

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 National Council for Voluntary Organisations at 11 a.m. on Tuesday 19 February 2019

Present

Officers

Chair	Andy Noyes
Deputy Chair	Alice Rogers
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	Heather Davis
British Society for Research into Learning Mathematics	Sue Gifford
British Society for the History of Mathematics	Robin Wilson (deputy)
Edinburgh Mathematical Society	David Pritchard
Heads of Departments of Mathematical Sciences	–
Institute of Mathematics and its Applications	Chris Chipperton
London Mathematical Society	Kevin Houston
The Mathematical Association	Tom Roper
Mathematics in Education and Industry	David Holland (deputy)
National Association for Numeracy and Mathematics in Colleges	Sally Barton
National Association of Mathematics Advisors	Matt Lewis
National Numeracy	–
NRICH representing the Millennium Mathematics Project	Ems Lord
Operational Research Society	Evelyn Hardy
Royal Academy of Engineering	Monty Jaffer
Royal Statistical Society	Carole Haynes
Scottish Mathematical Council	Chris Pritchard
STEM Learning	Michael Anderson (deputy)
United Kingdom Mathematics Trust	Steven O'Hagan (deputy)
Wales Institute of Mathematical and Computational Sciences	–

Co-opted Members

Immediate Past Chair	Paul Glaister
UK Representative to the International Commission on Mathematical Instruction	–

Representatives of Observing Bodies

Department for Education [England]	–
Department of Education [Northern Ireland]	Julie Harris
Education Scotland	–
National Centre for Excellence in the Teaching of Mathematics	Jane Imrie
Office for Standards in Education	–
The Office of Qualifications and Examinations Regulation	Alison Tonkin
The Royal Society	Helen Harth
The Royal Society Advisory Committee on Mathematics Education	–
Scottish Qualifications Authority	Sue Pope
Welsh Government Education Department	–

1 Introduction

- 1.1 **Welcome** The Chair welcomed those present.
- 1.2 **Practical Arrangements** The Secretary made known the procedure for emergency evacuation.
- 1.3 **Apologies for absence** Apologies for absence were received from June Barrow-Green (BSHM), Chris Budd (UKMT and UK Representative to ICMI), Stuart Cathro (Education Scotland), Janet Holloway (Ofqual), Sofya Lyakhova, Stephen Lyon (STEM Learning), John Mason (Welsh Government Education Directorate), Alex Smith (DfE), Charlie Stripp (MEI) and Lydia Watson (DfE, visitor [afternoon])

2 Minutes of the meeting held on Tuesday 13 November 2018

- 2.1 **Approval** The minutes of the meeting held on Tuesday 13 November 2018 were approved (on a motion proposed by Paul Glaister and seconded by Chris Chipperton).
- 2.2 **Matters arising not elsewhere on the agenda** None.

3 Reports from Trustees

- 3.1 **Chair** The Chair explained that as the Chair of the JMC he sat on RS ACME (also, in a separate capacity, he chairs one of the Contact Groups). He said that he and Frank Kelly, Chair of RS ACME, had agreed that it would be good to have a discussion on the roles of RS ACME and the JMC, exploring common areas of interest, so as to ensure the two bodies acted in complementary ways without duplication. That conversation is open and they will keep working on the relationship so that the two bodies work in co-ordinated ways.

Paul Glaister intervened to raise the relationship between the RS ACME and the JMC. He said that now the RS ACME Contact Groups were almost all up and running, it would be a good opportunity to have a discussion session with the Chairs of the Contact Groups otherwise there would be a risk of the link becoming tenuous. The Chair replied that he hoped that the short reports the Contact Groups provide to RS ACME would also be made available to the JMC. Paul Glaister repeated his suggestion that it was timely to have a JMC discussion session with the Chairs of the Contact Groups.

The Chair also noted the death of Ros Sutherland, formerly Chair of the JMC.

- 3.2 **Deputy Chair** None.
- 3.3 **Secretary** The Secretary drew the meeting's attention to the forthcoming election for the Secretary of the JMC. Formal notice would be given in March 2019; nominations would close on 30 April 2019 and, if the election was contested, a ballot would be held at the General Meeting on 4 June 2019.

The Secretary that he had recently received some reports and other communications which he would include in a post-meeting circulation.

