Advisory Committee on Mathematics Education

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Rt. Hon Michael Gove MP
Secretary of State
Department for Education
Sanctuary Buildings
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Dear Secretary of State,

Key Issues across the Mathematics Education Landscape

I would like to take this opportunity to congratulate you on becoming Secretary of State in the Department for Education. ACME looks forward to building on the dialogue we had while you were in Opposition, and to explore with you in more detail some of the pressing challenges faced in mathematics education.

I hope that we will be able to have the opportunity of meeting face-to-face to discuss many of the big issues in more detail, but I will use this introductory letter as a chance to bring to your attention some of the major challenges as seen from our perspective.

Curriculum development and review – we believe that ACME will play a valuable role in restructuring curriculum and qualification development as QCDA ceases to exist. We are already working with our science (SCORE) and engineering (E4E) colleagues in thinking about alternative structures for developing (and revising) the curriculum and assessment, with the agreed starting point that the current system is not functioning anywhere near as effectively as it ought to do, and that we are presented with a unique opportunity to shape a new and more effective landscape.

Partly, we believe this ineffectiveness is a result of the institutions themselves (QCDA, Ofqual, awarding bodies etc) but partly it is also due to an overriding obsession with assessment and testing, with the curriculum, pedagogy and teacher training being only secondary concerns. Moreover, we do not believe that enough value is placed on the large amounts of expertise that reside in higher education, employers, learned societies, subject associations and the teaching community which could help shape and inform the content of the curriculum. For example, the regulator (Ofqual) has been established in such a way as to be all but unaccountable to subject communities, and we have already questioned some of their decision making (with no success) where we believe their remit has strayed beyond purely regulatory issues into matters of education policy.

ACME is eager to help shape any post-QCDA landscape, particularly as so many of our key issues outlined in this letter are currently the responsibility of QCDA.

Assessment and Accountability at Key Stage 2 (KS2) – I notice you have committed to review how KS2 tests operate in the future, which is welcome. ACME has been working for some time on an alternative assessment regime at the end of KS2, as we believe the current high-stakes nature of testing is damaging the mathematics education of learners. Part of the solution must be a recognition that the three different purposes of assessment – monitoring national standards, assessing pupil

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progress and holding schools to account – cannot be satisfied by the KS2 tests alone. We believe that a system of sample testing can be judiciously employed to monitor national standards and an alternative regime for monitoring pupil progress must have a role for teacher assessment at its very heart.

Primary Curriculum and Mathematics Teaching – we note that the work of the Rose Review will not now be translated into a new primary curriculum from September 2010. ACME urges you to build on the work that was undertaken by the Rose Review – that we and many other stakeholders contributed to – when considering any future changes to the primary curriculum. In addition, we would urge you to commit to continuing to implement the recommendations of Sir Peter Williams report into primary mathematics teaching – in particular, safeguarding the funding of a primary mathematics specialist in every primary school. The quality of mathematics teaching in primary schools will be greatly boosted as a result.

Early and multiple entry in GCSE Mathematics – driven by the A*-C (including English and Mathematics) league tables, early and multiple entry is becoming an ever increasing occurrence. Learners gaining an early qualification is not necessarily a sign of success. Our concern is that the achievement of the C-grade is overriding all other educational objectives, and as such the mathematical understanding of learners is secondary to targets and league tables. We are concerned that students may stop learning mathematics altogether once a C-grade has been obtained. As the exam entry may be in Year 10, or even earlier, this can lead to one or two years with no mathematics. This gap can prove absolutely critical in the future mathematical education of learners, undermining study at A-Level and university, and in many other subjects beyond just STEM.

Impact of the two-tier GCSE model – in addition to early and multiple entry, there are growing concerns that the current two-tier model in GCSE Mathematics is leading to some students not receiving the full programme of study (yet still being able to achieve the gatekeeper C-grade). While we support having two tiers, we fear that the current model has significantly reduced the extent to which the GCSE is good preparation for A-Level, and has unhelpfully introduced a gap between the two qualifications. We have anecdotal evidence of A-Level students lacking in important elements of their mathematical understanding as a result. We hope you agree that this has the potential to be very detrimental to mathematics education and that you will press your department colleagues to swiftly complete the analysis of the problem which they have been promising ACME for some time.

