

The Joint Mathematical Council of the United Kingdom

A Charitable Incorporated Organisation

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Minutes of the General Meeting of The Joint Mathematical Council of the United Kingdom held at the Royal Statistical Society at 11 a.m. on Tuesday 13 February 2018

Present

Officers

Chair	Paul Glaister
Secretary	Peter Thomas
Treasurer	Jennie Golding

Representatives of Participating Bodies

Adults Learning Mathematics	Jeff Evans
Association of Mathematics Education Teachers	Helen Farmery
Association of Teachers of Mathematics	Sue Pope
British Society for Research into Learning Mathematics	Sue Gifford
British Society for the History of Mathematics	Snezana Lawrence (deputy)
Conference of Heads of Departments of Mathematical Sciences	–
Edinburgh Mathematical Society	David Pritchard
Institute of Mathematics and its Applications	Chris Chipperton
London Mathematical Society	Kevin Houston
The Mathematical Association	Tom Roper
Mathematics in Education and Industry	–
National Association for Numeracy and Mathematics in Colleges	Sally Barton
National Association of Mathematics Advisors	Matt Lewis
National Numeracy	Mike Ellicock (deputy)
NRICH representing the Millennium Mathematics Project	Ems Lord
Operational Research Society	Sophie Parker
Royal Academy of Engineering	–
Royal Statistical Society	Scott Keir
STEM Learning	Stephen Lyon
United Kingdom Mathematics Trust	Bill Richardson
Wales Institute of Mathematical and Computational Sciences	Sofya Lyakhova

Co-opted Members

Chair of the BCME Committee	David Martin
UK Representative to the International Commission on Mathematical Instruction	–

Representatives of Observing Bodies

Advisory Committee on Mathematics Education	Jeremy Hodgen
Department for Education [England]	–
Department of Education [Northern Ireland]	Julie Harris
Education Scotland	–
Higher Education Academy	–
National Centre for Excellence in the Teaching of Mathematics	–
National College for Teaching and Leadership	–
Office for Standards in Education	–
The Office of Qualifications and Examinations Regulation	Alison Tonkin (deputy)
The Royal Society	David Montagu

Visitors

Association of Teachers of Mathematics	Heather Davis
Department for Education	Will Longhill (morning)
The Office of Qualifications and Examinations Regulation	Laura Taylor
UCL Institute of Education	Alison Clark-Wilson (afternoon)
UCL Institute of Education	Celia Hoyles (afternoon)

1 Introduction

- 1.1 **Welcome** The Chair welcomed those present.
- 1.2 **Practical Arrangements** The Secretary read out the procedure for emergency evacuation as laid down in the contract for the booking of the premises.
- 1.3 **Apologies for absence** Apologies for absence were received from June Barrow-Green (BSHM), Stuart Cathro (Education Scotland), Derek Huby (NN), Janet Holloway (Ofqual), Jane Imrie (NCETM), Charlie Stripp (MEI), Jan van den Heuvel (HoDoMS) and Rebecca Veitch (The Royal Society). Apologies had also been received from Ofsted which was in the process of appointing a Mathematics National Lead to succeed Jane Jones following her retirement on 31 January 2018.

2 Minutes of the meeting held on Tuesday 14 November 2017

- 2.1 **Approval** The minutes of the meeting held on Tuesday 14 November 2017 were approved following the insertion of 'for CIOs' after 'constitution' in the penultimate line of item 2.1.
- 2.2 **Matters arising not elsewhere on the agenda** None.

3 Reports from Officers

- 3.1 **Chair** The Chair said that over twenty schools had been accredited in the first round of the JMC enabled community approval process for the NCTL-funded TSST secondary mathematics courses delivered in schools. Aside from the initial applications from schools to NCTL, and final decisions communicated to schools, the remaining administration covering communication and liaison with schools and the panel of assessors, is being carried out by the Chair; the second round was now in progress and an additional third round is to take place. He expected that it would take until Easter for all the cycles to be completed; at that stage the list of accredited schools would be put on the JMC website. The Chair added that NCTL is also looking at SKE courses, and engaging with providers, with a view to improving provision. Sue Pope observed that NCTL would not exist after 1 April 2018 and asked whether contact would be retained. The Chair said that the Trustees at their meeting had discussed the need to engage with the new Teacher Regulation Agency; after 1 April 2018, once the change has happened, they will seek to find the best person or section to engage with in the DfE or the TRA about teacher supply.

The Chair said that ACME had not met since the previous meeting of the Council but work was progressing on setting up the Contact Groups.

The Chair said that, following the response from the DfE to the JMC's letter on university admissions tests, he had contacted the relevant Director General at the DfE and had a response from the Deputy Director for the STEM Strategy Unit who was looking to engage with the JMC on the issue. The Chair hoped that it would be possible to set up a meeting in the near future. Alison Tonkin added that Ofqual had recently opened a consultation on updating the AEA and it was agreed that colleagues would be alerted to this.