- National Numeracy had sent information about National Numeracy Day on 15 May 2019.
- The United Kingdom Mathematics Trust had sent a report on its activities.
- The Immediate Past Chair had sent information on NCETM resources relating to *Raising girls' participation in maths*.
- The Royal Society had sent an update following the meeting of RS ACME on 12 February 2019.

- 3.4 **Treasurer** The Treasurer thanked representatives for arranging the prompt payment of subscriptions. Another £1800 had come in since the figures in the accounts included with the agenda. There were just four subscriptions outstanding.

The Treasurer said that there was a large balance on the BCME account, this was pending a decision on its investment. She said that earlier that morning, the Trustees agreed to move most of the money to an interest-bearing account for its better curation.

4 Reports from Committees

- 4.1 **BCME Committee** Sally Barton introduced the discussion on the interim proposals from the BCME Review and thanked those who had already sent in written comments. She invited further comments and advice, including on the best way to find out from schools and colleges whether they would release teachers to attend if it was held when proposed.

Sue Pope said that it was worth trying something different, from the past format, as in the proposals.

Heather Davis said that the proposals had been seen as a good idea when talked about by ATM.

Sally Barton said the proposal was still that BCME would be held every four years. She invited the organisations present to think what they could add to make the event special.

Sue Gifford said that BSRLM was a bit worried and felt that the extra-curricular activities in the evening were still needed as opportunities for informal networking were important. It was also important that the event should be relevant to primary teaching colleagues and those involved in primary initial teacher training.

Tom Roper said that the MA welcomed the simplification of the day programme but it had concerns that the separation of phases by day might inhibit involvement in more than one day and make difficult the treatment of issues which spanned more than one phase.

Sally Barton said that BCME would be promoted as a three-day event but with the options for attendance made clear.

Heather Davis said that the proposed timing in the summer term was good for getting teachers out of school.

Sally Barton asked what other events in June need to be taken into account.

Sue Pope mentioned the MEI Conference.

- 4.2 **GCSE Working Group** Jennie Golding, as link trustee for and convenor of the GCSE Working Group, said that the group had met for the first time on the previous day. She said there were emerging concerns about the new GCSEs in England but not such concerns in Wales. The emerging concerns were about the enactment of problem-solving and reasoning, the drive to the bottom from the competition between the awarding organisations, gaming of the tier of entry and the effect of the wide range of grades on the experience of the weaker candidates at each tier. The Working Group is also looking at how it will work with and also, when necessary, provide challenge to the RS ACME 11–16 Contact Group.

- 4.3 **ICME Bursaries Committee** David Pritchard, as link trustee for the ICME Bursaries Committee, made clear that neither he nor the ICME Bursaries Committee had been involved in the paper on a proposed National Presentation at ICME-14 in 2020. He was concerned that the bursaries had become entangled with a possible National Presentation and he considered it was now time for Chris Budd to convene the ICME Bursaries Committee so that the relationship between the bursaries and the National Presentation could be cleared up.

Sue Pope suggested that it would be beneficial for David Pritchard to have a conversation with Hilary Povey who had acted as the link member of the Executive Committee of the unincorporated JMC for the ICME Bursaries Committee for ICME-13 in 2016.

- 4.4 **MMSA Special Interest Group** The report was noted.

5 Reports from Participating Bodies

- 5.03 **Association of Teachers of Mathematics** The report was noted.

- 5.04 **British Society for Research into Learning Mathematics** Sue Gifford added to her report that this year there had been an increase in the number of votes cast for the Janet Duffin Award. She was also pleased to announce that the BRSLM termly conference in the spring of 2020 would be held in Edinburgh.

- 5.05 **British Society for the History of Mathematics** Robin Wilson gave a brief verbal report. He said that BSHM had an active programme which could be found on its [website](#). In 2020, from 6 to 8 July, BSHM will be holding, at the University of St Andrews, its seventh joint conference with The Canadian Society for the History and Philosophy of Mathematics/La Société

Canadienne d'Histoire et de Philosophie des Mathématiques. BSHM will also be marking its fiftieth anniversary in 2021.

