



- 1 **Foreword** : Tim Oates, CBE
- 1 **Editorial** : Tom Bramley
- 2 **The art of test construction: Can you make a good Physics exam by selecting questions from a bank?** : Tom Bramley, Victoria Crisp and Stuart Shaw
- 9 **Indirect assessment of practical science skills: Development and application of a taxonomy of written questions about practical work** : Frances Wilson, Stuart Shaw, Neil Wade, Sarah Hughes and Sarah Matthey
- 16 **Data, data everywhere? Opportunities and challenges in a data-rich world** : Nicholas Raikes
- 19 **Moderating artwork: Investigating judgements and cognitive processes** : Lucy Chambers, Joanna Williamson and Simon Child
- 26 **What makes researchers anxious? It's Time to Talk about talking about research** : Gill Elliott, Irenka Suto and Emma Walland
- 34 **Research News** : Karen Barden

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

This and all previous issues of *Research Matters* are available to download, in full and by individual article, from our website: www.cambridgeassessment.org.uk/research-matters

Research *Matters* / 27

A CAMBRIDGE ASSESSMENT PUBLICATION

Foreword

There currently is a great deal of interest in the impact of the new model of assessment in GCSE and GCE Science – where performance in practical work does not contribute directly to the grade – see the related article in this issue by Frances Wilson and colleagues. The new arrangements initially were monitored in pilot schools, and are now, rightly, the focus of considerable evaluation and review. The model was designed carefully – to assess the knowledge and understanding which is essential to practical work in science. And the model tries to break “assessment dominated learning”, by promoting and emphasising the requirement to undertake a rich diet of practical as part of learning programmes. Some critics stated it would “kill” practical work; current evidence suggests the opposite. But where did the model come from? Before the mists of time descend on the history, it might be useful to trace things.

The bidding process for delivery of *English Baccalaureate Certificates* may be forgotten, but in 2013 exam boards hunkered down to prepare competitive bids for GCSE replacements. In the wake of work by OCR colleagues in 2005 on an alternative to practicals, I looked at what practicals were actually for – the work of Robin Millar, then Board Director, National Skills Academy UK, was particularly valuable – the problematic claims that practicals give access to “real science”, the enduring problems of controlled assessment, and the professional contradictions being placed on teachers. The latter were particularly important. On the one hand we were asking teachers to be independent agents of exam boards (in making consistent assessment contributing to the grade) and on the other, there was huge pressure on teachers to gain maximum marks in the practical assessment, and improve grades year on year, on behalf of the school. Tightening the conditions of the assessment had proved dysfunctional. So, on 12 December 2012, I recommended to Simon Lebus (CEO, Cambridge Assessment, 2012–2018) a controversial approach which I believed would be an essential and unique part of OCR's bids; taking practicals out of formal assessment. This proposal was refined and developed into a working model by colleagues in OCR. The rest is public record, and the model moved from being part of the abandoned bidding process to being national policy, where it seems to have achieved its objectives – focused and dependable examinations, and rich practical work in schools.

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

Editorial

Two of the articles in this issue of *Research Matters* are related to the impact of technology on assessment. One area where there is potential for technology to change the way we do things is in how exams are constructed. In GCSEs and A levels, the traditional way is for one person to write all the questions. But in many other assessments these days, the test is constructed by selecting questions from a bank of questions. In the first article, Vicki Crisp, Stuart Shaw and I report on how the method of construction affects expert perceptions of the quality of the resulting exam paper.

A second area that all readers will be aware of is how increases in computing speed and power, and data storage and transmission capability, can transform the kinds of knowledge we can gather and inferences we can make about what students know and can do. In the third article, we publish an edited transcript of a conference presentation by Nicholas Raikes that guides us through the hype and identifies some of the opportunities (and dangers) that are currently being explored in the assessment world.

The fourth article by Lucy Chambers, Joanna Williamson and Simon Child describes what we believe is the first detailed qualitative study of the cognitive processes involved in moderating Art and Design – would the processes found for more traditional assessments also apply to the very different type of work produced here?

Our final article is something of a departure for *Research Matters*. While we have often reported our attempts to use insights from research in psychology to improve how we develop, mark and grade assessments, here Gill Elliott, Irenka Suto and Emma Walland turn their attention to what we can learn from psychology to make us more confident and effective at sharing that research when we have to stand up and talk about it – public speaking being no less stressful for researchers than for anyone else!

Tom Bramley *Director, Research Division*