

# The Joint Mathematical Council of the United Kingdom

A Charitable Incorporated Organisation

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Registered Office: De Morgan House, 57-58 Russell Square, London, WC1B 4HS

## Minutes of the General Meeting held online at 11.00 am on Tuesday 16 February 2021

### Present

#### *Officers*

Chair

Andy Noyes

Deputy Chair

Noel-Ann Bradshaw

Secretary

Chris Chipperton

Treasurer

Jennie Golding

#### *Representatives of Participating Bodies*

Adults Learning Mathematics

Beth Kelly

Association of Mathematics Education Teachers

Fiona Curtis

Association of Teachers of Mathematics

Heather Davis

British Society for Research into Learning Mathematics

Ruth Marks (deputy)

British Society for the History of Mathematics

June Barrow-Green

Edinburgh Mathematical Society

Andrew Wilson

Heads of Departments of Mathematical Sciences

Jan van den Heuvel

Institute of Mathematics and its Applications

Paul Glaister

London Mathematical Society

Kevin Houston

The Mathematical Association

Tom Roper

Mathematics in Education and Industry

Charlie Stripp

National Association for Numeracy and Mathematics in Colleges

Graham Griffiths

National Association of Mathematics Advisors

Matt Lewis

National Numeracy

Paul Milner (deputy)

NRICH

Ems Lord

Operational Research Society

Evelyn Hardy

Royal Academy of Engineering

–

Royal Statistical Society

Jonathan Everett

Scottish Mathematical Council

Carol Lyon

STEM Learning

Steve Lyon

United Kingdom Mathematics Trust

Hannah Telfer

Wales Institute of Mathematical and Computational Sciences

Sofya Lyakhova

#### *Co-opted Members*

UK Representative to the

International Commission on Mathematical Instruction

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#### *Representatives of Observing Bodies*

Department for Education [England]

Alex Smith

Department of Education [Northern Ireland]

Julie Harris

Education Scotland

Pamela Di Nardo

National Centre for Excellence in the Teaching of Mathematics

Sue Madgwick

Office for Standards in Education

Steve Wren (deputy)

The Office of Qualifications and Examinations Regulation

Sarah Old

The Royal Society

Helen Harth

The Royal Society Advisory Committee on Mathematics Education

Lynne McClure

Scottish Qualifications Authority

Sue Pope

Welsh Government Education Department

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## 1 Introduction

1.1 **Welcome** The Chair welcomed everyone present and opened the meeting.

### 1.2 Practical Arrangements

1.3 **Apologies for absence** Apologies for absence were received from: Jeremy Hodgen (BSRLM), Sam Sims (National Numeracy), Ems Lord (NRICH, Hannah Stoten (Ofsted).

New members and deputies were welcomed to the meeting.

## 2 Minutes of the meeting held on Thursday 12 November 2021

2.1 **Approval** All actions in the minutes of the meeting held on Thursday 12 November 2021 were reported as complete. The minutes were approved following a correction to the list of apologies.

2.2 **Matters arising not elsewhere on the agenda** There were no matters arising not appearing elsewhere on the agenda.

## 3 Reports from Trustees

3.1 **Chair** The Chair thanked Council for supporting the survey work that had been undertaken with RS/ACME. It had been a good opportunity to collaborate and JMC had offered access to a different range of respondents.

The Chair reminded Council that he is a member of ACME and is also on the Mathematics Futures Board. It is intended that there will be an update on the Mathematics Futures programme in the June meeting. There has been a good response to the call for views and JMC are encouraged to get involved.

There has been a lot of work taking place in relation to communications. The logo has been re-designed in order to better portray the JMC 'brand' and a process for renewing the website has been agreed. Resources to maintain the website are limited and the possibility of drawing on member organisations may be a way of supporting this to the benefit of all. The Deputy Chair is looking into re-establishing a Twitter profile.

Consideration needs to be given to the kinds of work JMC should be doing in terms of commissioned projects. Some of this is to be covered in item 11.

3.3 **Secretary** The written report was noted.

3.4 **Treasurer** The Treasurer thanked representatives for the prompt response to the request for subscription payments.