- 5.08 **Institute of Mathematics and its Applications** Chris Chipperton said that the new round of applications for the Mathematics Teacher Training Scholarships had got off to a positive start. The IMA was also holding a series of events for alumnae from the scholarship programme and had set up a Facebook community for the alumnae. He acknowledged the frustration that there was no tracking of the subsequent careers of former scholars by the DfE (it was not something the IMA was in a position to undertake.)
- 5.09 **London Mathematical Society** Kevin Houston said that the LMS would be holding its annual Education Day on Monday 13 May in 2019. He expressed interest in the idea of a Maths Week England and invited others who were interested to speak to him during the lunch break.
- 5.10 **The Mathematical Association** The report was noted.
- 5.15 **NRICH representing the Millennium Mathematics Project** The report was noted.
- 5.16 **Operational Research Society** The report was noted.
- 5.20 **STEM Learning** The report was noted.

6 Reports from Observing Bodies

- 6.04 **National Centre for Excellence in the Teaching of Mathematics** Jane Imrie said that there was verbal agreement on the national priorities for the Maths Hubs for 2019/20 but ministerial sign-off was awaited. There was now a principal evaluator in place to head a team to provide formative evaluation of the Maths Hubs.

Jane Imrie also referred to a report on an evaluation by Sheffield Hallam University of the Shanghai mathematics teacher exchange programme ([Longitudinal evaluation of the Mathematics Teacher Exchange: China-England - Final Report](#)), she made clear that this was an evaluation of the initial exploratory visits and not of the current programme. The DfE has decided there will be another round of exchanges under that programme but it is felt that such visit will be of less and less value in future.

Sue Gifford expressed concern at reports that exchange teachers were teaching Y1 classes. Jane Imrie replied that the advice to the Maths Hubs was that visiting teachers should not teach Year 1 classes but, when arrangements were being made for visits to schools, it sometimes had to be accepted.

- 6.08 **The Royal Society Advisory Committee on Mathematics Education** Helen Harth said that she had nothing to add to her report but she had noted the suggestion that, in future, JMC should receive updates from the Contact Groups and would seek to bring that about.

The Chair then invited those present who were involved with the Contact Groups which were already active to update the meeting on progress (the 11–16 Contact Group was yet to meet).

Sue Gifford (who chairs the **Primary and Early Years Contact Group**) said that the group was looking at several issues: baseline tests, the multiplication tables check testing and scoping advice for any future review of the National Curriculum. The group would like to put out some position papers and discussions are being had with RS ACME on this.

Steven O'Hagan asked whether the Contact Groups were set up to consider just the National Curriculum in England. Helen Harth responded that they were to cover the four jurisdictions. The Chair said that there was ongoing discussion on that point.

Jennie Golding said that there were challenges with what the RS ACME Contact Groups could do politically and that sometimes it would be possible for JMC groups to ask questions in a way that it was not possible for ACME to do. She added that there should be a way for MMSA to work with RS ACME Contact Groups in this regard.

Paul Glaister then spoke about the work of the **A Level Contact Group** (of which he is a member). The group is monitoring the implementation of the reformed AS and A Levels in Mathematics and Further Mathematics in England, including holding discussions with the awarding organisations and Ofqual. The group has had a particular interest in how the innovations in statistics assessment, including the large data set, are being implemented and has been working with the RSS on that.

Jeff Evans asked whether 'large' was used to avoid 'big'. Paul Glaister responded that 'large' was not defined.

Matt Lewis said that it was interesting to learn that special attention was being given to the assessment of statistics but he felt that the assessment of problem-solving and reasoning also needed attention, there being a need to identify and develop expertise in those fields.

The Chair said that big or large data might be the subject of a discussion at a future JMC meeting.

The Chair then spoke about the Post-16 Contact Group. He said the group had its origins in a group established previously by The Royal Society which had developed a working paper to provide a competency framework, rather than content, for T Levels which has been refined and published for the DfE to use as point of reference for those developing the new qualifications. The Contact Group is also looking at Core Maths and recently had a morning receiving evidence from the DfE, the Advanced Mathematics Support Programme and Matt Homer who is Principal Investigator on *The early take-up of Core Mathematics: successes and challenges* (<https://coremathsproject.leeds.ac.uk/>) project, funded by the Nuffield Foundation, at the University of Leeds. Another area of work is GCSE re-sit; a RS ACME Community of Interest discussion will be held on the subject later in the year. The group is also looking at the embedding of mathematics across the curriculum and what it means for the professional development of those teaching that mathematics, and seeking funding for a research project in that area.