- 3.2 **Secretary** The Secretary thanked representatives for the timely submission of their reports and for there being fewer late reports.

The Secretary announced that elections for Chair and Deputy Chair for the three years from November 2018 were about to take place; formal notice of them would be given in March and nominations would close at the end of April; a ballot would take place at the Council meeting on 6 June 2018 if an election was contested. The Secretary said that the vacancy for a Co-opted Trustee would be held open until after the results of the elections for Chair and Deputy Chair were known so that the balance of the Trustees might better reflect that of the Council.

The Chair said that at the National Maths Hubs Forum on 30–31 January 2018 the JMC had been represented by Tony Cotton. The Chair, who was also at the Forum, said that the DfE was giving a clear steer to the work of the Hubs, with more tasks to do and more scrutiny of them.

The Secretary said that as well as Sue Pope resigning as JMC representative, OCR was changing the format of its Mathematics Consultative Forum to being part of a multi-subject forum, so it was considered timely to review JMC's involvement. The Secretary would attend the next event (as JMC representative as well as representative of The Mathematical Association) and report back; the Trustees would then decide whether to nominate a representative to the new forum.

- 3.3 **Treasurer** The Treasurer reported that she had only just been able to get full access to the JMC's accounts. She said that some subscriptions had yet to be paid and she would be sending out reminders.

4 Reports from Committees

- 4.1 **BCME Committee** David Martin (Chair of the BCME Committee) thanked the members of the Committee and its subcommittees and the administrators of ATM and the MA. He drew attention to the 350 sessions to take place at BCME as well as the plenary speakers. He said his report was written a few days before the end of the early-bird rate for delegates and he gave an update. The bookings for exhibitors had exceeded expectations. There had been a late surge in early-bird bookings; another 120 bookings were needed to break-even. So far £150 000 had been received.

David Martin also drew attention to the celebration of the life and work of Malcolm Swan which would take place immediately after BCME.

Jeff Evans asked what proportion of those attending BCME were from abroad. David Martin could only give a guess of the number on the spot. [[On 10 March 2018, David Martin circulated a break-down of the overseas attenders by nationality which showed 60 attending.]]

The Chair thanked David Martin and those working with him for their efforts to make BCME9 a success.

- 4.2 **GCSE Working Group** This item was not discussed.
- 4.3 **ICME Bursaries Committee** This item was not discussed.
- 4.4 **MMSA Special Interest Group** This item was not discussed.

5 Election of the Chair of the BCME Committee

The Secretary said that no nominations had been received for Chair of the BCME Committee for the next four years. The Trustees will take forward the appointment of officers of the BCME Committee following the post-BCME meeting of the BCME Committee on 14 May 2018.

Bill Richardson said that there was a need to actively recruit a Chair rather than rely on nominations. Sally Barton said that, whilst ideally the Chair for BCME10 would be able to shadow the present Chair at BCME9, as this was not going to be possible then the appointment was no longer urgent. Bill Richardson added that the need to find a Secretary and a Treasurer should not be forgotten. David Martin said that it might be that by 14 May 2018 there would be someone interested and any interested persons were welcome to attend the meeting on that day. The Chair thanked him for that offer.

6 Reports from Participating Bodies

The Chair thanked all those who had sent in reports and reminded those present of the new procedure for handling reports. There would be an initial opportunity for updates and clarifications but substantive discussion would be held over until all reports had been received.

- 6.02 **Association of Mathematics Education Teachers** Helen Farmery said that AMET was working hard on a response to the DfE consultation on Qualified Teacher Status; AMET would be making its own submission as well as a joint submission with NAMA.

Helen Farmery said that it had recently been announced that the previous restriction on attempts at the QTS Skills Test had been lifted, and it could now be taken as many times as necessary without any waiting period although only the first three attempts would be free. This removed an issue but there was concern about the suitability of those needing multiple attempts. Sue Pope raised the situation of those presently in a waiting period before they could attempt further tests and said that providers would be contacting those currently locked out.

- 6.04 **British Society for Research into Learning Mathematics** Sue Gifford was pleased to report that a new editorial team had been appointed for *Research in Mathematics Education*.

- 6.08 **Institute of Mathematics and its Applications** Chris Chipperton made a correction to the IMA report; in section on Applications, 'the remaining 22' should be the 'remaining 24'. Of the Scholars Events, he said he had attended the Bletchley Park Super Visit and had very much enjoyed the day; the next event would be at the National STEM Centre in York.

