

ROYAL STATISTICAL SOCIETY RESPONSE TO THE CONSULTATION ON THE ACADEMY FOR THE MATHEMATICAL SCIENCES

10 July 2023

1. Vision

Q1. Do you find this vision attractive? Which elements of the vision do you like? Which elements do you dislike?

The vision is generally fine. The second sentence establishing the vision for partnership with existing societies and organisations is important – the academy should be a powerful voice, independent of existing bodies (who also retain their independence), but partnership should ensure that, generally, we are all working towards common goals, creating synergies where possible.

The vision talks about “bringing together those in the community and more broadly” but it is somewhat unclear what exactly is aspired to here. Little of “What the Academy will do” is specifically bringing people together (except early career mathematical scientists). Perhaps “supporting” rather than “bringing together”.

A vision statement is necessarily short on detail and needs to be read in conjunction with bullet points 9-12 of “What the Academy will do” which is a strong list and one that we can support.

2. Policy

Q2. Are there other areas that you would like the Academy to focus on in its policy and advocacy portfolio, beyond those listed above?

a-d are not so much policy initiatives but rather areas where the Academy will build an evidence base to support future policy work. That is not a criticism, and this seems like a reasonable list. Another item would be data on the health of university mathematical sciences in the UK, for example student and staff numbers, funding etc. Additionally, any relevant data around international comparisons would be helpful. And in a, case studies can also be persuasive, particularly where relevant quantitative data is hard to come by.

Initial policy areas for the “policy for mathematical sciences:” strand might include research funding and “Maths to 18” just to mention two of those which were discussed in paras 2.4 and 2.6 of the consultation document.

e-f are policy activity suggestions but are necessarily rather vague reflecting (correctly) that one often has to be opportunistic in this kind of work. There are some areas which one could predict will be important going forward. The role of AI/ML/algorithms is one which is mentioned elsewhere in the consultation and where the academy might consider building a knowledge and expertise base at an early stage.

Throughout, in its policy work, it is essential that the academy maintains strong communications with learned societies and other organisations engaging in policy



activities. The existence of the academy should be an opportunity to expand and enhance policy activities related to mathematical sciences avoiding unhelpful duplication (and competition for the same volunteer resources). The RSS already does substantial policy work both in “policy for statistics” and “statistics for policy” areas. Some of those areas might also benefit from the additional insight that a broader mathematical sciences perspective might bring. In others, the benefits of the academy additionally engaging might not be so obvious. The development of robust working practices for the policy team for the academy and its counterparts in other learned societies will be key to optimising the capacity and effectiveness of our combined activities in this area. This might include a future role for the academy in brokering relationships between government and the learned societies where that was appropriate.

Q3. What prioritisation would you place on items in the list above, and any other areas you have in mind?

We don't feel that prioritisation is helpful at this stage, beyond the comments made in the response to Q2 above.

3. Advocacy

Q4. Do you agree with our broad approach towards advocacy (set out in the Advocacy Section of the full consultation documents)?

We see advocacy as one of the most important functions of the academy. There is a strong link with policy in the sense that there is little purpose in the academy taking policy positions except for the purposes described in 3.3 of the consultation document. The broad approach seems generally fine, if short on detail.

In 3.7, it would be helpful to be clear that the academy will not be afraid to be critical where appropriate. To that end, it would be helpful for the italicised summary to include something like ‘... the contribution of mathematical sciences *and their correct and appropriate application* ...’ In recent years, RSS has, for example, engaged with OfS and Ofqual in areas where Statistics was not being used appropriately. In those situations it was important and, we consider, effective to be quite vocally critical.

We have some concerns about 3.8, where it is suggested that the balance between ‘mathematical sciences for policy’ and ‘policy for mathematical sciences’ should be evenly split. The appropriate split, which is likely to vary over time, will depend on issues which it is impossible to predict. Our view is that the academy should have a particularly strong focus on ‘policy for mathematical sciences’, and that the strength of focus on ‘mathematical sciences for policy’ will depend on the value that the academy feels it can add at any time, given the principles in 3.10.

Q5. Do you agree with the proposed principles (the 6 tests) for the Academy's advocacy work?