Further to the notes on the budget, the Treasurer reported that expenditure on the website would be slightly over what had been budgeted. If the two projects on mathematics education and gender are approved there will be an additional spend of £8,000. The funds are available given the reduced expenditure on physical meetings,

## 4 Reports from Committees

There were no reports.

## 5 Reports from Participating Bodies

The Chair thanked representatives for writing the reports. A sense of resilience was identifiable with things being made to work in difficult circumstances. In an effort to know how reports are engaged with, whether hyperlinks are used, etc. it is suggested that Council are surveyed at some point in the future.

In addition to the circulated reports being noted, the following verbal reports were taken:

5.2 **AMET** Upcoming events include a webinar with Paul Ernest and an online conference with keynote speakers Dan Meyer, Jeremy Hodgen and Anne Watson.

There is concern regarding the establishment of the Institute of Teaching. This risks diluting an already fractured system of teacher training.

Council agreed that a single focus meeting should be held in early March. **Action: Chair; Secretary; Fiona Curtis**

5.12 **NANAMIC** The new Skills for Jobs white paper has been published. There will be a need for teachers of these subjects to support it which raises an issue. The clear commitment to English and Mathematics post-16 is welcomed.

## 6 Reports from Observing Bodies

The reports were noted, plus:

- 6.4 **NCETM** Numbers accessing the website look impressive, but it would be good to know who they are and what they do. On the whole, activity is the downloading of resources for professional development (primary and secondary).

Primary guidance documentation provides lots of resources to support teachers and is proving to be very useful in the current circumstances with curriculum prioritisation being key to allowing progress to be made. There is a similar situation at secondary level although materials are not as comprehensive. The *Planning to teach* videos are a good resource.

Teachers are accessing the site to access PD materials.

Important for Level 3, the support programme is being extended until the end of next academic year.

## 7 Reports from Meetings

There were no reports.

## 8 Discussion of Reports

**Mathematics Futures programme** Helen Harth reported that the Mathematics Futures Programme had been started by RS ACME in February 2020; mathematics has a broad definition. Since the launch 3 workstreams had been developed: 1) looking at the changing nature of mathematics through a call for views; 2) identification of foresight planning; 3) mapping national mathematics education policy and international influences through a 20-year review with 8 broad themes. Responses to the call for views were encouraged and telephone calls welcomed.

**ACME** There had been a very constructive meeting. A major focus is educational technology and the impact of current practice

**Subject Knowledge Enhancement** The Government has not made a decision on SKEs and there is no commitment on a date for this. Difficulty in recruiting is causing problems. There is potential impact on diversity, etc.

## 9 Communications

The Chair reported that the development of the new website was well under way. It was important to view communications as being from a council of organisations and not necessarily from just the trustees or representatives. The possibility of there being a regular news feed/item was raised. If this was taken on across the Council it would only require an individual to take responsibility once every two years or so.

In the ensuing discussion the following points were made:

- As Council is a broad church there is not a concern that statements have to be representative of JMC.
- What would be the purpose – do blogs advance the cause? Would it be better to engage in research, etc. and feed into Government?
- There is an opportunity to reach a wider set of interested people.
- It is important that there is a larger social media voice/presence whether this is individuals' comments or those of member organisations.
- Blogs can point to other social media.
- Will there be a commitment to engage in Twitter conversations? No, just a flow of news.
- News/blogs from member organisations could be reused.
- This would stop JMC appearing stale.
- Is there a case for employing a 'media' person to handle this even for a couple of hours per week say?

## 10 Joint RS/JMC submission on the impact of COVID-19 to the Commons Education Committee

Helen Harth referred to the paper already circulated. Key take-away messages were identified as:

- Mathematics is more vulnerable to the impact of the pandemic due to its interconnected nature. It is also important to other subjects.

- While there was no shortage of ideas, schools were prevented from implementing these due to lack of resources.
- Student engagement was poor.
- Pastoral issues rocketed when students returned to the classroom.
- Parental engagement was a problem. Anxiety was one issue and parents dropping into lessons was another.

In the autumn term:

- Social distancing prevented learning.
- Planning was difficult as changes to the curriculum were required.
- There were problems with A level. Study skills were poor and deadlines were missed. Mathematical knowledge was not as good as would normally be the case.
- Government interventions were not well utilised. More are now available but their effectiveness not known.
- Teacher workload has increased and impacted on well-being.

