ROYAL STATISTICAL SOCIETY

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Reforming Key Stage 4 Qualifications: Royal Statistical Society response

Dear Sir/Madam,

Whenever government reforms curricula and examinations, it is crucial that it recognises the unique role that statistical understanding plays in allowing learners to make sense of the world. With data and quantitative information increasingly prominent in the modern world, and with businesses identifying skills gaps as regards statistical capabilities in their workforce, any moment of reform presents an opportunity for policymakers.

Statistics is a multifaceted discipline, and although it clearly has strong roots in mathematics, it is also very important in its application in a wide range of fields, from science and engineering to the financial sector, the social sciences and sports. Only this month, Deloitte calculated that mathematical science as a whole contributes 2.8 million jobs, and 16 per cent of the UK's Gross Value Added.[1] Statistics is an important part of mathematics which, when taught well, ignites the interests of students who might not be motivated to continue their study in other areas of mathematics. More broadly, in today's complex world, it is increasingly important for every citizen to be able to make sense of key statistical concepts, such as risk and probability, on an almost daily basis.

If these reforms, following the consultation period, are to go ahead, it is vital that the chance is taken to embed in our education system the acquisition of the statistical skills that are essential both for success in an increasingly information-driven economy, and for individuals to play a full role as citizens.

The Royal Statistical Society (hereafter 'RSS') has written previously on curricular matters during the Department's 2011 consultation,[2] and for a fuller view of promoting statistical education, we would wish to point the Department to the RSS and The Actuarial Profession report of 2011, 'The Future of Statistics in our Schools and Colleges'.

The RSS are also concerned that, in several areas, the government seems to be proceeding with reforms on the basis of limited or inconclusive evidence. As a Society committed to the promotion of evidence-based policymaking, we have highlighted below areas in which we do not feel that this standard has been maintained.

[1] 'Measuring the Economic Benefits of Mathematical Science Research in the UK', Deloitte for the Council for the Mathematical Sciences, December 2012
[2] See http://www.rss.org.uk/uploadedfiles/userfiles/files/Education_NC_Review_2011_response.pdf

We have answered the specific consultation questions on the form provided, but there are a number of issues contained within the consultation document but without questions attached on which we wish to comment. Our approach in both responses has been to focus primarily on the specific implications for the teaching and learning of statistics and data handling, since this is our primary expertise, but also to engage on the general education issues raised in the consultation document where we feel qualified to comment.

Awarding Organisation choice

It is not clear that the case has been made for restricting examination board choice. The key, however, is to ensure that any changes that are made are not made to the detriment of innovation and development across the curriculum, or to the statistical education received by students, especially in terms of coordination of statistics learning across curriculum subjects. The RSS believes that curriculum innovation and development is important in statistics. Therefore, whatever system is in place, it is crucial that this aspect is secured. Here, the RSS can offer its expertise as both a learned society and professional body, to help inform the curriculum. There is a risk that the single Awarding Organisation model would have a tendency towards conservatism that would militate against innovation in the system. This would be particularly damaging at a time when the (information) technologies associated with learning and assessment are changing very rapidly. Any discouragement of innovation would ultimately feed through to a reduction in the UK's economic competitiveness.

With the potential for different subjects being assessed by different Awarding Organisations, an element of co-ordination across different subjects would be lost. This is especially crucial for a cross-curricular subject like statistics. Statistics is a tool that underpins many disciplines, comprising the four essential problem solving activities: plan; collect; process; and discuss. To do all these requires a broad range of cognitive skills, more than just those required to 'process'. It is vital, therefore, that, whatever approach to examination boards is taken, the curriculum is co-ordinated such that essential theory and practice in statistics is taught (most likely in mathematics) before it is required in specific subjects, such as geography or the sciences. If single Awarding Organisations are adopted for each subject, the RSS would be keen to help advise the chosen Awarding Organisation (or Organisations, if different Organisations are offered the role of setting examinations across different statistics-relevant subjects) about teaching, learning, and assessment of statistics.

Re-sits

The proposal views re-sits as generally undesirable. The RSS, however, despite not encouraging a culture of resits, looks favourably on them as, from an educational perspective, they offer the opportunity to improve on past performance - a motivating factor which should be preserved.

However, we note that, despite resits not sitting comfortably with the proposed new system, there will still be a proportion of students who fail examinations in mathematics (and other subjects) at 16 and who *will* need to re-sit examinations. Indeed, if all students are to remain in education of some kind until 18, and, in keeping with the Wolf Review 2011, rightly cannot 'drop' English and mathematics without achieving an EBC at KS4, there may be many *more* resits. The number of resits may be further compounded if the content of courses is made more challenging. The RSS would suggest that such a development is viewed positively, provided it is accompanied by a supportive culture of improvement.

Further consultation issues

The government plan to encourage Awarding Organisations to draw on the expertise of learned societies and educational institutions in the design and direction of the new qualifications is welcomed. The RSS is keen to offer its first consideration of the extent to which the new proposals represent 'a new secure academic foundation' for those planning to continue their education post-16, be it on vocational courses or in school, including those who plan to continue to HE study.

yours faithfully,

Valerie Isham,

President of the Royal Statistical Society