In response to a question from Paul Glaister, The Chair said that the competency framework, *Mathematics for the T Level Qualifications: a rationale for General Mathematical Competences (GMCs)*, can be found on The Royal Society's website (<https://royalsociety.org/~media/policy/topics/education-skills/Maths/Mathematics%20for%20the%20T%20Level%20Qualifications%20-%20a%20rationale%20for%20GMCs.pdf?la=en-GB>). Paul Glaister then asked how the awarding organisations are using it. The Chair replied that it was published too late for the first round of T Levels; RS ACME had wanted to develop a framework of principles that could be applied across the pathways.

The Chair concluded by mentioning that MEI was undertaking a project funded by the Nuffield Foundation to design an alternative to GCSE re-sits in Mathematics (<http://www.nuffieldfoundation.org/new-mathematics-gcse-curriculum-post-16-resit-students/> http://mei.org.uk/files/pdf/Nuffield_MEI_mathematics_GCSE_public_statement.pdf).

7 Reports from meetings

7.01 **OCR Mathematics Consultative Forum: 21 November 2018** The Chair said that in future the report would be shorter.

8 Discussion of Reports

There were no matters for discussion from the reports. The Chair urged representatives to include in their reports key questions, challenges and problems for discussion.

9 Maths Weeks

The Chair introduced the discussion paper on Maths Weeks in England and Wales and asked "What does the JMC think about this?" The present were asked to break into groups of three or four to discuss the seven points (set out below).

1. **Purpose:** Why might a maths week be needed? What would be the aims and potential benefits? How would its success be judged?
2. **Audience:** What would be the target audiences be and do the purposes above vary for these groups?
3. **Integration:** How would maths week a) relate to existing activities, if at all, and b) relate across different countries, if at all?
4. **Timing:** When would be the best time to run a maths week and why?
5. **Delivery:** Who would a) develop the maths week proposal and b) oversee the project?
6. **Evaluation:** what would the success criteria be and how would these be assessed?
7. **Funding:** What would it cost to develop and deliver and who might fund it?

After twenty minutes, the Chair invited verbal feedback from the small-group discussions.

- David Holland said that his group could not distinguish a purpose or audience for a national Maths Week. Also was there to be a national theme handed down to local groups or was it to be an encouraging of people at local level to do something without being specific what it should be.
- Jane Imrie said that it should start small and focussed. She noted that the model of Maths Year 2000 was not sustainable.
- The Chair asked what the aim would be of a Maths Week, who would it be for, and why would it be held? He asked whether particular attention should be given to the twelve English Opportunity Areas.
- Helen Harth said that the suggestion in her group was for a problem-solving week, rather than a maths week, which would be across subjects and raise awareness of STEM.
- Sue Gifford asked how we would know whether a maths week had been successful or had had impact.
- Michael Anderson said it could serve to move mathematics away from high-stakes assessment.
- Chris Pritchard said that Maths Week Scotland had followed on from the example of Maths Week Ireland. This year Maths Week Scotland was moving from September to October. When Maths Week Scotland was set up, the week very quickly became populated with activities. Now there were also activities at other times of year, for example, the Deputy First Minister's Holiday Maths Challenges (written by the SMC); he felt that benefit was being seen throughout the year. A buzz had been created in Scotland by Maths Week Scotland (as it had in Ireland by Maths Week Ireland), and he asked whether that buzz already existed in England in other ways.
- Ems Lord said that it might stretch organisations if there were four separate maths weeks. Any new maths week would need to have impact and that would need to be measured.
- Heather Davis said that it made sense to look at Maths Week Ireland and Maths Week Scotland as both of these are seen as having been successful. Nevertheless, she wondered whether economies of scale could be achieved by having a Maths Week UK.
- Ems Lord said that there were different term dates in different parts of the United Kingdom and this could be an issue.
- David Pritchard pointed out that the Republic of Ireland was not part of the United Kingdom.
- Matt Lewis said that the public perception of mathematics had improved and continues to improve, and there is some public appetite for mathematics. He felt holding a Maths Week in England was a really good idea but it should not replace existing activities.
- Kevin Houston said that a Maths Week should be a celebration of mathematics; its audience should be everyone; it would start mainly in schools but also be for adults. He asked what part MathsJams, where people meet to do mathematics for fun, might play.
- Robin Wilson noted that Maths Week Ireland (which includes two weekends) is aimed at those aged 8 to 80, and was not just school-based activities; there are lectures to adults and activities in the streets. He liked the idea of a British Isles Maths Week.
- The Chair reminded the meeting that there were already two Maths Weeks established in the British Isles and they take place at different times of year.
- David Pritchard asked how does one get into every corner of the country, for example, rural areas and areas not well served by higher education (higher education institutions have people involved in public engagement). In England it is harder to use schools as many schools are not linked to local authorities.
- The Treasurer said that we should consider participation and priorities; a key valued focus should be marginalised groups and there should be a something for those who have less successful academically. She reported that in June there will be a Maths Week London which will involve schools and those engaged in widening participation, there will be family elements and also activities aimed at those who will be future parents. There will be activities to intrigue and give satisfaction, particularly around problem-solving and encouraging mathematical thinking. There will be possibilities for evaluation and it will build from existing structures. The week will involve a large number of voluntary and community organisations and city funding is being sought. The initiative will be aimed at low-participation neighbourhoods in London.