Tom Roper asked how long the scholars stayed in the profession. Chris Chipperton replied that there was no tracking, the matter had been raised before, and there was no formal continuing link. The Chair added that this was something the DfE could do and there was a conversation to be had there.

- 6.09 **London Mathematical Society** Kevin Houston made a correction to the LMS report; Jen Roger should read Jen Rogers. Kevin Houston said that it was still looking as if the number of Further Mathematics starters had gone down in September 2017 but he asked those with information to speak to him. He also asked for nominations for the Christopher Zeeman Medal and he observed that so far

it had not been won by a woman but that could not happen without a nomination; nominations could be made on the IMA and LMS websites. He said that the LMS would be holding an Education Day in May 2018 on Teaching and Assessing Undergraduate Mathematics. The LMS has undertaken a survey on how mathematics degree courses can facilitate students going into teaching and the findings are awaited.

Jeff Evans asked whether the nominees for the Christopher Zeeman Medal had to be British. Kevin Houston replied they did not but the work recognised had to be undertaken in the United Kingdom.

6.10 **The Mathematical Association** Tom Roper had nothing to add to the printed report.

Sue Pope drew attention to the joint ATM/MA Family day at the National STEM Centre in York on 7 July 2018.

6.14 **NRICH representing the Millennium Mathematics Project** Ems Lord had nothing to add to the printed report.

6.15 **Operational Research Society** Sophie Parker had nothing to add to the printed report.

6.18 **Royal Statistical Society** Scott Keir said that applications for the William Guy Lecturer were now open and he invited applications. He also said that a response was awaited to the further discussions with DfE officials on the inclusion of A Level Statistics and AS Level Further Mathematics among the qualifications qualifying for the £600 uplift. [[On 28 February 2018, the DfE announced that GCE Mathematics, Further Mathematics and Statistics (at A and AS Level), Core Mathematics qualifications and IB Standard Level Mathematical Studies would qualify for the uplift.]]

6.20 **United Kingdom Mathematics Trust** Bill Richardson said that the Intermediate Mathematical Challenge had taken place on 1 February 2018 and the results were now being processed. He added that the International Mathematical Olympiad would take place in and around Bath in 2019.

7 Reports from Observing Bodies

7.01 **Advisory Committee on Mathematics Education** Jeremy Hodgen said that The Royal Society Advisory Committee on Mathematics Education would be holding a policy conference on 17 July 2018 entitled *Working Together: Continuity in a Changing Landscape*; the conference will be launched formally shortly before BCME. It is expected that the Contact Groups will be launched at the conference (interest was expressed in the progress with them and Sue Gifford said that she will be chairing the Primary Contact Group).

The Chair asked whether the work on teacher supply was focussed on England. Jeremy Hodgen replied that it was but ACME was aware of developments elsewhere.

Ems Lord drew attention to The Royal Society's Partnership Grants Programme where work is being done, with the support of NRICH, to encourage activity in mathematics. She said that whilst the level of application had been disappointing at first, fifteen applications have been received recently.

7.03 **Department of Education (Northern Ireland)** Julie Harris had nothing to add to the printed report.

David Pritchard asked about the C* grade being introduced at GCSE in 2019. Julie Harris replied that to enable comparison with England and Wales it was decided to have nine grades. The C* grade will correspond to the new grade 5 in England and will straddle the C/B boundary. A consequence will be that the number of B grades will fall and this may impact on A Level numbers. Also the currency of the A* grade is unknown; it is unclear how it will be viewed by schools, universities and those providing higher apprenticeships.

7.06 **National Centre for Excellence in the Teaching of Mathematics** The report was noted.

8 Reports from meetings

8.01 **National Maths Hubs Forum 20–21 November 2017** The Chair had nothing to add.

Tom Roper asked what were LLMEs. The Chair replied that they were local leaders of mathematics education; he added that NCETM would be holding events for LLMEs on 7 March 2018 in Manchester and 15 March 2018 in London which will include Level 3. He said that NCETM wanted to grow a group of people to work with Maths Hubs and become Work Group leaders. Tom Roper said he chaired the Strategic Board of a Maths Hub (the Chair interjected that he also did) and asked if there is an independent evaluation of Maths Hubs. He said that the DfE scrutinises NCETM but there is no scrutiny of the effectiveness of the Maths Hubs except for the project coordination team for each national priority, but there has been a call made by DfE for evaluators. Sue Pope said that evaluators had been appointed. The Chair added that they were drawn largely from higher education and that the greatest scrutiny of the Maths Hubs would be in the areas of greatest need. Stephen Lyon added that

at present each Maths Hub has a NCETM person who monitors it but the eight regional leads being appointed will take this on.