There are issues with the geographical scope of the survey. JMC is very sensitive to the four jurisdictions while RS ACME tends to be more England-centric. There was a good response from Wales, but less so from Scotland.

The submission to the Select Committee has not yet been published. The Select Committee's focus was more towards well-being.

It was questioned whether the impact of poverty and deprivation had been included. No question on this had been included, but some responses included these issues. However, it was difficult to draw any conclusions from these.

The Chair referred to the afternoon discussion session. What should JMC be doing going forward? He also stated that there had been some learning about how we conduct such surveys including ethics and ownership.

## 11 Projects

**11.1 Mathematics education and gender** Two draft calls for expressions of interest had been circulated with the papers for the meeting. These were for some small research projects to inform Council.

- 14-19: participation and attainment** What is the impact of recent qualification reforms? What happens when high stakes tests are not there?
- 5-14: affect, attitudes and aspirations** Where do patterns emerge from?

Representatives were asked to pass any comments to the Chair by the end of the week. It was agreed to proceed with the projects subject to these.

**11.2 Use of technology in mathematics education** It is proving difficult to define the meaning of this in a rapidly changing situation. The online teaching and learning that is taking place as a result of the pandemic is obfuscating what we might want to look at. Consequently, holding off until more normal time.

However, there is a link between this topic and the 2011 work carried out by a JMC working group. This could be the basis for a review. It is proposed that a working group be established in the summer to run through to early 2022 and publish a position paper in the summer of 2022.

Helen Hearth reported that RS ACME are very interested in digital technology. Interest in this is also being shown by Government. Subject specific issues need to be kept in focus.

Charlie Strip added that AMSP/MEI are also very interested in this topic. There have been some exciting things happening. *Desmos* is becoming a phenomenon. The time for technology is (finally) coming having been accelerated by Covid. It is important that we look to enhance what is happening and not replace the teacher.

The Chair raised the question of how we can engage organisations who have knowledge about this area as well as involving those who want to be.

## 12 Maths Week England

Unfortunately, due to technical issues Andrew Jeffrey was unable to join the meeting. It is hoped that he will be able to attend the June meeting.

Heather Davis who is a member of the MWE Committee, reported that there was some money remaining in the kitty and that planning for MWE 2021 had started.

## 13 Meet the Council

**British Society for the History of Mathematics** BSHM is marking its 50<sup>th</sup> anniversary. There are about 300 members with a quarter coming from overseas including Canada.

Its aims are to promote and encourage research into the history of mathematics and the dissemination of the results of that research, develop awareness of the history of mathematics for the public benefit, and support teachers and lecturers at all levels of mathematics education to incorporate the history of mathematics into their teaching, enriching their students' experience.

BSHM organises conferences and meetings some of which are regular and some ad hoc. Some events are run jointly with LMS and Gresham College. Prizes are awarded for books and for school competitions, and small grants are available to support research. There is a journal which has grown.

Funding for BSHM comes from subscriptions, Taylor and Francis (publisher of the journal) and bequests e.g., John Fauvel. The organisation is run by volunteers and there is no paid staff.

There is a library which is housed by the OU.

There is an important question around how well the history of the subject is incorporated within the teaching of Mathematics. It is recognised that time is difficult to find for the creation of resources and while there are some very good resources available on the internet there is also a considerable amount that is extremely poor. Conversations are being held regarding resources which have a clear emphasis on diversity.

**Adults Learning Mathematics** Formed in 1992, ALM is a relatively new organisation. It has an expanding membership which is international giving it a global reach. Membership covers practitioners, researchers and policy makers.

A conference with the theme of *Numeracy and Vulnerability* is scheduled for July; this is being supported by Hamburg University.

How many adults are engaged in learning Mathematics remains an open question. Access to colleges for adults is shrinking with the removal of budget for this and only 16-18n year olds receiving funding.

**Heads of Departments of Mathematical Sciences** HoDoMS represents the combined opinions of university Heads of Department although this covers a broad church given the variety of institutions represented. There are about 50-55 members from a potential membership of 65-70.

A committee of ten are responsible for the organisation and its activities. Committee members are mainly ex-heads of department; IMA, LMS, RSS, OR and EMS have representatives on the committee.

