting in a significant increase of difficulty, or (ii) the number of papers taken at one sitting will be unreasonably large compared with other subjects. In either case A level Mathematics (and Further Mathematics) will be perceived as significantly harder than now, and than other subjects. This is a deterrent to the study of mathematics which we are definitely not seeking.

An additional assessment burden, and cost, arises from students who take AS mathematics at the end of Year 12, decide to continue to A level, perhaps encouraged by their school or college, using AS results as a guide to further study at school. These students will then have further assessment, with associated costs, on some of the same material as before.

2. Change in funding arrangement for schools

If schools are indeed funded according to numbers of students and not numbers of courses taken by those students then this is a strong disincentive for schools to provide for Further Mathematics AS or A level, since these are often taken as an addition to three A level courses. Also Further Mathematics will be regarded as a 'risky' option as one of three A level courses because it is, rightly, regarded as a demanding subject. The gap cannot be filled by the Further Mathematics Support Programme since this raises the same funding issue and in any case the longer term aims of the Programme are to make as much Further Mathematics teaching as possible take place in schools as part of the normal curriculum.

I hope that these comments will be of use to you in your deliberations on curriculum and examining in mathematics.

Yours sincerely,

David.

Chair

Prof. David K Arrowsmith
School of Mathematical Sciences
Queen Mary
University of London
Mile End Road
London
E1 4NS

T: 020 7882 5464
E: D.K.Arrowsmith@qmul.ac.uk

Vice-Chair

Prof. Charles C Taylor
Department of Statistics
University of Leeds
Leeds
West Yorkshire
LS2 9JT

T: 0113 343 5168
E: charles@maths.leeds.ac.uk

Secretary

Dr Toby O'Neil
Department of Mathematics and
Statistics
The Open University
Walton Hall
Milton Keynes
MK7 6AA

T: 01908 652136
E: t.c.oneil@open.ac.uk

Treasurer

Prof. Dugald Duncan
School of Mathematical &
Computer Sciences
Heriot-Watt University
Edinburgh
EH14 4AS

T: 0131 451 3244
E: d.b.duncan@hw.ac.uk