- The Chair drew attention to the Deloitte Report, [Measuring the Economic Benefits of Mathematical Science Research in the UK](#), published in 2012 and the high economic value of mathematics which it demonstrated. He felt those looking to start a Maths Week England should be looking for significant funding from a wealthy philanthropist. In exchange for that funding, it may be necessary to shape the dream to meet the aspirations of the funder.
- Sally Barton said that a problem-solving week would engage subjects other than mathematics in schools but we should beware of schools using such a week to be able to say they had 'done problem-solving' and tick it off their to-do list.
- The Chair summarised the discussion so far as one of cautious open-mindedness and a willingness to explore further. He said he would bring some alternative proposals to the next meeting.
- The Deputy Chair asked if it should be known about widely that this is being thought about, as champions will be needed. Ideas should be put forward soon enough that people can feedback at the General Meeting on 4 June 2019.
- The Treasurer said that the JMC may not be able to run a Maths Week England itself but it could provide thought leadership, enabling and reference groups.
- Paul Glaister stressed the need for champions.
- The Chair said that the JMC should hold on to a part of shaping the vision of a maths week.
- Tom Roper said the discussion at the General Meeting on 13 November 2018 had ended rather fluidly. He asked, if a Maths Week England is going to happen, who is going to do it? Should we as a group do it (or a commercial organisation, Sumdog is behind Maths Week London)? He said we were reluctant as we did not want to be the people doing it.
- The Chair said that the JMC could have different relationships with different aspects of the maths week.
- Robin Wilson drew attention to the use of online activities by Maths Week Ireland which had reached 36 000 face-to-face but 250 000 online.
- Kevin Houston said that he had talked to Mareli Grady, Sue Pope and others who were willing to pitch in. He was willing to get something started and could commit some time.
- The Chair said he was willing to engage with Kevin Houston and a small group in exploring what was possible.
- Kevin Houston said the LMS Education Committee had discussed the idea the previous day.
- The Chair said he would pick up the ideas he had heard in a paper for the next meeting. Seeking funding would become easier once there was a clear idea of what was intended. He also said that evaluation was really important and needed to be designed in.
- Jane Imrie said there might be a theme but 'you' might do things within the theme, like Red Nose Day, so groups would do their own thing but within the bigger theme.
- Matt Lewis pointed out that the National Numeracy day run by National Numeracy last year had been well supported.

The Chair brought the feedback session to a close and said he would prepare a scoping paper for the June meeting.

The following written comments were also collected as supplementary feedback from the small-group discussions.

- What is the purpose of a Maths Week? Mathematics as a tool for social mobility – mathematics provides the preliminary skills that give people the opportunity to move upwards economically. Could this be integrated into a Maths Week in some way, especially in terms of geographies that do not have strong academic, science or mathematics capital?
- Maths Week should be kept broad – mathematics features in and is a conduit to so many other routes in further education and higher education, upskilling and different disciplines. There could be a heavy focus on engineering but not enough people have the prerequisite skills; biology might be a focus, as might the digital and data analytic skills needed for artificial intelligence and virtual reality. Maths Week's target audiences should include parents and people disengaged by mathematics.
- Maths Week should engage with commercial bodies, possibly with a view to funding; many engineering firms have apprentices who use/need. Some city firms have outreach

programmes for students in the poorest areas. They have the strongest need for mathematical skills.

- Maths Week could link with MATHSWORLDDUK.

10 Any other business not elsewhere on the agenda

The Chair announced the topic for the afternoon discussions at the next two meetings.

The Chair said that the discussion session at the June 2019 meeting would receive short presentations on the state of mathematics education in the four jurisdictions from four speakers and then discuss the strengths, weaknesses, challenges and direction of travel of mathematics education in the four jurisdictions.