9 Discussion of Reports

9.1 **National Numeracy** Mike Ellicock began the discussion by introducing National Numeracy Day to be held on 16 May 2018 (which is part of Learning at Work Week and a day on which National Curriculum tests will take place). National Numeracy had previously not held a National Numeracy Day but KPMG (one of its sponsors) was keen to have an event to engage organisations (KPMG do something similar for literacy and have seventy organisations signed up).

Mike Ellicock said that National Numeracy does three things:

- awareness raising:
 - the numeracy deficit – the issue and its impact,
 - the difference between numeracy and mathematics,
 - encourage a sense that all can be better at numeracy;
- improve everyday mathematics:
 - the journey into work,
 - in-work progression (for example: working with the NHS and the John Lewis Partnership),
 - financial capability and debt management,
 - engaging with the education and skills system:
 - parent engagement,
 - post-16,
 - higher education: National Numeracy has engaged with 10 universities where 600 social science undergraduates took the National Numeracy Challenge but only 30% had the 'essentials of numeracy',
 - persuading adults to take the National Numeracy Challenge to check whether they have the essentials of numeracy and, if needs be, then route them to attitudinal and skills-based resources;
- Plain Numbers, looking at how can we present numbers and data in more appropriate ways, is being developed with the Nationwide Building Society.

Mike Ellicock said that the National Numeracy Day would be largely digital. It was hoped to get press coverage, for example by opening the London Stock Exchange on the day. Supporters already include KPMG, University for Industry, Education Scotland, Experian and Virgin Money, and it is hoped to recruit more supporters. The theme of the day will be 'we're all numbers people', numeracy is an issue but it is to show that all have a pathway to engage with numbers. He would like Participating Bodies and Observing Bodies to engage people in schools from Key Stage 3 upwards. He added that one can register for updates at numeracyday.com.

Scott Keir asked what we were being asked to do; is it to get the message out, is it to become a Champion? Mike Ellicock replied that at present they were looking for supporters but in March kits would be put on the website to recruit Champions who would engage to get at least 500 people doing something.

Jeff Evans asked about the work with universities. Mike Ellicock said that much of the work is part of the Q-Step programme which is backed by funding from the Nuffield Foundation; he added that he had spoken on the issue at The British Academy but that concerted action was challenging given the autonomy of universities. Outside of the Q-Step programme, National Numeracy is working with London South Bank University, which has close links with the NHS, where they have degree-level apprenticeships which have Functional Skills Level 2 as an exit criterion; they are now looking also at their other programmes. The distinction between underlying skills and qualifications is very stark. The Chair asked how the staff reacted in the ten universities in the Q-Step programme. Mike Ellicock replied that the reaction was piecemeal with varying engagement in different universities; at Edinburgh 90% of the 50 to 60 students who took the challenge had the essentials of numeracy whilst at another university only 18% of the sample did. The Chair observed that there was an issue of openness with universities on the mathematical demands of their courses. Mike Ellicock said that he hoped to raise the issue with the new universities minister, Sam Gyimah.

Mike Ellicock said that BBC Breakfast is doing a mathematics series starting on Friday 16 March 2018; they are working with Bobby Seagull; the central hook is that three BBC staff (one a presenter) are taking GCSE Mathematics this summer.

Jeremy Hodgen said that 10% of university entrants do not have a grade C at GCSE. Jeff Evans said that there are 120 to 150 universities in the UK, and 16 to 20 in the Q-Step programme but only one of those is a post-1992 university; innovations tend to go in at the top end and not filter down. Mike

Ellicock said there needed to be strategic leadership at the level of Vice-Chancellors who should see numeracy 'as something we do'. At present the commitment is very patchy but he is trying to engage with the Universities UK Innovation Panel.

9.2 **Department for Education (England)** The Chair welcomed Will Longhill from the DfE.

Will Longhill said that the delay in announcing details of the Level 3 Mathematics Premium was because of the change of ministers and the need to finalise a launch plan. The DfE had taken on a reasonable amount of the feedback following the Budget announcements. The government would like it to be known that it wishes to raise Level 3 participation in mathematics. The bigger communications issue around Level 3 mathematics is to build awareness it is valuable, and that this is not just for STEM. They want to get messages to young people and make sure they resonate with them. The DfE would like pointers as to what would be helpful to develop messaging to those making decisions and he would welcome emails on the subject; the DfE has a working group on the subject for the next four months. He asked how this might link to activities which are already planned? How do we change attitudes to mathematics? How do we get more to choose mathematics post-16? This work links to the work on signalling on which there had been a useful meeting between Nick Gibb and The Royal Society.

The Chair encouraged people to send ideas to the working group on engaging young people and changing attitudes to mathematics. Ems Lord said that the working group was an excellent idea, a sentiment with which Scott Keir concurred. Matt Lewis said that a key constituency was head teachers and other providers; we need to know the deal, so we can sell it to them. Will Longhill remarked that the government was trying to engage not just through the mathematics community.

