



Qualifications and
Curriculum Authority

Evaluation of participation in GCE mathematics

Executive summary

November 2007

QCA/07/3440

Evaluation of participation in GCE mathematics

In November 2007 the Qualifications and Curriculum Authority (QCA) published the findings of its evaluation of participation in GCE A level mathematics.¹ The evaluation itself began in 2004 ahead of the introduction of the revised A level in mathematics in September of that year. The work was undertaken in response to a national inquiry into post-14 mathematics.²

The evaluation gathered a wealth of evidence from national examinations data, awarding body data, large-scale questionnaire surveys, school and college case studies, and interviews with higher education admissions tutors.³ A summary of the main findings, key themes and recommendations is given here.

Main findings

We found that:

- Recruitment to mathematics and further mathematics at AS and A2 levels has increased.
- The messages about students' transition from GCSE mathematics to A level mathematics are positive.
- The rates of retention from AS to A2 for mathematics have improved and the number of students who were expected to continue to A2 but did not has fallen.
- Schools and colleges continue to target their recruitment to A level mathematics towards the most able students rather than at those within a wider range of abilities, in some cases even increasing their requirements.
- There is no evidence that the revision of the A level has encouraged a widening in participation; the prior attainment of pupils in GCSE mathematics remains high.
- Increased timetabled time for mathematics A level emerged as a possible route towards increasing achievement and retention.
- Many teachers found that spreading the core content over four units has helped students to secure a firmer and clearer understanding of the core material.

¹ Qualifications and Curriculum Authority. *Evaluation of participation in GCE mathematics: Final report*. November 2007

² Professor Adrian Smith, *Making mathematics count. The report of Professor Adrian Smith's inquiry into post-14 mathematics education*. DfES, February 2004

³ UCAS report for QCA, *Investigation into the use of unit grade information amongst UCAS pilot institutions for 2006 entry and selected schools and colleges*, (unpublished) June 2007

- Most teachers also felt that the two optional units do not provide sufficient 'stretch' for the most able students.
- Teachers saw the shift in the balance of the subject areas towards pure mathematics as one of the most significant changes to the revised A level.
- Teachers also viewed the perception that the new specifications were easier as one of the most significant differences in the revised A level.
- There is no evidence that the increase in the number of students converting from AS to A level was due to perceived or actual improvement in the accessibility of the qualification.
- In some cases 'accessibility' of the new A level has improved students' attitudes towards A level mathematics.
- Teachers are still divided about whether the revised A level is 'more accessible' or 'less demanding'.
- Almost all the surveyed centres said that their students generally completed their AS in a single year in the 2004/5 academic year.
- Male and female students' choice of A level mathematics appears to be influenced to a different extent by different factors. Girls placed more emphasis on the demands of the qualification while boys gave more weight to the usefulness of the qualification in later life.

Recommendations

1. Formally separating the requirements for an A level in mathematics and an A level in further mathematics would simplify the structure of the A level in general. By designating particular units to each award, the peculiar 'least best' relationship would be severed, and there would be more clarity – both for the student and those selecting students for higher education – about what is being studied for each award.
2. The perception among teachers and students that the different combinations of core and optional units result in different levels of difficulty should be considered further in the light of discussion about the students for whom the A level is intended.
3. The issue of whether A level teaching is geared to the right level to encourage participation and achievement by students who are not high-flyers is something that may merit further investigation. It also needs to be considered in terms of how teachers see mathematics A level's ability to challenge those who are more able.

4. A clear statement about the purposes and expectations of mathematics provision at A level is needed, so that there is less division of opinion about how far it is fit for its purpose. Depending on the outcome of this, there are two choices:
 - develop a qualification that meets the needs of the 'clever core', accepting that you are building an exclusive route
 - revise the A level to be a qualification that is well aligned to the demands of other A levels, but design some form of supplementary stretching qualification that is accessible only to very able mathematicians; this – of course – raises the issue of what level this new qualification should be pitched at, since it seems unlikely that it could be easily encompassed within 'A level'.