The Chair also said that the discussion session at the November 2019 meeting would look at what is happening in the Maths Hubs and Centres for Excellence in Further Education in England, what networks there were for reaching into providers, for professional learning and professional development.

11 Discussion: The Supply of Mathematics Teachers

The speaker, Kevin Houston, introduced himself and the London Mathematical Society (LMS) which he represented; he added that this discussion had originally been scheduled for February 2018.

Kevin Houston said that there were reasons to be cheerful: Mathematics was the most popular A Level subject, although only the fourth most popular for women. Mathematics had a second A Level, Further Mathematics and that received government funding through the Advanced Mathematics Support Programme (and its predecessors) and support indirectly from higher education mathematics departments. The importance of mathematics had been recognised in the Industrial Strategy and the Budget.

He said there were also reasons not to be cheerful. Mathematics was seen as important for its utility rather than anything intrinsic. Mathematics was not compulsory to 18, although making it so would increase the demand for mathematics teachers. The UK is not developing its mathematics research talent, both the most recent UK-based Fields Medallists were not educated in the UK; all bar one of last year's prizes awarded by the London Mathematical Society were awarded to mathematicians from abroad (the exception was the history prize awarded to Jeremy Gray); much of the staff of many university mathematics departments come from abroad. There has been a lack of piloting of changes.

Kevin Houston went on to say that there were problems with teacher recruitment, teacher initial training, teacher professional development and teacher retention; in evidence he cited the House of Commons Library Briefing Paper by David Foster, *Teacher recruitment and retention in England* (<https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-7222>).

The speaker said that pupil numbers are expected to rise by 5% from 2018 to 2024, with secondary numbers going up by 15% but primary numbers going down by 1.4% after peaking in 2019. An interim report from the NFER research project on teacher retention and turnover (<https://www.nfer.ac.uk/key-topics-expertise/school-workforce>) showed a decline in retention for mathematics.

He said that the government's strategy for initial teacher training favoured school-centred training with students learning 'on the job' through SCITTs, School Direct and Teach First, with (for already qualified teachers) Teacher Subject Specialist Training (TSST). Lorna Howarth (DfE) intervened to say that the move to school-led training gave schools the opportunity to take responsibility for training and to make their own decisions; also whilst 50% of training was school-led, 50% was still HEI-led and of the school-led training 80% involved HEIs. Sue Gifford added that the number of hours that schools made available on school-led training to HEIs was an issue.

Kevin Houston resumed, saying that training can be short, only five weeks for Teach First. He also questioned why a school needing a teacher would necessarily have the capacity to train a teacher, how is the subject-specialist knowledge assessed, who checks, do the school-led routes provided time for reflection? He asked whether the effectiveness of this approach is being assessed (he could not find any research on this)? Matt Lewis said that there are statistics on retention for those who have entered teaching by the different routes. Lorna Howarth said that there was no research on either route but that there were indications that

retention was the same either way, with slightly higher initial retention for school-led routes. She added that all routes were inspected by Ofsted and 90% of providers were good or outstanding. The different routes meet the needs and preferences of different entrants. All the Ofsted reports are published and Ofsted publishes an annual report on initial teacher training (ITT); the DfE also publishes statistics. Sue Pope drew attention to the National Audit Office report which looked at the cost-effectiveness of ITT. Lorna Haworth responded that the DfE is trying to make the choice of route less confusing for potential entrants and to address the inefficiencies of small providers. Matt Lewis observed that the two-year retention for Teach First is low.

Kevin Houston said that we should aim to raise the esteem of teachers. He said that the DfE had produced a Teacher Recruitment and Retention Strategy (<https://www.gov.uk/government/publications/teacher-recruitment-and-retention-strategy>) which was welcomed but there were some suspicions. Is the Early Career Framework (<https://www.gov.uk/government/publications/supporting-early-career-teachers>) an admission that teachers were not properly trained in the first place? He also questioned the need for new qualifications for teachers and the effectiveness of the bursaries. He went on to draw attention to teachers' salaries, saying that a 2017 report from the Gatsby Foundation (<https://www.gatsby.org.uk/education/latest/examine-pay-of-early-career-shortage-subject-teachers-to-effectively-tackle-retention-in-english-secondary-schools>) had suggested that a 5% rise in salaries would remove the shortage of mathematics teachers.