HoDoMS provides a source of communication and for the exchange of information. A mailing list has been an urgent and important development. Letters are sent on matters of concern.

One major meeting is held each year with an additional two half-day meetings. Speakers are invited on important, relevant topics. On occasions, a second major meeting with a managerial theme has been run.

A large amount of money (£300m over 5 years) has become available for mathematics research (the Cummings Effect) though how much of this will survive is unclear. There is scrambling to find ways to spend the money with smaller pieces of research being considered.

The situation at Leicester University was raised. Staff involved in Pure Mathematics (and Theoretical Computer Science) are being made redundant; there will be small number of openings for teaching only posts. HoDoMS are in a complicated, difficult position. They were not invited to be involved.

## 14 Any other business not elsewhere on the agenda

## 15 Discussion: Impact of COVID-19

### Five inputs from representatives

Teachers, in particular NQTs (Fiona Curtis, AMET)

- Also relevant to this issue is the teacher training process. Some schools have not been able to offer placements causing a massive impact on uniformity of provision. Some trainees were already in schools. What could usefully be done in university in its place? NCETM videos were helpful.

- Remote teaching is a challenge as is how to teach trainees how to teach remotely.
- Remote assessment is also challenging as is how to observe; some has been remote, but consistency is an issue even so. Questions need to be devised to replace what would have been (easily) seen during observations.
- Pastoral issues exist.
- There has been a recruitment deluge – some are not suitable and have needed filtering.
- Each school (and department) have had different expectations. Sometimes teachers have been left to their own devices, some doubled up lessons (2h per subject), some only taught mornings, and in some there were no lessons.
- The infection rate in teachers is a concern – conflicting information between Government sources and NEU.
- Isolation with teachers left to themselves – emotional well-being issues.

#### New undergraduates in HEIs (Jan van den Heuvel, HoDoMS)

- Many of the issues are shared with teachers in schools: online teaching; firefighting; morale (high levels of stress and poor work-life balance).
- Unlike schools, universities don't have vulnerable students on site – all mathematics learning is online.
- There are concerns about student engagement, participation in online learning, and the environments students are having to work in.
- With regard to transition, HEIs have had to deal with students' centre assessed grades (CAGs) and the intake numbers that have resulted from last summer's awards. In general, there have not been too many issues. In response, some members mentioned that other HEIs had more significant issues regarding knowledge and preparedness of incoming students.
- Concern is growing about next year. There have been considerable interruptions to learning. How will students be assessed?

#### A level students (Charlie Stripp, AMSP)

- Consideration of L3 qualifications (A level, Core and Further) and transition to university.
- Focus groups with teachers held in January highlighted work overload and issues with resources.
- Student motivation and engagement at home are a big concern. This could impact on future choices.
- Assessment is an issue and there is difficulty in giving feedback.
- AMSP has some experience of online delivery and video clips are available to support teachers.
- There are plans to address the development of support packages, enrichment and supporting students for Level 3.
- Programmes will be available over the summer.
- There is concern about Further Maths and the uptake numbers.
- Can things be done to assist transition to university both for mathematics and other numerate subjects?
- Curriculum prioritisation needs to take place so that lost academic learning can be addressed next year; this should be at depth and not thin coverage.

#### 5-14 in Northern Ireland (Julie Harris, DoE)

- Pupils are engaged in remote learning.
- A consultation with schools has just taken place. There will be further conversations with school principals.
- 77% of primaries responded. 94% of these reported that most children were engaged in learning.
- 82% of post-primaries responded. 72% reported that online learning was being accessed.
- There are differences between primary and post-primary in regard to the use of synchronous or asynchronous learning.
- Primary responses suggest that only 42% were engaged in live learning while this is 94% in post-primary. Confidence may be a factor.
- Opportunities for paired/group work are reported as only being in a fifth of primary schools. In post-primary this is over 50%.

