Joint Mathematical Council of the United Kingdom

Minutes of the Council meeting held at the Royal Statistical Society on Tuesday 16 June 2015

Present

Officers

Chair	Tim Rowland
Honorary Secretary	Peter Thomas
Honorary Treasurer	Paul Harris

Representatives of Participating Societies

Adults Learning Mathematics	Jeff Evans
Association of Mathematics Education Teachers	Ros Hyde
Association of Teachers of Mathematics	Sue Pope
British Society for Research into Learning Mathematics	Hilary Povey
British Society for the History of Mathematics	Sarah Hart (deputy)
Conference of Heads of Departments of Mathematical Sciences	Jan van den Heuvel (deputy)
Edinburgh Mathematical Society	Colin Campbell (deputy)
Institute of Mathematics and its Applications	Nigel Steele (deputy)
London Mathematical Society	Alice Rogers
The Mathematical Association	Peter Ransom
Mathematics in Education and Industry	–
National Association for Numeracy and Mathematics in Colleges	Sally Barton
National Association of Mathematics Advisors	Matt Lewis (deputy)
National Numeracy	Lynn Churchman
National STEM Centre	Stephen Lyon
NRICH representing the Millennium Mathematics Project	–
Operational Research Society	Charlene Timewell
Royal Academy of Engineering	–
Royal Statistical Society	Neil Sheldon
United Kingdom Mathematics Trust	Bill Richardson
Wales Institute of Mathematical and Computational Sciences	Stephen Williamson

Co-opted Members

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

Representatives of Observing Societies

Advisory Committee on Mathematics Education	Robert Barbour
Department for Education [England]	–
Department of Education [Northern Ireland]	–
Education Scotland	–
Higher Education Academy	–
National Centre for Excellence in the Teaching of Mathematics	–
National College for Teaching and Leadership	Ellen Agrebi (deputy)
Office for Standards in Education	–
The Office of Qualifications and Examinations Regulation	–
The Royal Society	Marie Rogerson (deputy)

Visitors

Advisory Committee on Mathematics Education Secretariat	Niamh Mc Mahon
Department for Education and Skills [Wales]	–
National STEM Centre	Gill Collinson

1 Introduction

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

1.2 **Practical Arrangements** The Honorary Secretary announced the procedure for emergency evacuation, as laid down in the contract for the booking of the premises, at the beginning of the Special General Meeting which immediately preceded the Council meeting.

1.3 **Apologies for Absence** The Honorary Secretary announced that apologies for absence had been received from June Barrow-Green (BSHM), Chris Chipperton (IMA), Charlie Gilderdale (NRICH),

Catherine Hobbs (HoDoMS), Janet Holloway (Ofqual), Jane Imrie (NCETM), Jane Jones (Ofsted), David Montagu (The Royal Society), James O'Donoghue (NCTL), Alice Onion (NAMA), David Pritchard (EMS) and Nick Todd (DE).

2 Minutes of the meeting held on Tuesday 10 March 2015

2.1 **Approval** The minutes were approved with two corrections; in item 6: 'Lynn Chamberlain' was corrected to 'Lynn Churchman' and in item 7.5: 'CRIME' was corrected to 'CRME'.

2.2 **Matters arising not elsewhere on the agenda** None.

3 Reports from JMC Executive Committee

3.1 **Chair** The Chair said that he had written to the chairs of Participating Societies in April to put forward a strategy to introduce the mathematics community to the Secretary of State for Education in England following the general election, in order to present a coherent face; it was that the Chair was to write to the new Secretary of State as soon as her identity was known, then Participating Societies would write themselves. The Chair wrote as he proposed and Participating Societies were informed once the letter had been sent. The Chair thanked the Participating Societies for the support that most had extended towards the initiative, although there were some that did not respond or had not agreed with the strategy. The Chair made clear that in sending his initial letter he was not seeking permission, just cooperation.

3.2 **Honorary Secretary** The Honorary Secretary asked and it was agreed that the *JMC Handbook* be replaced by a page for new representatives on the JMC website. It was noted that this would make it easier to ensure representatives had access to up-to-date information and reduce the risk of conflicting information being held in different places; the Annual Report would maintain the historical record by providing an annual snapshot of information.

3.3 **Honorary Treasurer** The Honorary Treasurer said that the JMC was running a fairly healthy surplus so far this year, although the cost of this meeting and associated travel expenses were still to be paid. A couple of societies were still to pay their subscriptions. There were no questions.