For ‘mathematical sciences for policy’ this looks fine. For ‘policy for mathematical sciences’ the expertise test should be broadened to include issues which ‘have an impact on mathematical sciences education, research and practice’.



A similar consideration applies to the italicised summary in 3.7, which needs to be broadened in a similar way.

Q6. What do you see as the best communications avenues to reach you and the other mathematical scientists in your field/sector/community?

Communication with the RSS and its membership is discussed in response to Q11-13

4. Education

Q7. Priorities will arise over time - are the priorities above the right ones to begin the work of the education workstream?

There seems to be the core of four strong priorities here (5 if one also considers engagement with 4.9 a priority, which we would). However, we view that some of them could be expressed more compellingly (and less defensively). Priority c (which is anyway difficult to parse for the uninitiated) would be better focussed on ensuring that there are sufficient Mathematical Sciences graduates for the UK workforce. That would combine both the issue here, of availability and demand for mathematical sciences degrees for a diverse range of qualified applicants, but also the equivalent leakage from the pipeline at age 16. Similarly, negative perceptions of mathematics (priority d) would be better placed within a more positive aim of increasing the overall level of numeracy skills across all ages in the population. RSS has such an aim for data-skills and would be happy to work with the academy in this area; we view data literacy as of particular importance, both here and within priority b.

A minor point, but in priority b, “mathematical sciences/stats/data” would be better as “maths/stats/data” or just “mathematical sciences”

Q8. Are there other areas you would like to see prioritised instead?

See answer to Q7 above – we would expand the scope of c and d and also include actions in response to 4.9 as a priority. In particular we would view data literacy as a key priority. In a world where data is increasingly important to how people work and engage with the state as citizens, improving data literacy, particularly amongst the proportion of the population not getting at least a C in GCSE Maths would be a strong priority for the academy.

We also remark that the remit of “Undergraduate mathematical sciences degrees, and other undergraduate degrees with a high proportion of mathematical sciences in the programme of study” omits the important, although minority, position of mathematical sciences education in a very wide range of undergraduate degrees. This does not seem to be well-described by “numeracy in the general populace” so seems to be an omission.

5. Implementation of Mathematical Sciences

Q9. What can we do now, as a proto-Academy, to increase awareness of the Academy amongst mathematical scientists working in all sectors of the community and encourage them to engage with the Academy and influence its activities and direction?



An obvious communication route to mathematical scientists, particularly those outside the education/academia, is through the learned and professional societies, particularly those, such as RSS, which have a strong and active professional membership. Not all of the professional members in RSS will consider themselves to be mathematical scientists, however broadly that is defined, but we expect that significant numbers will. However it will be important that the academy offers such individuals something specific to engage with, particularly at the proto-academy stage. What this is envisaged to be is not clear in the consultation document.

Q10. One of the attractions of an Academy is it can facilitate the education, academic and practice sectors working together. What do you see as the most effective model for sharing expertise between these different sectors to improve the implementation of mathematical sciences in all areas of the economy?

The KE hub is a distinctive and potentially exciting initiative which would add real value to the academy and its external perception. The vision that the KE hub become part of the academy is one we support.

Another avenue the academy could pursue is more informal networks of academics and practitioners. The RSS has a structure of sections and local groups, the activities of which involve both academic and non-academic members.

6. Academies & Societies

Q11. What areas of engagement would benefit from an Academic Affairs committee of the Academy which was able to speak for Mathematical Sciences as a whole?

It is not clear what is being asked here. As addressed in previous sections, the academy will take policy positions and engage in advocacy. In doing so, we would expect that the academy would draw from the breadth of its fellowship and the aim would be very much to 'speak for Mathematical Sciences as a whole'. Therefore it is not clear how an 'Academic Affairs committee' differs from the academy as a whole. If the suggestion is that such a committee might subsume the other learned societies with respect to certain activities then this is something we would resist. The independence of the academy from the societies, and vice versa, should be a strength of the structure that is being developed. Effective communication and partnership (see below) with the societies will be essential but the academy should be a strong independent voice.

Q12. How can the Academy best work with existing learned societies in the mathematical sciences?