Jennie Golding asked if there was any idea of the timescale. Will Longhill said it would be in the not too distant future, a grid slot was being agreed. Jennie Golding said that there was an urgency about the matter as delay costs participation. Will Longhill replied that he hoped it would be sooner than two months. Tom Roper asked what format was envisaged. Will Longhill said there would be technical guidance with a covering section which would provide some colour about the ambitions of the initiative and he asked what else there should be. He said there was also a need to influence students and he asked what could be used in that messaging. Once the announcement was made the working group would advise on that.

Tom Roper asked about the use of mathematics across other subjects and in industry. The Chair commented that those communities need to be on message. Sally Barton asked how much it was that some subjects were not open about their mathematical demands as they did not want to put off students. The Secretary said there was a need to let prospective undergraduates know about the mathematical demands of their intended areas of study and a need to let mathematics subject leaders know about the premium so they could lobby senior management to make use of it. Heather Davis said that Level 3 Leads in the Maths Hubs were also a key vector in getting the message out.

Tom Roper asked what was the role of National Numeracy. Mike Ellicock responded that National Numeracy was primarily interested in up to Level 2; the Chancellor's speech had been frustrating as his 'for all' was talking about Level 3. National Numeracy is applying to the flexible learning fund which was also announced in the Budget; Anne Milton is receptive but Nick Gibb is less so.

Jeremy Hodgen said they get Level 2 at school; the problem is that they do not keep it; Core maths is badged as Level 3 but is about continuing Level 2 mathematics, applying it in contextualised scenarios, as well as learning some Level 3 mathematics. Stephen Lyon said that recently much of his time had been spent supporting Design and Technology teachers in teaching the mathematics in DT, many of the questions involved would be perfect for Core Maths; he had observed that many of the teachers came to his sessions with the perception they could not do mathematics. He added that Core Maths was important across the board. The Chair said that quite a few of those taking Mathematics A Level would benefit from doing Core Maths. The Chair added that much of the content of Core Maths was Level 2 mathematics but used with Level 3 contextualisation.

Mike Ellicock drew attention to the work of Sue Johnston-Wilder and Clare Lee on mathematical resilience: we should value mind sets and effort (this linked to the work of Jo Boaler), we need to be clear that mathematics will be challenging and we need to help learners learn to be comfortable about being uncomfortable, there is a need to change beliefs about mathematics and learning mathematics.

Scott Keir sought clarification that the plan was to announce details of the Level 3 Mathematics Premium and then work on cultural issues. With the latter in mind, he mentioned his responsibility, within the RSS, for careers and careers materials. He added that promoting mathematics participation was a whole-school responsibility and the strategy needs to ensure it engages at that level.

Chris Chipperton asked about the progress of work in response to Recommendation 16 of the Smith Report. Will Longhill replied that work relating to attitudes, including gender issues, was starting.

Matt Lewis asked if there was anything that could be said about the times tables check? Mike Ellicock responded that there would be an announcement on 14 February 2018.

10 Any other business not elsewhere on the agenda

None.

11 Discussion

11.1 Developing teachers' mathematical knowledge using digital technology – a research project funded by the Nuffield Foundation

The Chair introduced Celia Hoyles and Alison Clark-Wilson (UCL Institute of Education) who then presented to the Council the findings of the research project funded by the Nuffield Foundation on Developing teachers' mathematical knowledge using digital technology. Their presentation (13 MB) is available at: http://www.jmc.org.uk/documents/JMC_GM_20180213_11_01_Presentation.pdf; alternatively, the 26 slides are available in three files at http://www.jmc.org.uk/documents/JMC_GM_20180213_11_01_Presentation_01-13.pdf, http://www.jmc.org.uk/documents/JMC_GM_20180213_11_01_Presentation_14-15.pdf and http://www.jmc.org.uk/documents/JMC_GM_20180213_11_01_Presentation_16-26.pdf.

The report on the research project is available at: http://www.jmc.org.uk/documents/JMC_GM_20180213_11_01_DynamicDigitalTechforDynamicMaths_FinalReport.pdf and its executive summary is available at http://www.jmc.org.uk/documents/JMC_GM_20180213_11_01_DynamicDigitalTechforDynamicMaths_ExecutiveSummary.pdf.

Celia Hoyles spoke first, introducing the project and giving the background to it. The vision was to transform access to mathematics through dynamic digital technology. Using digital technology raise questions of equity of access but it transforms learning, including generating new learning hierarchies; studies across the world have shown its effectiveness.