- There has been a deeper delve over the last two weeks and case studies will be published in March.
- Schools felt more prepared for lockdowns this time. The better preparation for schools and parents has led to increased engagement, an emphasis on quality, improved tracking, more effective feedback, and better home-school communication.
- Consolidation is easier to manage than the development of new concepts. This has led to a loss of progress.
- There is frequently a daily pattern of literacy, numeracy and one other subject. Parents are more comfortable dealing with subjects such as art and PE.
- Providing differentiated tasks is problematic.
- Foundation stage is particularly challenging. Videos of how to work with children at this level are proving helpful.
- Parental circumstances can be challenging.
- There is a significant number of parents lacking the IT skills to allow them to support their children. Knowledge and time are other factors impeding support.
- Ensuring that acceptable standards are achieved is challenging. Work with parents on this has been helpful.
- Quality is wanted not quantity.
- There are issues around senior students especially where they are starting new subjects.
- Senior students are struggling with what is happening.
- Post-primary is moving away from 'lecture style' lessons and is engaging in more group work.

#### Primary/transition in Scotland (Carol Lyon, SMC)

- Scotland has a similar situation as already spoken about. Only children of key workers and vulnerable pupils are currently in school. The First Minister is meeting with ministers today to address the return to school of other pupils/students. This may be as early as next week with the return of P1 to P3 (ages 4-7) and secondary students who need to complete critical practical work likely to be the first phase.
- The COVID-19 Education Recovery Group has published guidance, but this covers a lot of practical matters and is generic. There is little relating to the curriculum and nothing specific to mathematics. A major focus is on health and well-being which needs to permeate all aspects of what takes place.
- Both formative and summative assessment should be taking place. P1-P7 passports are to continue.
- For transition, virtual tours to introduce schools and their staff are taking place. Video conferencing for teachers is also happening.
- Induction days and activities are sometimes happening online.
- In many ways, we are where we have always been, only online.
- Pre-COVID, visits by secondary maths teachers to primary schools to deliver lessons were common. Such activities would be better as partnerships.
- Too many 'fresh starts' take place through schooling with a lack of trust in the primary phase evident from secondary teachers.
- The challenge is how to develop an ethos of true collaboration across phases.

#### **Small group discussion feedback**

##### Group 1

Initial exploration identified transition as a common area interest and concern. From the ensuing discussion the following key points emerged.

- There is something wrong with our examination/testing systems. While accepting that there is benefit and value to having some external, high stakes examinations/testing it is overplayed in punctuating transition through schooling.
- The status of formative assessment needs to be raised and used effectively by teachers to increase the fluency of learning.
- There needs to be a dialogue between both sides at transition points.
- A common understanding needs to be developed leading to increased consistency across phases.
- There needs to be trust and a valuing of what happens in earlier phases.

- Widening pedagogy in secondary would benefit learners e.g., the use of manipulatives which could be more attractive if virtual rather than physical.
- There should be a prioritisation of the curriculum to aid transition rather than to gain marks.
- Consideration needs to be given to the maths anxiety in parents and the impact this has on their children. What lessons can be learned from schools that have worked with parents virtually during the pandemic?

## Group 2

### Lessons from online teaching

#### 1. Lesson content

- Consolidation lessons are easier to teach than lessons designed to focus on new concepts. There is some concern that teachers may therefore be doing more consolidation and less teaching of new material.
- Some teachers are focussing on consolidation as they are aware that some students have maths anxiety and do not want to exacerbate this. However, it means that some students are not moving on as they would if they were in a classroom.
- Whilst attendance can be good there is an issue with knowing if the students are present both socially and cognitively. Having interaction within the lesson is very important.
- Working with different ability groups is much harder online.
- In a classroom you use students to push knowledge to students but online there is a need to motivate students to pull knowledge for themselves. This means the role of the teacher in online delivery is different and needs acknowledging.

#### 2. Technology

- Some students do not have appropriate equipment. When students are physically in school, they can appear equal but when learning remotely the equality disappears.
- Technology for both students and teachers is not available equally.
- Technology is forcing people to teach differently. Some teachers are really struggling with this as some are less confident with IT and have less help within the school/college.
- More help is required to enable teachers to be creative.
- Creating archives of material is being done by some – can JMC encourage this and even have a page on the website with links to large repositories?

#### 3. Well-being

- It is harder to motivate students online – particularly younger students.
- Younger students also need more support in their learning and are missing social interaction with their peers.
- Are the students who are succeeding with online learning becoming more self-regulated?

#### 4. Future

- After school activities could be held remotely.
- Schools might adopt a home learning day once month/week.
- Professional development days may be held remotely or may use a blended model.
- Some people commented that they missed the face-to-face element of conferences and meetings so wondered if there may be an initial swing back to face to face before a more practical blended approach to these events.