The academy should develop effective methods for partnership working with the societies, ensuring that clear lines of communication are established. One possibility would be for a reconfigured CMS, a regular meeting where the societies and the academy would discuss areas of common concern and which would help to inform the academy, particularly in its policy and advocacy work. The CMS would be a forum rather than a body and would not itself take a position on any particular issue.

Q13. How should the Academy foster constructive relationships with existing National



Academies? This includes geographic national academies such as the Royal Society of Edinburgh and the Learned Society of Wales, and discipline-specific academies such as the Royal Society and the British Academy.

The academy should be engaging with these bodies, at the highest level, at the earliest possible opportunity. It would be helpful if the initial fellowship of the academy were to include some fellows of the existing national academies, tasked with building strong relationships.

7. Equality, Diversity and Inclusion (EDI)

Q14. What are in your opinion the three highest priorities concerning EDI in the mathematical sciences community in the UK?

The academy's initial priorities in this area should be inward-focussed, ensuring that the academy itself is established in a way in which it is seen as an inclusive body, with a diverse fellowship and a firm commitment to equity. Beyond that, paragraph 7.3 establishes key priorities of access, participation and progression (across all career/life stages), with which we agree.

Q15. The EDI workstream is eager to engage with groups active in EDI across the mathematical sciences community to seek input from these on a regular basis. Which types of engagement/communication do you think would work best?

RSS has established the role of Honorary Officer for EDI, chairing an EDI Advisory Committee to coordinate our work in this area. We would be keen to work with the academy on themes of common concern (as we are at present on the EPSRC project). As discussed earlier, strong partnership and effective communication is the key here. The academy has the potential to play an important role in co-ordinating and strengthening activities across other groups with similar concerns.

Q16. What activities and relationships should the Academy develop to promote a more diverse and inclusive mathematical sciences community in the UK?

The activities in 7.7 represent a promising start and any future directions will be informed by these, particularly by the relationships developed with other existing groups.

The academy's work on education should be an important component of its efforts to enhance EDI in the Mathematical Sciences, ensuring that the education activities and policies enhance participation among all sectors of the population at all stages of education.

8. Early Career Mathematical Scientists

Q17. How do we ensure that all people who enter the workforce outside academia, with bachelors' or masters' degrees or doctorates in mathematical sciences, continue to engage actively with mathematical sciences, and consider themselves to be, mathematical scientists"?

It is of little importance how an individual identifies themselves, whether that be as a



Mathematical Scientist, Mathematician, Statistician, Data Scientist etc. What is important is that they continue to appreciate the importance of the Mathematical Sciences and its relevance to them in their career and to the sector that they work. As mass-membership organisations, the learned societies can play a key role here in maintaining and enhancing that connection, drawing attention to the activities of the academy where relevant. Similarly the academy can support the societies, promoting membership and its benefits.

(It should be recognised that many individuals active in the mathematical sciences would not consider themselves to be mathematicians or to be engaging in mathematics, so care needs to be taken not to slip into using mathematics as a shorthand for mathematical sciences.)

Q18. How do we make sure that the full community of early career mathematical scientists is represented and heard by the Academy – including early career researchers, teachers, and people working in industry, commerce, and government?

Having an engaged and diverse early-career cohort in the fellowship will be important to reaching out to the early-career community. As a fellowship organisation, there is a danger that the academy is viewed as being somewhat elite by early career mathematical scientists. So it will be critical to have mechanisms to reach out to the early-career community. One might envisage the early-career fellowship being supplemented by an early-career forum of equally engaged individuals. RSS has a Young Statisticians Section which, since its establishment in 2008, has been highly effective at keeping early-career statisticians at the forefront of the Society's thinking in developing its strategic aims and activities, mobilising early-career statisticians in the Society's activities and providing a pipeline for early-career statisticians into other key leadership and governance activities of the Society.

Q19. What actions and activities should the Academy take on to support and build the early career community?

1. Actions within the communities of practitioners, teachers, and academics.
2. Actions across the whole early career community.