He said that higher education can increase the supply of mathematics graduates into teaching, and many departments have modules, with credits, which allow mathematics undergraduates to engage with teaching. The LMS has set up a 'Teaching Mathematics as a Career Working Group', which had recently held its first meeting, and wants to involve other learned societies. The LMS document, which stimulated the holding of this discussion session, was not circulated widely but the DfE has addressed some of the points in it.

In conclusion, Kevin Houston said that our schools-based approach is out of line with other developed countries; teacher preparation and development was a specialist enterprise. He said there should be a national structure to replace the school-based approach, with a single unifying organisation to oversee all aspects of mathematics teacher recruitment, training and retention which would collect information and issue advice and recommendations

It was noted that there was no shortage of mathematics teachers in Northern Ireland. Julie Harris said that there was concern in Northern Ireland that the bursaries in England will have an impact, drawing teachers away from Northern Ireland.

Mention was made that the Bond Review (<https://epsrc.ukri.org/newsevents/news/mathscience-review/>) proposes an academy for mathematics.

The Chair thanked Kevin Houston for his presentation.

Julie Harris said that Northern Ireland had never had a shortage of mathematics teachers or other teachers but the universities in Northern Ireland, where teachers are trained, were worried by the bursaries in England and she said that she had asked in the past about the tracking of those receiving bursaries. She concluded by saying that more people were applying to become mathematics teachers. Sally Barton said that she had seen statistics which said that 90% took mathematics, in some form, post-16. Lorna Haworth said it was common outside England for learners to progress in mathematics post-16. Julie Harris added that there was no gender difference in participation in mathematics post-16 in Northern Ireland.

Chris Pritchard said that the experience in Scotland was similar to Northern Ireland. He said that the profession of mathematics teacher was an all mathematics-graduate profession and there was popular respect for teacher in Scotland, but they were starting to see problems emerging with recruitment. The Scottish Government had told ITT providers to double the number of places in the last two years but the same number are applying so half of the places are untaken. David Pritchard added that the quality of data on the teacher workforce in Scotland was not great; the Royal Society of Edinburgh has been involved in conversations on the subject; there were huge regional disparities, with ratios differing by a factor of two for STEM teachers.

Tom Roper said that he had been an external examiner at Queen's University Belfast and conversations had suggested that teaching was a highly respected and revered profession, something that was not the case in England.

Lorna Haworth said that in England the scale and population growth made the situation different. England is training more mathematics teachers but it is not keeping up with the population growth and retention; also, the strength of the economy means that teaching has to compete harder. The DfE's Teacher Recruitment and Retention Strategy was trying to improve the situation, but she acknowledged that there were also complicated questions about pay.

The Chair asked about the role of the media. Chris Chipperton said that teaching had lost respect with the public through taking industrial action. He added that starting pay was not so important as the rate at which pay rose for mathematics graduates who remained in the profession. The Deputy Chair also thought that the industrial action in the 1970s marked a point when public respect for teachers declined (there was a brief period late in the time of the Callaghan government when pay went up) but the lack of respect for teachers was endemic, going back to George Bernard Shaw; there was a notion that no one needed to train to be a teacher, and the profession may look weaker if we lower the hurdle.

The Treasurer said colleagues overseas could not believe how low the bar was in England for subject-specific knowledge and subject-specific pedagogic knowledge. In her research, she encounters secondary classroom teachers without the depth of subject knowledge needed to support an aspirational curriculum, and she said that we could raise standards with better subject knowledge.

Paul Glaister said that the LMS is keen to do more in higher education to raise the profile of teaching and the LMS is also keen to work with all JMC members. The Chair asked if there was any evidence whether the degree module courses were effective. Kevin Houston said that some decide not to teach following the modules. Paul Glaister added that recently it has become possible for schools to bid for money to provide Teaching Internships.

Lorna Haworth said that pay for Mathematics and other STEM will always be problematic. There was also the conundrum of quality versus quantity. She added that there was evidence that initially subject specific knowledge does not make someone a better teacher and it was important to improve continuing professional development. She pointed out that the Mathematics Teacher Training Scholarships were there for high-quality graduates.

Sally Barton said that the constant rate of change is also a factor in causing people to leave teaching. She asked how many teachers go when they cannot cope with yet another change? Lorna Haworth said that the Secretary of State had made a commitment to stability for the lifetime of this parliament and the DfE was working with Ofsted to reduce high-stakes accountability.