Celia Hoyles went on to speak about the Cornerstone Maths Project which she said was based on a robust theoretical understanding of mathematical pedagogy; it sought to exploit the dynamic and the visual (it is now possible also to feel things) and focussed on big mathematical ideas, emphasising links between key representations and using realistic contexts which some find motivational. The project included professional development for teachers with a focus on teachers' mathematical knowledge and practice. It took place in 100 schools, as they wanted to look at what happened at scale, and was shown by the evaluation by NFER to produce learning gains. (The Cornerstone Maths Project material is stored on the London Grid for Learning.)

Alison Clark-Wilson then spoke. She said that the Nuffield-funded project focussed on teachers' mathematical pedagogical technology knowledge (Thomas and Hong, 2013). It was a large-scale project involving 150 teachers from 42 London secondary schools; it made use of both face-to-face meetings and NCETM online communities; a professional development kit was provided to support further scaling within the schools. The project took three themes from the Cornerstone Maths Project (linear functions, geometric similarity, algebraic patterns and expressions), developing teachers' knowledge, drawing attention to invariant and non-invariant properties. The overall findings highlighted what teachers do when: introducing pupils to the software – and supporting this phase, and convening whole class teaching to discuss. It was notable that teachers were not confident using the software in public and were reluctant to use the software live, preferring to display static screenshots rather than exploit the dynamic technology. The researchers are now going back to the schools eighteen months later to see where the schools are now.

Sally Barton said that sharing between teachers gives opportunities for mutual support. Celia Hoyles and Alison Clark-Wilson replied that the teachers were invited in pairs and departments had from 2 to 7 teachers involved; the schools have used the material in different ways but in no school where just one teacher used the material was the use sustained for the duration of the project. At the other extreme, too many teachers trying to use the software can cause problems getting access to computer facilities.

Jennie Golding said that what the project was trying to do was very difficult, even though they had optimum conditions for teachers to use and learn working with the software, it had still proved difficult. Alison Clark-Wilson replied that introduction of the use of technology by teachers needs structuring until it is incorporated into routines, and depended on how the schools did their professional development and support. Celia Hoyles drew attention to the churn in teachers and how this led to a waste of training. Snezana Lawrence said that the churn was greater for mathematics and science teachers.

Ems Lord noted that the resources were only available on the London Grid for Learning. Alison Clark-Wilson and Celia Hoyles said they would try to facilitate use elsewhere if they were contacted.

The presenters then addressed some questions to the Council. Alison Clark-Wilson drew attention to what was happening internationally, the issue of exam-room technology, and the data from PISA on computer use by teachers and learners (a survey in which England did not take part) which showed no correlation between computer use and mathematics rankings. As an example of a country that has embraced digital technology in learning, Alison Clark-Wilson gave Norway where every student has a tablet or laptop, including in assessment. David Pritchard asked what the new material displaced. Celia Hoyles responded that the Cornerstone material sought to replace existing units of work rather than be extra. She said that aspects of the technology really made a difference and changed peoples' views of themselves as mathematicians and their capability to solve problems. Sally Barton said that use of technology definitely did not need extra time and in the end saved time as pupils make more connections.

As time was pressing, the Chair closed the discussion and thanked Celia Hoyles and Alison Clark-Wilson.

11.2 Ofqual's Research in GCSE Mathematics

The Chair introduced Alison Tonkin and Laura Taylor from Ofqual. Alison Tonkin then presented to the Council an overview of Ofqual's work on the evaluation of qualification reform. She began by saying that, having previously worked in the Reform Team, she now works in the Design, Development and Evaluation of General Qualifications Team at Ofqual; she gave the context of the team's work and a timeline of recent reforms. The work of the team concentrated on ensuring compliance and ensuring qualifications were working as intended – ensuring validity within the constraints that exist; this work is supported by an increased research team.

In support of the monitoring of the reform of GCSE, Laura Taylor had run teacher conferences in December for the first round of reformed qualifications which helped to identify risks. One hundred and sixty mathematics teachers had wanted to come to the conferences but only 65 to 70 were able to attend. The teachers expressed concern about tiering and the choice of tier of entry, this had put pressure on teachers, especially with the alternative routes to grades 4 and 5 on the two tiers, in deciding which tier would give learners the best chance. Nevertheless, the teachers felt they had made the right decisions and intended to repeat them this year. There was also concern about grade boundaries, especially at the top end, and how it may affect recruitment into A Level and the confidence of students on such courses.

The grade boundaries were lower in November 2017. This was the first sitting when there was not the opportunity to take the legacy specifications. About a quarter of those taking GCSE Mathematics in November 2017 had originally been taught the legacy specifications. The Comparable Outcomes approach was used in awarding in November 2017 as in the summer of 2017 to establish the grade boundaries.

Work has been undertaken on assessing the level of demand in the Summer 2017 GCSE papers across the awarding organisations; it was found to be closer than in the Specimen Assessment Materials; reports on this work and on the relative demand of the GCE Mathematics Specimen Assessment Materials were published in January 2018.

