
From the Education Secretary:
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Dear Maths to 18 Expert Advisory Group,

I write to express the thoughts of the London Mathematical Society (LMS) on the subject of mathematics provision to 18. A draft of the following was discussed by the Council of the LMS and subsequent minor edits were made.

First, any reforms or changes to mathematics provision up to the age 18 will be unsuccessful without teachers. Teacher recruitment, training and retention is the central issue in mathematics education. There are insufficient teachers to teach the current curriculum and further expansion of provision requires a significant increase in their number. This is a difficult problem to solve but, without a solution, any expansion or reform of provision, though welcomed by the LMS, is doomed to failure.

An important observation of the current provision is that A Level Mathematics is the most popular A level but, though uptake has increased in the last decade, entry into mathematical sciences degrees has remained largely flat in that time. This may indicate that the content is not interesting enough for pupils. Certainly, many mathematically interesting topics are to be found instead in the Further Mathematics A Level. It is interesting to note that, although most mathematical sciences degrees feature linear algebra as a central topic, the A Level Mathematics curriculum contains no meaningful linear algebra topics.

Further Mathematics A Level is not without problems. It has become an essential entry requirement for many high-tariff university mathematics departments but, despite the important work of AMSP for example, it is still not universally available for all pupils and provision can vary considerably in quality. Take-up by girls has been poor (only around 30% of FM entrants are female as the Group will be aware) which has implications for the proportion of women enrolled in mathematical sciences degrees, particularly at high-tariff institutions. Furthermore, the dramatic reduction of AS Level enrolment in all subjects means that now many students do not have the opportunity to sample FM without committing to the full A Level. This may lead to many missing an opportunity to expand their mathematical education.

Therefore, in any review of provision of mathematics to 18 it is important that the opportunity to revisit the two A Level mathematics qualifications is not missed. The timing is fortuitous as Royal Society ACME is progressing its Mathematical Futures programme.

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Core Mathematics is another important option in 16-18 mathematics provision. While this is a highly suitable qualification for many pupils and could provide a strong contender for the main provision for non-A Level mathematics students, it has failed to prosper as one would have hoped. As with other provision, this is due, in part, to lack of teachers and of the CPD to enable non-maths-specialists to deliver the qualification. Core Maths also needs to be made more attractive to universities and employers, and consideration should be given to ensuring that it is available in variants suitable for weaker students.

Appropriate digital technology should permeate mathematics provision at all levels and 16-18 should be no exception. However, current provision is poor. For example, in A Level Mathematics the use of Large Data Sets, mainly due to the method of assessment, has not had the intended consequence of pupils becoming familiar with software for large data. Thus, consideration should be given to how digital technology could be used in mathematics provision at all levels, in particular how to embed it within teaching and high-stakes assessment, and how to make it relevant to employment. Considerable investment in equipment and teacher training will be required for this but it will be crucial if society is to harness its benefit in the mathematics curriculum.

I hope you find these comments useful. I am available to discuss any of the points above or answer any questions if you require clarification.

Best wishes,



Dr Kevin Houston

Education Secretary of the London Mathematical Society.