Tom Roper said that NFER report on teacher retention and turnover had found that the working week for teachers averaged 54 hours including holiday time and that many were working during their holidays – workload was an enormous factor, also that many leave for less total money but their hourly rate goes up; an improved reputation for teaching and a reduced workload could solve the retention problem. He also said that the DfE Teacher Recruitment and Retention Strategy made no provision for subject specialism; it mentions Chartered Teacher Status awarded by the Chartered College of Teaching but not Chartered Mathematics Teacher; he added that the mathematics community had experienced difficulty in getting the Chartered College of Teaching to work with it. He asked why the DfE did not come to the subject associations rather than the Chartered College of Teaching. Heather Davis said that there was no point increasing recruitment if one was not ensuring retention: new teachers are treated badly in many schools and are burning out. Lorna Haworth said she was present because the DfE wanted to work with subject associations and she would take back the comments about Chartered Mathematics Teacher to the DfE.

The Chair invited colleagues to think about what we should think about and what we should do next.

Jane Imrie said there were some reasons to be cheerful; she mentioned subject-specific initiatives for professional development, the Maths Hubs, the Advanced Mathematics Support Programme, among other things, but there needed to be space for teachers to take advantage

of what was offered. She also noted that more money is going to mathematics than to other subjects.

Lorna Haworth gave a brief summary of the DfE Teacher Recruitment and Retention Strategy, speaking mostly about the retention elements. The DfE was seeking to tackle early career retention with the Early Career Framework which builds on initial teacher training and provides for 10% remission in the first year and 5% remission in the second year. The DfE is also committed to extending the phasing of bursaries to increase retention. The Strategy also provides for new National Professional Qualifications and for flexible working. It was important to develop the right school culture and to that end Lorna Haworth drew attention to the Workload Challenge. She concluded by saying that the fourth chapter of the Strategy was on recruitment, the initiatives being pursued and the simplification of the market.

The Chair asked what can the JMC do next?

The Deputy Chair asked what higher education mathematics departments do? She said that she had run the Student Ambassadors Scheme at King's College London but running it did not give kudos; she asked if with the Teaching Excellence Framework there were any incentives for departments to work towards this being valued. She mentioned that the use of salary three years after graduating as an indicator which is unhelpful as it is an incentive to discourage mathematics students from entering teaching.

Heather Davis said that we should be encouraging a mind-set of when you introduce a new policy of doing a thorough risk assessment of what might happen; recent innovations, over the last fifteen years have shown the pitfalls of not doing that. Lorna Haworth said that the Secretary of State had asked for a risk assessment for future policy changes. The Chair said that the JMC could act as a sounding board.

Tom Roper asked what the DfE Teacher Recruitment and Retention Strategy might mean for mathematics teachers. Would it be worth us gathering evidence to forward to the DfE? Sally Barton said there was a need for more subject-specific training and not to have continuing professional development time used generically. Paul Glaister noted the reconvening of the Expert Group and called for it to have subject-specific input. Sue Gifford said that professional development is key for early years and primary, and not just secondary.

Helen Farmery said that the meeting of RS ACME's Community of Interest on 22 February 2019 would provide an opportunity for feedback.

It was agreed that a link to the DfE Teacher Recruitment and Retention Strategy (<https://www.gov.uk/government/publications/teacher-recruitment-and-retention-strategy>) would be sent to all members. All members were asked to feedback comments within the following two weeks which would be collated and sent to Lorna Haworth who was soon to become Head of Teacher Workforce Strategy at the DfE. The Chair also asked members to consider what connections they had with stakeholders, both higher education institutions and others.

12 Conclusion

The Chair thanked everyone present for their contributions; he then closed the meeting at 3.28 p.m.

13 Dates of future meetings

Tuesday 4 June 2019 at The London Mathematical Society, De Morgan House, 57-58 Russell Square,

Bloomsbury, London WC1B 4HS (deadline for papers: Tuesday 21 May 2019)

Tuesday 12 November 2019 at The National Council for Voluntary Organisations, Regents Wharf,

8 All Saints Street, London N1 9RL (deadline for papers: Tuesday 29 October 2019)

Tuesday 18 February 2020 at The National Council for Voluntary Organisations, Regents Wharf,

8 All Saints Street, London N1 9RL (deadline for papers: Tuesday 4 February 2020)

These meetings will begin at 11 a.m.