Work is being undertaken on entry patterns for A Level Mathematics to help with awarding in Summer 2018 when it will be sat by only a partial cohort. Teacher conferences have also taken place for A Level Mathematics. Many teachers reported that numbers for A Level Mathematics have held up but numbers are down for Further Mathematics, some are offering Core Maths instead of Further Mathematics. Alison Tonkin invited those present to let her know of any concern and risks.

Jeremy Hodgen noted the Core Maths-Further Mathematics trade off which he thought to be associated with small sixth forms in 11–18 schools and to be based on the availability of suitable staff. Alison Tonkin said the figures were based on small numbers and there had been little representation from colleges at the teacher conferences, to address this she was going to the NANAMIC conference. She added that more than expected said that they would be offering Core Maths.

Tom Roper said that in a sixth form college know to him, which in 2016 had had 500 take A Level Mathematics, had in 2017 only 400 take A Level Mathematics; this was put down to the lack of confidence in those who had gained a grade 7; on the other hand, those who are taking A Level Mathematics are better prepared; numbers for Further Mathematics are unaffected. The Chair reported that he had presented to all sixth form college in the Wessex region and that they had seen a fall in numbers for A Level Mathematics, to which he responded that it was their duty to engage with 11-16 feeder schools and promote rather than blindly relying on a continuing intake of healthy

numbers without any intervention on their part. He also suggested that increasing numbers for Core Maths may mean some take that rather than A Level Mathematics.

Sally Barton said that the loss of Further Mathematics may affect teachers' enjoyment of their jobs. The Chair said that for Further Mathematics with most boards teachers can use their existing expertise but A Level Mathematics was more challenging. Scott Keir observed that we do not know who is teaching what to whom. Alison Tonkin said that the DfE is going out to schools to try to find that out.

Sally Barton said that AS grading this year will be a nightmare with the very different population.

Scott Keir asked about the mathematics content of qualifications in other subjects. Alison Tonkin said the Ofqual research team had a project on that at the moment (and it was also an area on which Andy Noyes was working); the team was also working on a project on quality of marking (but there was less concern about that in mathematics than elsewhere).

Tom Roper said there was an impression that putting more in Mathematics was making it harder. Sue Pope said this was an argument for Core Maths.

Alison Tonkin said Ofqual wanted to regulate to make sure what was done was done well.

Following the meeting, Alison Tonkin supplied the some useful links which are available at http://www.jmc.org.uk/documents/JMC_GM_20180213_11_02_JMC_Useful_Links.docx

The Chair closed the discussion and thanked Alison Tonkin.

12 Conclusion

The Chair thanked everyone present for their contributions. He especially thanked Sue Pope, who was attending her last meeting, for her long and valuable service to the JMC. He then closed the meeting at 3.14 p.m.

13 Dates of future meetings

Wednesday 6 June 2018 (deadline for papers: Tuesday 22 May 2018)

Tuesday 13 November 2018 (deadline for papers: Tuesday 30 October 2018)

Tuesday 19 February 2019 (deadline for papers: Tuesday 5 February 2019)

These meetings will be held at the Royal Statistical Society and begin at 11 a.m.

Summary Minutes of the Meeting of the Trustees of The Joint Mathematical Council of the United Kingdom held at the Royal Statistical Society at 9 a.m. on Tuesday 13 February 2018

Present Paul Glaister (Chair), Peter Thomas (Secretary), Jennie Golding (Treasurer), Sally Barton, Matt Lewis and David Pritchard.

1 Introduction

1.1 **Welcome** The Chair welcomed those present.

1.2 **Practical Arrangements** These were addressed informally.

1.3 **Apologies for Absence** None.

1.4 **Declarations of Conflict of Interest** The following declarations of conflicts of interest were made:

Paul Glaister: member of ACME, IMA (trustee), LMS;

Sally Barton: member of ATM, BSRLM, NANAMIC (trustee);

Jennie Golding: member of ATM, BSRLM, IMA, LMS, MA (trustee), former member of ACME, running projects for Pearson;

Matt Lewis: member of ATM, BSRLM, NAMA;

David Pritchard: member of EMS, Scottish Mathematical Council (trustee), examination validator for SQA;

Peter Thomas: member of ATM, BSRLM, IMA, MA (former trustee), MEI, NANAMIC, RSS, UKMT (former trustee), former member of ACME, reviser for STEP for Cambridge Assessment.

It was agreed that in future only new conflicts of interest or conflicts of interest particularly relevant to the business of the meeting would need to be declared at this point in the meeting.

4.1 Preparations for BCME9

The Trustees discussed preparations for BCME9 with David Martin, Chair of the BCME Committee.