4 ICME

Hilary Povey, the JMC's representative on the ICME13 Bursaries Committee, reported that there was no activity so far but, following the previous Council meeting, she had contacted Chris Budd, the chair of the committee. The Chair said that he had taken up matters with Chris Budd, who is a co-opted member of this Council but has yet to attend; Chris Budd had overlooked the procedure agreed by the Council for the Bursaries Committee. Two months ago the Chair sent him the agreed procedure which he acknowledged from Vancouver where he was on sabbatical.

There was agreement that time was moving on: funds need to be raised, bursaries need to be advertised and awarded before ICME13 which takes place in 2016 from 24 to 31 July. Hilary Povey will again contact Chris Budd and seek to move matters forward.

Peter Ransom said that no publicity had been circulated about ICME13. He felt it was a great opportunity as it was so close to the UK. There was no information about what the UK was doing. The deadline for papers was early this autumn. The MA planned to have a meeting for volunteers on 19 September 2015. He wanted the JMC to be more active. The Chair said the point was well taken.

5 BCME

David Martin, Chair of the BCME Committee said the target date for BCME9 had been set. Paul Metcalf has been appointed as Treasurer of the BCME Committee. Much activity about finding a venue was taking place. A Reference Group has been established (its members have been sent the minutes of the BCME Committee Meeting on 17 March 2015). The next meeting of the BCME Committee is on 24 September 2015.

Hilary Povey said it would be useful to have the membership of the Reference Group publicly available. David Martin said that he hoped in the near future to move forward with the BCME website and the membership list would be put there; it would also be appropriate to send the list to the JMC membership. Peter Ransom said that most Participating Societies have provided a member for the Reference Group and he was contacting the others. Sally Barton raised a question about NANAMIC's representative, she and Peter Ransom agreed to discuss the matter outside of the meeting. Peter Ransom said that when the list was complete it would be sent to the Honorary Secretary to circulate to Participating Societies.

The Chair thanked David Martin and Peter Ransom for all they had done; he was encouraged by progress.

6 A Level Mathematics Advisory Board

It was noted that four members of ALMAB were present: Sue Pope, Alice Rogers, Peter Thomas and Neil Sheldon (the first three did not participate in the vote on the proposal).

The Honorary Secretary introduced the proposal in the terms given in the agenda which invited the Council to confirm the provisional decision of the Executive Committee to endorse the A Level Mathematics Advisory Board as an independent body in good standing with the JMC and enjoying its support. The Chair then put the proposal to the meeting.

Sue Pope said that the matters being considered by ALMAB were important as the changes taking place to A Level Mathematics could affect participation; she also noted that ALMAB was talking to Ofqual and DfE.

Lynn Churchman said that there should be a comparable body for GCSE where the implementation had been a dog's breakfast. She asked whether JMC should create a similar body.

Jeff Evans asked why DfE stopped funding ALCAB. Sue Pope replied that ALCAB had done its job which was to develop content, assessment of that content was beyond its brief; ALMAB was needed to maintain a watching brief and limit potential damage. Alice Rogers said that it was encouraging that Ofqual was taking so much notice of ALMAB and four members of ALMAB were members of Ofqual's A Level Mathematics Working Group; there was a desire on the part of Ofqual to avoid repeating what had happened with GCSE.

Alice Rogers said there was a crying need for something similar for GCSE which could feed into a more coherent body being developed by CMS and The Royal Society; if we already had a National Mathematics Subject Committee then we would not be in this situation. Robert Barbour said that ACME is minded when it meets with Ofqual in July to suggest that such a committee is established. Lynn Churchman said this would meet her concern; we did not have the ALCAB history in the GCSE space; we should look to limit damage and look to a revision of the new GCSE in the near future; she asked how such a group could be convened. Sally Barton said that ACME should go ahead with a proposal, including the suggestion of names. Lynn Churchman said it would need to be an independent group. Niamh Mc Mahon said that it was encouraging that Ofqual had asked to come to ACME's termly meeting; any group that ACME set up would be using its Expert Panel model which would include an open call for members, on a principle of transparency.

Sue Pope said that the MMSA in October, which will be chaired by Ros Hyde, will focus on assessment and Ofqual will be invited to send someone (as will ACME as is usual); she also mentioned that Ian Stockford from Ofqual had met ATM at its annual conference.