This question needs to be answered in light of a broader understanding of what the portfolio of "activities" of the Academy will look like across its breadth. At the moment, it is clear what the Academy will engage in, particularly in the areas of policy, advocacy and potentially knowledge exchange and some of the areas in which it will not (journal publication). There is a grey area, for example around meetings, conferences and other events. These are the kind of activities which could support the early career communities but care would need to be taken to ensure that the Academy was adding value and not cannibalising existing provision.

Q20. What should be our three highest priorities for the early career community?

The highest priority should be that the Academy is seen to represent, and be relevant to, early career mathematical scientists across the whole early-career community. Activities which contribute to this should be prioritised.

9. Governance



Q21. Do you have any comments on the Academy's plans for charitable status?

No. These seem appropriate.

Q22. Do you agree that this structure, including the Trustees, is suitable to keep the Academy constructively and appropriately working towards the flourishing and support of the mathematical sciences and their impact?

Yes, while noting that only the highest-level structure is specified at present. The effectiveness of the academy will depend on establishing suitable sub-structure to ensure that the aims of the academy can be effectively pursued.

Q23. Do you have any other comments on this section?

No

10. Fellowship

Q24. Do you have any comments on the proposed model of Fellowship?

The proposed model of fellowship seems appropriate, particular attention being paid to diversity, both in an EDI sense and in terms of across the mathematical sciences and across sectors of interest/employment. In para 22 of the Summary it is stated that the Academy will not be a mass-membership organisation, which we welcome. However, it would be helpful to have some sense of what we envisage as the size of the fellowship in steady state and how that would be achieved starting from scratch.

Q25. "Excellence" is seen in many places in the mathematical sciences: in classrooms, elsewhere in education, in research, industry, government, finance, charities and more. What does "excellence" look like in your field/sector/community?

The community served by the RSS is arguably as diverse as the community which will be served by the academy. This is exemplified by the wide range of RSS honours and excellence awards, each with their own specific definitions of excellence, and we would acknowledge that even that does not cover the full range of activities of members of the RSS. Hence, it is beyond the scope of a consultation response to properly address this question. We would be happy to engage with the academy going forward as it develops proposals for ensuring that excellence covers the full breadth of mathematical sciences activities. We welcome the implicit recognition that excellence can be found at all career stages and note that Section 10 is careful not to define excellence in a way which can only be achieved over a longer career. In that respect it is less helpful that paragraph 21 of the Summary suggests that Fellows should be "respected by their peers for their contributions" which seems to lean more strongly towards individuals with longer career trajectories.

Q26. We are determined that the Academy will have Fellows from all parts of the mathematical sciences community, including teachers and other educators, research, academia, and innovators and practitioners of the mathematical sciences in industry, commerce, government and elsewhere. We will also have Fellows from all fields of mathematical sciences - and a diverse and inclusive Fellowship. How do we best ensure



equity, diversity and inclusiveness amongst our Fellows?

By ensuring that equity, diversity and inclusiveness are primary considerations at every stage in the fellowship election process. The academy has an advantage here that it has the opportunity to be seen as a diverse body from the start, an opportunity which should not be squandered.

Q27. Do you have any suggestions for the criteria that might be suitable for selecting Fellows working in your area of mathematical sciences?

As with Q25, it is beyond the scope of a consultation response to properly address this question, given the breadth of activity supported by RSS. We would be happy to engage with the academy going forward as it develops proposals for ensuring that fellowship criteria are appropriate to our discipline.

Q28. Do you have any other comments on these proposals?

“all parts of the mathematical sciences community, including teachers, other educators, academics, and innovators and practitioners in industry, commerce, government and elsewhere” should include “communicators”.

11. Finance

Q29. The Finance section sets out expected activities (in terms of what people hired do in similar organisations); a range of costings; and possible sources of funds. Do you have any comments on whether we are missing any activities that the Academy should pursue; or activities in the list that you think the Academy should not carry out? Are we right to look at all these sources of funds?

No specific comments here. At some point it would be helpful to understand what the options are if significant funding was obtained but less than required for the ‘minimum viable structure’. But that is probably for a later date.

In Conclusion

Q30. Are there any other comments that you want to provide?

Not at present. We appreciate the efforts that have been made to engage with RSS and the other learned societies throughout the development phase of the academy. We trust that this will continue and we are committed to playing our part in that engagement.