2 Minutes of the meeting held on Tuesday 14 November 2017

2 Previous Business

- 2.1 **Approval of the minutes of the meeting held on Tuesday 14 November 2017** The minutes of the previous meeting were approved following the insertion of the word 'to' after 'is' in the first line of 5.1.
- 2.2 **Decisions since the meeting held on Tuesday 14 November 2017** The following decisions since the meeting held on Tuesday 14 November 2017 were noted.
- 2.2.1 **Research Excellence Framework 2021** The Trustees agreed that all six persons suggested should be nominated (subject to their agreement) as panel members for the Research Excellence Framework 2021. *(Decision confirmed by the Secretary on 29 November 2017.)*
- 2.2.2 **Letter on University Admissions Tests in Mathematics** The Trustees agreed that a letter should be sent to the Secretary of State for Education concerning University Admissions Tests in Mathematics in England and calling for research to be carried out into the impact of such tests. *(Decision confirmed by the Chair on 8 December 2017.)*
- The letter was sent and a reply had been received (these were included in the papers for the General Meeting).
- 2.3 **Actions** The action points from the previous meeting were reviewed. Most had been completed and the progress on the others was discussed.
- 2.4 **Matters arising not elsewhere on the agenda** None.

3 Officers

- 3.1 **Chair** The Chair reported on the Maths Hubs Forum on 30-31 January 2018 at which the JMC had been represented by Tony Cotton.
- 3.2 **Secretary** The Secretary reported that the process of preparing the JMC's application for registration with the Scottish Charity Regulator was still ongoing.
- The Trustees agreed to establish a Twitter account and the offer of Sophie Parker (OR Society) to manage it initially was gratefully accepted. It was agreed that the Chair would act as Lead Trustee for this project.
- 3.3 **Treasurer** The Treasurer had nothing to add to her report to the General Meeting.

4 Committees

- 4.1 **BCME Committee** The report of the Chair of the BCME Committee was noted.
- It was agreed that after completion of the BCME9 cycle there should be a review of the future of BCME.
- It was also agreed that the position of Chair of the BCME Committee should be left vacant, if none was elected at the General Meeting, and that the positions of Secretary and a Treasurer of the BCME Committee should also be left vacant, in the light of the impending review.
- 4.2 **GCSE Working Group** It was noted that Sue Pope had resigned as Convenor. It was also noted that the establishment of an ACME 11–16 Contact Group is imminent and it was decided consider the future of the Working Group at the next meeting.
- 4.3 **ICME Bursaries Committee** There was no report and this item was not discussed.
- 4.4 **MMSA SIG** There was no report and this item was not discussed.

5 Policies

Proposed policies in the ten areas listed below were discussed; these proposals were based largely on guidance published by the Charity Commission for England and Wales and the Office of the Scottish Charity Regulator. Draft amended Bye Laws, draft policies and a draft risk assessment will be considered for adoption at the Trustees' Meeting on 6 June 2018.

- 5.01 Conflict of Interest
- 5.02 Financial Controls
- 5.03 Handling Complaints
- 5.04 Investment
- 5.05 Managing Volunteers
- 5.06 Paying Staff
- 5.07 Reserves

- 5.08 Risk Assessment
- 5.09 Safeguarding
- 5.10 Trustee Training

6 Vacancies

- 6.1 **Nomination for Chair** The Chair asked all to consider possible nominations.
- 6.2 **Co-option of a Co-opted Trustee** It was agreed to defer a decision until after the elections for Chair and Deputy Chair on 6 June 2018 which could affect the balance of the Trustees.
- 6.3 **Appointment of a Convenor for the GCSE Working Group** It was decided to defer a decision on appointing a new Convenor for the GCSE Working Group until a decision had been made at the next meeting on the future of the group.
- 6.4 **Appointment of a Representative to the OCR Mathematics Consultative Forum** OCR is restructuring the forum from a day spent on mathematical matters to one where the morning was generic then in the afternoon those there would split into subject-specific groups. It was agreed that the Secretary, who was already attending the Forum in another capacity, would report back on the event with particular regard to whether the JMC should continue to send a representative. A decision would be made at the next meeting whether to appoint a new representative.

7 Future Business

- 7.1 **Business of the General Meeting** The issues on which discussion had been requested were reviewed.
- 7.2 **Dates of Future Meetings** It was agreed that a meeting would be held on 19 February 2019 in addition to those already agreed for 6 June 2018 and 13 November 2018.
- 7.3 **Discussion Sessions at General Meetings** The discussion items at the General Meetings in June and November 2018 were agreed:
6 June 2018: Discussion to be led by ACME,
13 November 2018: Maths Weeks.

8 Any other business not elsewhere on the agenda

None.