Lynn Churchman emphasised the need for a GMAB-type body which would need to include practitioners as well as policy people to have credibility with Ofqual and DfE; DfE could be approached for funding. Robert Barbour said that a letter would be helpful after discussions with Ofqual in July and the JMC Executive Committee. The Chair asked when such a letter should be sent. Niamh Mc Mahon said that she would send the JMC some options. The Chair said that he would involve the Honorary Secretary, Lynn Churchman and others as well as himself.

When put to the vote, it was agreed, with no opposition and four abstentions, that the JMC endorse the A Level Mathematics Advisory Board as an independent body in good standing with the JMC and enjoying its support.

7 Reports from Participating Societies

7.1 **Association of Mathematics Education Teachers** Ros Hyde said that she had attended a meeting of the Supply of Teachers Advisory Group at the House of Commons two weeks previously at which John Howson had presented figures which showed there were significant shortages of teachers: the overall percentages hide the scale of the problem; also, the failure to meet targets for recruitment is increasing the problem; anecdotal evidence from higher education providers indicates that this will be a challenging year, the full picture will be known later in the year.

Ros Hyde also said that AMET would be holding a one-day Saturday conference in Manchester on 3 October 2015, it will cover primary and secondary.

Ros Hyde said further that AMET has concerns about the quality of some Subject Knowledge Enhancement courses (SKE). This is a long standing concern, and it is drafting a leaflet of best practice which will cover content, assessment, range of provision and pedagogical approaches; AMET hopes to distribute the leaflet through Participating Societies, MMSA and its own website. Alice Rogers said that the LMS Education Committee had discussed SKE; it was concerned that there was no quality control and providers did not have an assured funding stream; it also noted that some university departments of mathematics have suitable people for teaching on SKEs rather than taking

teachers out of the classroom. The Chair mentioned that the NCTL report to an earlier Council meeting had claimed that restricting SKEs to HEIs was contrary to market principles. Ellen Agrebi said that NCTL would welcome input from AMET; NCTL would be reviewing quality concerns about SKEs at a meeting on 22 June 2015; she asked for views on the length of SKE courses.

Robert Barbour said that courses needed to be at least 24 weeks long. He added that some universities deliver SKEs with accreditation and these courses undergo quality assurance, although many other courses do not. He also wished to point out that there is good practice as well as practice that causes concerns. Hilary Povey entered a caveat about 24-week courses, from her own experience at Sheffield Hallam University where the course is co-taught with undergraduates whose course is 36 weeks long, the courses must have lengths which are consistent with undergraduate programmes.

Lynn Churchman asked for clarification about the alternative route (to taking an SKE) to subject specialism available through Teaching Schools (some of which were working with HEIs) which was free except for cover; it was a smaller commitment than an SKE (and less well funded). Ellen Agrebi said that NCTL is funding this route; there are now only two streams: pre-ITT SKE and the Teaching Schools Specialist Teacher (TSST) programme (which replaced post-ITT SKE); NCTL was trying to align and coordinate these programmes. Lynn Churchman said there was an issue of quality assurance with the TSST programme as well as with SKEs. Ros Hyde said that the length of the TSST courses made it more manageable for schools to release teachers, it was a compromise, but it is for those already in the classroom. Hilary Povey said that it looked more like the predecessor of post-ITT SKE but without the need for accreditation. The Chair recalled the original SKE specification which had been drawn up by Keith Hirst and noted that there had been erosion over time.

The Chair raised the matter of the post-Carter review and drew attention to the JMC's letter offering expertise which had not been taken up so far. Niamh Mc Mahon said that there had been delays during purdah. Ros Hyde expressed frustration about expertise in HEIs being ignored.

7.2 **Institute of Mathematics and its Applications** Nigel Steele spoke about the Mathematics Teacher Training Scholarships (MTTS). He said that the removal of the differential between the MTTS and the bursaries had made recruiting for MTTS more difficult; the IMA has written about the issue to the Secretary of State (and received a reply). They have been encouraged to economise and converted the initial test to multiple-choice, but have now decided to revert to the previous format. He said good people are coming through but not enough of them. The IMA is working with NCTL to develop a new format for the MTTS. The Institute of Physics is developing a Physics degree which will give QTS and this is a source of interest; he felt there would need to be proper time for study of the subject and proper time for educational studies. He said that the IMA had a very good working relationship with NCTL and he was cautiously optimistic.

