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If you would like to comment on any of the articles in this issue, please contact Tom Bramley – Director, Research Division. Email: researchprogrammes@cambridgeassessment.org.uk

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Foreword

This issue of *Research Matters* makes the national scene in England appear calmer than really it is. Calm it is not. I write this foreword now, in June 2017, knowing it is likely that this issue will be read for many years to come, by readers who are not aware of the gravity of the changes to public examinations which are impacting this year. Cambridge Assessment played a key role in the development of the revised National Curriculum, which was designed from 2010–13 and first implemented in schools in September 2014. Alongside these changes, the wide set of reforms included revised GCSEs and A levels, these latter – following Cambridge Assessment's recommendations – being linked more closely to the entry requirements of Higher Education; the former elevated in demand, with a new grade structure – 9–1 rather than A*–G. Concerned that GCSEs had fallen behind the standards emerging globally in high-performing jurisdictions, Secretary of State Michael Gove decided on a demanding policy option. Knowing that it is GCSE and not the National Curriculum which dominates school learning from age 14–16, change in the content of the examinations was seen as a critical priority. The simplest policy option – to leave the qualifications unchanged but to move from C to B as the lowest recognised 'target grade' – was eschewed in favour of root and branch reform of content, and a new grade structure (lowest 1, highest 9) was introduced to give greater differentiation at the top of the scale, with '5' as the new lowest 'target grade' expectation – the lower '4' corresponding to the old 'C' grade. Cambridge Assessment has of course provided a suite of exams alongside the other exam boards, but its policy work resulted in a revised national model of assessment of practical work in Science GCSE and A level, and to the national model for awarding the top '9' grade in GCSE. First awards are occurring this summer (2017) and all stakeholders – parents, candidates, schools, government, exam boards and the national regulator understandably are watchful and anxious. The stakes are high for them all, but for different reasons in each case. Using 'comparable outcomes' as an approach to smooth the transition into the new qualifications provides some assurance in general, but until all results are known, current speculation about the way in which individual pupils and schools in different localities have adapted to the new demands will be conjecture rather than fact.

Tim Oates, CBE *Group Director, Assessment Research and Development*

Editorial

Mathematics is the most popular A level subject, and it has been reported that it can add (on average) 11 per cent to your salary by age 34¹. But how useful is it as preparation for an undergraduate degree in Mathematics? The first article in this issue by Darlington and Bowyer reports on a survey of undergraduate mathematicians on how well A level Maths and Further Maths had prepared them for their university studies. They consider the impact of A level reform in terms of the shift from modular to linear exams and the introduction of compulsory Mechanics and Statistics content. The second article by Crawford continues a strand of work in the Research Division aiming to understand the causes of volatility in schools' exam results. The third article by Shaw and Child considers the problems arising from the attempt to assess collaboration, and evaluates the extent to which technology can provide a solution. The fourth article by Vidal Rodeiro explores a range of methods from simple to complex for estimating 'missing marks' on components of GCSE and A level exams that arise (for example, when illness prevents a student from sitting the exam).

Specifying the knowledge and skills being assessed is an important aspect of test validity, and several classification schemes or taxonomies have been developed for this purpose. However, it is difficult to unambiguously classify test questions, and experts inevitably differ, so it is important to assess the reliability of classification when such taxonomies are applied. Coleman reviews some of the literature and finds that the majority of studies have reported moderate to good reliability. Finally, Benton attempts to shed some light on the age-old question of 'how much should I write?', using image processing techniques to identify the distinct words in scanned images of candidates' answers to an essay question. Reassuringly he finds that although there is a relationship between number of words written and mark obtained, quantity doesn't 'trump' quality!

1. Adkins, M., & Noyes, A. (2016). Reassessing the economic value of advanced level mathematics. *British Educational Research Journal*, 42(1), 93–116.

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