#### 5. Role of JMC

- Could JMC (and others) put out a call for researchers to investigate this in order to articulate the pedagogy around the online teaching of mathematics?
- Could JMC collect and publish case studies of what has worked well in online delivery? Note from scribe – Sigma did this very successfully (and cheaply) when looking at aspects of Maths Support in HE.

## Group 3

- Transitions – last year not unsurprising that there might be less of an impact when only the end of year was involved but this year the impact is likely to be larger.



- Concerns that online learning may be more procedural / formulaic.
- Using breakout rooms are potentially useful but how is this achieved in a safe / effective manner.
- Desmos classroom has been helpful and might hold some ideas for the future.
- What about the student and parent perspective? Being sent pages of textbook – maybe like a standard class but how can learning be supported without a teacher.
- How do we improve home learning? Might there be lessons from this to take into the future around learning at home.
- What will be the impact of loss in the early stages of issues around home learning?
- Is it better to do a small amount better than try to teach a full day?
- Better to focus on some really core ideas and drop some peripheral issues.
- Will the pandemic be blamed for things that normally happen?
- For older learners there are potential opportunities for using online learning to support learning.
- The real concern is the lack of the socialisation aspect of schooling.
- Online parents' evenings have been effective
- Some concerns about social justice – differential impact exacerbates divisions.
- Teachers need time to develop and change practice.

#### Key take-aways:

- Transitions will be worse for the current year
- Focus on core ideas to develop when catching up
- Online learning 'wedge' – likely to be significant for older students and less for younger
- Socialisation issues often more significant
- Teachers need time to change practice

#### Group 4

- Concerns that even with access learning is impeded – lack of opportunities for manipulatives and formative assessment particularly hard.
- Equity for higher and lower attainers – some students can 'have a book thrown at them' and succeed; there is significantly more impact on less able individuals.
- (In HE?) Anecdotal evidence that examination performance has been comparable to previously.
- It has been hard to engage with teachers in PD sessions and teachers suggest this is the same for them with students.
- There is a distinction between doing maths with technology and using technology to learn maths.
- Evidence from some teachers suggests that some students found it hard to return to the classroom.
- Good resources are available, but poor student take-up.
- There is an issue that HEIs can't contact Y1 students until enrolled missing opportunities for individual preparation.
- Issues around the equivalent of classroom management exist for online learning.
- Opportunities have been lost to know more about students e.g., small groups hanging back at the end of a lesson/lecture – 'water cooler moments'.
- Blended world: prep work for resolution in class; videos, resources that can be made accessible on-the-fly, in many ways (extent that P16 GCSE engaged with this).

#### Key Points

- Disadvantage gap: access to technology; access to support (parents, teachers).
- Gap between more and less resilient learners.
- Guidance on online learning: learning maths online; online pedagogy.
- Learner identity and belonging; learning community.

#### Summary

A wide-ranging discussion of the issues for mathematics education through primary to higher education and across the UK surfaced a number of key themes for further consideration:

1. Uneven access to technology and related social justice issues
2. General pedagogic challenges of remote teaching including

- a. Variations in parental support
- b. Mixed ability teaching
- c. Engaging with new technologies and diverse platforms
- d. Assessment and feedback
- e. Social dimensions of learning (peer-peer, pastoral care)
3. Mathematical pedagogical challenges including
  - a. Overemphasis on consolidation at the expense of conceptual development, with potential long term implications
  - b. Development of mathematical reasoning and problem solving
  - c. Use of mathematics-specific technology
4. Attitudinal and affective issues including
  - a. Engagement
  - b. Maths anxiety
  - c. Resilience
5. Curricular prioritisation in the recovery phase
6. High stakes assessment and transition
7. Professional development, support and training

## **16 Conclusion**

The Chair thanked everyone present for their contributions and closed the meeting.

## **17 Dates of future meetings**

Tuesday 8 June 2021, online tbc (deadline for papers: Tuesday 25 May 2021)

Thursday 11 November 2021, venue tba (deadline for papers: Thursday 28 October 2021)

February 2022, date and venue tba

These meetings will begin at 11.00am