Ros Hyde said that her own institution was running a Physics with QTS course but there was a question whether it would expand the pool or whether it would just reduce PGCE numbers. She also mentioned the internships that some schools offer. Nigel Steel said that putting final year undergraduates in schools was very good and we should do more of it. Hilary Povey said that Mathematics with QTS undergraduate routes do exist but Sheffield Hallam University's undergraduate Mathematics course has an optional module with teacher education as a focus, this generates interest in doing a PGCE. Sally Barton said that Nottingham had a similar course; she asked if there is any research into the impact of X + QTS versus a final-year option.

Sue Pope asked about the educational background of the scholars, including the types of school. Nigel Steele replied that they were Mathematics, Physics and Engineering graduates and that only one of them had gone on to work outside the state sector. Sue Pope emphasised that her question was about what schools they went to themselves.

Nigel Steele noted that Chris Budd had been awarded an OBE in the Queen's Birthday Honours.

7.3 **London Mathematical Society** The report was noted.

7.4 **The Mathematical Association** The report was noted.

The Chair expressed sadness at the death of Douglas Quadling.

7.5 **National Association of Mathematics Advisers** Matt Lewis said that the attendance at this year's NAMA conference was the best in recent years. Members were preparing for the challenges for CPD across all sectors. NAMA is working on a document on mastery, the *Five Myths of Maths Mastery*, as mastery is a term which is being used in a variety of ways. The 2014 PISA report has been considered, a key priority is developing learner resilience. He also mentioned NAMA's participation in the London Schools Improvement Programme. He said that Jeremy Hodgen (University of Nottingham) is looking to recruit trainers for an EEF-funded second ICCAMS project. He spoke also of

a project investigating best practice in grouping in English and Mathematics in secondary schools being undertaken by King's College London.

The Chair noted the large amount of activity being undertaken. Jeff Evans asked if the PISA report referred to was the paper by Andreas Schneider reported on the BBC. Lynn Churchman said that NAMA had not made a formal response.

The Chair expressed concern about the low take-up of Core Maths. Matt Lewis said that Core Maths had been discussed at the NAMA Conference, Mick Blaylock (from the Core Maths Support Programme (CMSP)) had said at the conference that there were currently 180 schools which were early adopters; anecdotally it appeared that many schools were being cautious and were loath to commit, unless they were early adopters, given the shortfall of teachers post-16 and the Level 2 requirements. Niamh Mc Mahon said that 600 schools had signed-up to start this year. Sally Barton said the Level 2 requirement had hit some places; at her institution they had had to go from 10 to 17 GCSE re-sit classes so there was no capacity to introduce Core Maths. Robert Barbour said that the attitudes of university non-mathematics departments were key, but it was proving hard to get information on their positions or level of understanding about the qualifications, and there is a danger of them not recognising Core Maths qualifications. Niamh Mc Mahon said the CMSP High Level Strategy Group has set up a Higher Education Task Force (including, among others, Andrew Tomei, Jeremy Hodgen and Vanessa Pittard). Lynn Churchman said that take-up by students in early adopters could be problematic with clashes on students' timetables even if teachers and rooms were available.

7.6 **Wales Institute of Mathematical and Computational Sciences** Stephen Williamson introduced his annual update on matters in Wales, saying that policy in Wales was diverging from that in England, perhaps in five or ten years we shall see which system is better. In 2014 the Welsh Government introduced compulsory examinations in mathematics in Years 2 to 9, there are tests in numeracy and mathematical literacy; they are seen as having been implemented successfully. Unlike in England, there will be two GCSE courses, Numeracy and Mathematics; the first examinations will be in November 2016. Objections had been raised to a ban on early sitting, so that pupils could sit Additional Mathematics, so there will be no ban on early sitting. AS Levels are being kept as contributing to A Levels, but will be 40% rather than 50%.

Stephen Williamson said that WIMCS had always had doubts about the Welsh Baccalaureate Qualifications fearing it would lead to examinations overload, especially for those taking 10 GCSEs and 4 or 5 A Levels. Nevertheless, because of the policy of the Welsh Government, it will soon be almost compulsory.

The Further Mathematics Support Programme Wales has been piloted successfully and, following a positive report, it has been invited to submit proposals to extend to the whole of Wales by April 2016.

There has been a lack of support for pupils in state schools in Wales taking STEP; the Welsh Government has asked schools to have a lead school in each area which will provide STEP training, this will be across Wales but with limited funding: twelve centres will each receive £15 000. Alice Rogers asked if there was a Widening Participation initiative in Wales. Stephen Williamson replied that Widening Participation is a Welsh Government policy. Alice Rogers said that King's College London had used Widening Participation funding to support STEP preparation. Colin Campbell asked whether Wales did not believe in its own universities. Stephen Williamson responded that the numbers of Welsh pupils going to Oxbridge had been declining in recent years.