Linked Pair of Mathematics GCSEs – at the ACME Conference back in March you expressed support for the linked pair of mathematics GCSEs which are to be piloted from September. The introduction of the linked pair of GCSEs should result in better learning, understanding and appreciation of mathematics. ACME believes it will help lessen the conceptual gap between GCSE and embarking on Level 3 study of mathematics, and it should help eliminate the 'cannot do' syndrome so often complained about by employers. In addition it ought to make mathematics more interesting and challenging to more students. Therefore, we hope you will support its full roll-out should the pilot prove the value of the pair.

Level 3 Mathematical Pathways – I would urge you to revisit Adrian Smith's influential 2004 report on mathematical pathways as the blueprint for widening the numbers of learners taking mathematics post 16. While there have been welcome rises in A-Level Mathematics and Further Mathematics numbers, the overwhelming proportion of post-16 year olds still do not study any mathematics, leading to unfavourable comparisons with our major industrial competitors. ACME believes that there are major benefits for individual learners, for universities, for employers and for the nation as a whole from all learners studying some mathematics up to the age of 18. In order to achieve this, your department will need to begin the groundwork now in order to ensure we have sufficient experienced teachers to deliver the additional teaching. In addition, a full suite of Level 3 qualifications will be required, such that every learner has an appropriate mathematics qualification matched to their

individual needs. This means we will need robust qualifications in Use of Mathematics and Statistics. We will also need a more effective approach to assessing stretch and challenge than the present arrangements for A* – we consider the retention of some form of extra paper, after the style of the present Advanced Extension Award (AEA), to be essential.

Teacher training and continuing professional development (CPD) – we acknowledge your proposals to raise the entry requirements for access on to initial teacher training (ITT) courses but we also believe that it is essential for the teaching workforce that we have subject specific CPD for mathematics teachers. Many entrants at secondary level do not have mathematics degrees, and even some of those who have do not understand key ideas in the school curriculum. Those who enter with mathematics-related degrees are often expert in one aspect of mathematics but unable to teach across the whole subject without further study. Primary teachers often have very little personal knowledge and confidence in the subject. An additional problem is that the needs of universities and employers require different forms of teaching from the procedural, test-driven, experience of many entrants.

CPD provision for the mathematics specialist teachers (MaST) courses appear to be very successful and we would urge that funding should continue. This model appears to be effective and lessons can be learnt from it for the delivery of other primary CPD. At secondary level, mathematics CPD provision to enrich subject knowledge is limited except for those who can afford to pay, and will be further limited by the TDA to generic Masters courses in which subject knowledge plays a very small part. Our concerns regarding the development of the Masters in Teaching and Learning – in particular the early-career focus and lack of subject-specific content – have prompted an ongoing correspondence with the TDA, a summary of which was referred to your predecessor on 29 April.

The National Centre for Excellence in Teaching Mathematics (NCETM) provides excellent access to a range of resources and information to improve subject knowledge, but teachers need support and encouragement to take up these opportunities. The requirements for passing ITT courses focus on professional and institutional issues and general pedagogy, and time to develop personal subject specific pedagogic knowledge is extremely limited.

In addition, your officials will need to consider the implications of both the demise of the National Strategies and the loosening of local authority control (through the move to a greater number of academies) on the position of CPD in schools. Our fear is that the new landscape will result in CPD being uncoordinated and having a lower priority within schools, to the detriment of the teaching workforce.

Mathematical Needs - as you already know, we are well in to our project looking at Mathematical Needs. We hope that the findings from this project will help inform the curriculum and teaching in years to come, and we look forward to sharing our findings with your officials. In addition, we look forward to the work of your Mathematics Taskforce being published.

I hope we can have the opportunity of meeting to discuss some of these issues in more detail, and how ACME may be able to help you and your colleagues develop new and effective policies in the area of mathematics education.

Yours sincerely

Julia S. Higgins

Professor Dame Julia Higgins FRS FREng
Chair, Advisory Committee on Mathematics Education