8 Reports from Observing Societies

8.1 **Department of Education** The report was noted.

8.2 **Advisory Committee on Mathematics Education** Robert Barbour highlighted that ACME had a new Chair, Philip England, and thanked the outgoing Chair, Steve Sparks. He said ACME was in the process of appointing three new members. ACME's three main projects were at present on the assessment of problem-solving and reasoning, jointly with the RSS on statistics in other subjects and on initial teacher education (ITE); reports would be published soon. He expressed gratitude to those who had contributed to these projects.

Robert Barbour went on to outline some emerging findings from the ITE project (a first draft report of which would soon be sent to Outer Circle members).

- There needs to be a long-term strategic plan for a greater quality and quantity of teachers of mathematics. (At present we are facing the challenges of a 9% increase in primary-age children, a 17% increase in secondary-age children, the growth of Core Maths and the new GCSE.)

- There are questions to be asked as to why we are not following internationally recognised qualifications if we wish to raise ourselves to international levels.
- There should be national criteria for and national accreditation of Subject Knowledge Enhancement courses.
- There should be mentoring of new teachers. It is suggested that that should be for two years (many Far Eastern countries offer five years of mentoring to their new teachers) and that to give full value to this it should be by a qualified teacher who has undertaken a MaST-like course.
- There should be defined minimum amounts of time for mathematics pedagogical input into teacher training for both primary and secondary routes, although the amounts proposed are still well below international levels.
- There should be accredited critical evaluation skills at Levels 6 or 7 in all teacher training courses to ensure teachers are reflective learners open to the finding of research.
- There should ongoing professional development available to teachers; existing and ongoing deficits should be addressed.
- There should be consideration of what is an appropriate threshold of mathematical attainment for someone seeking to become a primary-trained teacher.
- There should be a long-term plan which signals that at some future date there will be an expectation of a Level 3 qualification in mathematics, perhaps even Core Maths, for those entering teacher training. Until then the threshold should be set in terms of GCSE, at the new grade 6 although perhaps not initially.

Sue Pope asked if the work had included an audit of the mathematics qualifications of those on current primary ITT programmes; she was concerned whether extra barriers would be affordable given current levels of recruitment. Robert Barbour said he had no figures. The Chair observed that the Williams Review had drawn back from recommending a grade B requirement in GCSE Mathematics. Sally Barton said that it would depend on whether Core Maths became a realistic option and whether it had a positive dispositional effect which would impact on the type of teacher those who had taken it became. The Chair said that Core Maths would be very useful. Sue Pope said there were two challenges for Core Maths: finding the teachers for it and finding the funding for it. Sally Barton said there was no funding for students unless taking GCE Mathematics and it was over to us to sort out how to do it. Sue Pope added that an OECD report had shown that class size does not impact on achievement, so one could teach classes of one hundred.

Robert Barbour said that the draft report would be circulated after the Outer Circle had seen it. Niamh Mc Mahon added that it was planned that the report would be published in September 2015.

8.3 **National College for Teaching and Leadership** Ellen Agrebi said that the new campaign of television advertisements has had a positive impact, the conversion rate from applications to acceptance had increased and allocations of teacher training places for 2016 should be out very soon. Ros Hyde queried the lateness of the request for bids for places. Ellen Agrebi replied that the model was running late because of purdah.

9 Reports from meetings

9.1 **OCR Mathematics Consultative Forum: 19 March 2015** The report was noted.

9.2 **National Maths Hubs Forum: 15 April 2015** The report was noted.

9.3 **Council for Subject Associations: Annual General Meeting: 13 May 2015** The report was noted.

10 Any other business not elsewhere on the agenda None.

11 Discussion Item

National STEM Centre

The session began with a presentation by Gill Collinson, Head of the National STEM Centre, outlining the work of the National STEM Centre (NSC). She said that the NSC was part of MyScience (a consortium of York, Leeds, Sheffield and Sheffield Hallam Universities) which runs the network of Science Learning Centres and the 51 Science Learning Networks (which are based at lead schools) on behalf of the DfE and the Wellcome Trust. The NSC is based at the National Science Learning Centre in York and manages several MyScience programmes, it is funded by the Gatsby Charitable Foundation until 2018. The NSC also runs ESERO-UK, the UK Space Education Office, a project funded by the European Space Agency and the Department for Education.

Gill Collinson said that the NSC had a free-to-access collection of 25 700 physical resources and 9800 online resources, there was also vibrant online community. Across the UK, the NSC has teachers

registered online from 68% of primary schools,100% of secondary schools and 96% of post-16 institutions. In the early days the collection was biased towards science but more mathematical material has been added. An e-library has been created to provide online access to resources which are tagged with key words to aid in searching the database.

The NSC's key priorities are:

- the resource collection: physical and online (this was a particular early focus);
- forums, groups and communities;
- the use of professional tools and other NSC-generated material;
- teacher engagement in CPD (this has been mainly on the science side);
- partnership working;
- breadth of community engagement;
- financial targets.

Gill Collinson went on to say what the NSC is doing to support the teaching and learning of mathematics:

- a second subject specialist for mathematics is to be appointed;
- landing pages are being developed for particular topics at particular key stages;
- ready-made resource packages are being collated;
- use of the National STEM Learning Centre in York is being promoted, both to access the resource library and as a conference centre (the centre has 70 bedrooms for residential professional development and users of the centre include the local FMSP and the local Maths Hub);
- CPD, for example, one-day courses on the new mathematics curriculum and courses to meet specific teacher needs.

There were synergies with the National Science Learning Network. Impact Awards are now available across the whole of STEM. The NSC is a partner in the Mathematics Teacher Training Scholarships, in NCETM and in the Core Maths Support Programme.

Stephen Lyon then set the background for a discussion of 'What is STEM?' and 'What is the role of mathematics within STEM?' He said that he was the mathematics specialist at the National STEM Centre. He worried that what he understood by the term STEM was different from what other people understood by the term STEM and that the term STEM was rarely used in schools, particularly in mathematics departments. He referred to the December 2014 edition of the IMA's journal *Mathematics Today*, in which Professor Dame Julia Higgins, Chair of The Royal Society's Education Committee, wrote of the society's Vision for Education; in the article she mentioned:

- …the science, technology, engineering and mathematics (STEM) sector
- …the demand for STEM skills
- Encouraging young people into STEM will increase our skills base and so boost the UK economy
- increasing the popular understanding of STEM will benefit modern democracy
- UK nations need new courses in STEM for 16-18 year olds
- …should draw on expertise of the STEM profession and learned bodies
- …I did not feel that I was part of the STEM subject community.

Stephen Lyon said that anecdotal evidence has shown him that, in general, teachers of mathematics consider 'STEM' to be something that someone else does, and do not consider themselves to be part of the 'STEM community'. Of a group of 29 PGCE mathematics students he had surveyed, only one recalled having experienced 'STEM' in their school experience (one Tuesday afternoon!).

Stephen Lyon then invited those present to discuss the following questions in small groups.

1. What do you understand by the term STEM?
2. From your experience in mathematics education do you think teachers of mathematics consider themselves members of the STEM community?
3. Do you have any experience of an integrated approach to STEM education in any education establishment?

4. What can the National STEM Centre do to ensure that there is a clear understanding of what is meant by the term STEM and that teachers and learners of mathematics feel part of the STEM community?

The group discussions were followed by a plenary session in which feedback was given from the groups. The following points were made.

- STEM is a shorthand for the STEM subjects and these include Computing.
- Teachers of mathematics did not consider themselves part of the STEM community – unless there was money involved.
- It was recognised that good things are happening in the name of STEM.
- Mathematics and STEM overlap, but mathematics is not a subset of STEM – it is elsewhere as well – and seeing mathematics as part of STEM can inhibit a wider perception of mathematics.
- Mathematics gives STEM its universality.
- In response to the question asking whether the NSC had a purpose, it was said that the NSC is an invaluable resource to go to virtually and for many a place of first resort when seeking resources to support teaching.
- When asked whether we should be teaching STEM rather than separate subjects, fears were expressed that integration would mean that value was seen in mathematics only in its application.

12 Conclusion

Having thanked Gill Collinson and Stephen Lyon for their presentation on the National STEM Centre, and reminded those present that the next meeting would start at 10 a.m. on 10 November 2015, the Chair closed the meeting.

13 Dates of future meetings

Tuesday 10 November 2015 (starting at 1100 following the Annual General Meeting at 1000)
Tuesday 23 February 2016 (starting at 1100)
Tuesday 14 June 2016 (starting at 1100)

These meetings will be held at the Royal Statistical Society.