

SYMPOSIUM NOTE

MAKING RESEARCH COUNT IN SCIENCE EDUCATION POLICY

September 2025



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Executive summary

Science education plays a vital role in the UK's society and economy. It equips individuals with the knowledge and confidence to engage in public debates on science-related issues and make informed decisions in their daily lives.¹ By fostering critical thinking and a commitment to lifelong learning, science education supports a dynamic and adaptable STEM workforce. It also provides the skills required for a wide range of careers, helping to sustain the UK's leadership in science, technology, engineering, and mathematics.

This report summarises discussions from a one-day symposium held in London on 22nd July 2025. The symposium brought together 25 delegates from higher education institutions, subject associations, and learned societies to explore opportunities for closer alignment and effective collaboration between research and policy in England.

The symposium revealed significant barriers to policy engagement, including academic incentives that prioritise publications over policy impact, the perceived opaqueness of the policy process, and the challenge of effectively communicating complex research. Current policy influence often stems from long-term, direct involvement of researchers or

through the brokering efforts of learned societies and subject associations. The science education research ecosystem is fragmented and underfunded compared to other sectors, which limits its capacity for long-term, impactful studies.

Key recommendations for strengthening the research-policy nexus emerged. Participants stressed the importance of research independence, arguing against aligning research frameworks solely with transient policy agendas. Intermediary bodies should more effectively bridge existing research with policy needs. Fostering strategic partnerships and a more unified voice within the research community are crucial. Establishing sustainable institutional mechanisms, such as university-based policy institutes, and integrating communication strategies from the outset of science education research projects were also identified as vital steps.

The contents of this note do not necessarily represent the views of the two host organisations or the employers of those who attended, nor are they a consensus view of the attendees. Nevertheless, the ideas presented and developed during the event offer valuable insights for future efforts to bridge the gap between science education research and policy.

KEY RECOMMENDATIONS (p. 12)

Prioritise research independence over policy alignment

Foster strategic partnerships and a collective voice

Build sustainable institutional mechanisms for policy engagement

Transform research communication from an afterthought to a core strategy

1. Rudolph, J. L. (2022). *Why we teach science (and why we should)*. Oxford University Press. <https://doi.org/10.1093/oso/9780192867193.001.0001>

Science education research and policy ecosystem in England

Science education ecosystem in England is steered by an interplay of research, practice and policy that involve various stakeholders. At its core, the **Department for Education (DfE)** prescribes National Curriculum and subject content for GCSEs and A-levels, framing what must be taught from Key Stage 1 to 4. **Ofqual** safeguards the reliability and comparability of those public examinations. **Ofsted** is responsible for school inspection, including through its published science subject report *Finding the Optimum*² and an earlier Research Review.³

The **Education Endowment Foundation** synthesises international findings and issues practical guidance—for example, its 2023 *Improving Primary Science* report⁴ and earlier secondary recommendations on modelling, feedback and self-regulation.

Learned societies such as the Institute of Physics, Royal Society, Royal Society of Biology and Royal Society of Chemistry, and **subject associations** such as the Association for Science Education, contribute by commissioning, conducting, and synthesising research. They also serve as key bridges between the research, policy, and practice communities in their respective disciplines. The **Science Education Policy Alliance** was formed by five organisations with the

mission to “bring about systemic improvement, by influencing policy and therefore funding and practice so that all students experience a high-quality, inclusive, accessible and contemporary 5–19 education in the sciences that unlocks individual opportunity, supports economic growth and benefits our society”.

Higher education institutions (HEIs) are central to shaping science education research, policy, and practice. In the 2021 UK Research Excellence Framework, over 130 research outputs submitted by 83 HEIs to Unit of Assessment 23 (Education) were related to science education. Most HEI-based science education researchers are based in Departments or Schools of Education, where they conduct research across various subfields of science education and contribute to both initial teacher education and continuing professional development.

Key funders of science education research in HEIs include public bodies such as the Economic and Social Research Council and the European Commission, alongside charitable foundations such as the Nuffield Foundation, Templeton World Charity Foundation, Wellcome Trust, Gatsby Foundation, and the Ogden Trust.

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2. Ofsted. (2023). Finding the optimum: The science subject review. <https://www.gov.uk/government/publications/subject-report-series-science>
 3. Ofsted. (2021). Research review series: science. <https://www.gov.uk/government/publications/research-review-series-science>
 4. Education Endowment Foundation. (2023). Improving Primary Science: Guidance Report. <https://educationendowmentfoundation.org.uk/education-evidence/guidance-reports/primary-science-ks1-ks2>



“You can’t just go and present your wonderful research and expect it to hit home. You need a collective voice and political astuteness.”

- Symposium Participant (Learned Society)

The research-policy interface in science education in England

Wonyong Park

Associate Professor of Science Education, University of Southampton

Carys Hughes

Principal Teaching Fellow, University of Southampton

Chris Downey

Professor of Education, University of Southampton

In the first part of the session, Wonyong Park analysed the landscape of UK science education research through **the Research Excellence Framework (REF)**. An examination of impact case studies from 2014 and 2021 revealed that only a minority focused specifically on policy impact, with most detailing impact on teacher practice instead. For those that did claim policy influence, a common pattern emerged: impact was typically achieved through researchers' direct, long-term participation in policy processes as advisers or panel members. This work was almost always underpinned by large, multi-year grants from major funders.

Park then shared perspectives from **interviews with researchers, revealing significant structural barriers to policy engagement**. Academics, particularly early career researchers on insecure contracts, felt incentivised to prioritise publishing papers over pursuing policy impact, which was not seen as career-advancing. Researchers often found

policy-making to be an opaque "black box", and felt a disconnect between the evidence they submit and the final policy decisions. They noted the difficulty of gaining direct access to policymakers and the challenge of getting qualitative research heard, especially for complex issues like curriculum reform.

Finally, Carys Hughes analysed **how learned societies use evidence in their submissions to parliamentary and government inquiries**. The analysis revealed a tendency to rely more on their own reports than on peer-reviewed academic journal articles, highlighting a potential mismatch between the evidence produced and the evidence mobilised. The type of evidence used was context-dependent: submissions on teacher retention were dominated by quantitative data, whereas those on curriculum used a more balanced mix of evidence types. The evidence cited was almost exclusively from the UK, suggesting a highly national focus in these policy discussions.

Making research count in science education policy: reflections from the academic community

Emily Perry

Professor of Education, Manchester Metropolitan University

Judith Hillier

Associate Professor of Science Education, University of Oxford

Emily Perry’s talk reflected on **the challenges and successes of influencing policy with academic research**. She began by noting that while a great deal of research was conducted, not all of it was seen or heard by policymakers, and it could be of varying quality. She highlighted the critical role of “brokers”—organisations or individuals who helped connect researchers with the policy world.

As a key example, she detailed **the Wellcome CPD Challenge project**,⁵ which investigated high-quality professional development for teachers. A major finding was the effectiveness of school-based professional development leaders, or “CPD Challenge Champions”. This evidence successfully influenced policy, contributing to the creation of the National Professional Qualification for Leading Teacher Development. She credited this success to a combination of factors—coincidental timing, the role of Wellcome as a broker, and sustained engagement with the Department for Education. She concluded by sharing ongoing frustrations, including the difficulty of aligning research with policy goals, the limited capacity for engagement, and ensuring researchers’ voices—particularly those of early career researchers—were heard.

In her talk, Judith Hillier reflected on **the problematic relationship between research, policy, and practice in science education**. She argued that the ideal, linear path from research to policy is a myth, and that in reality, findings are often applied by policymakers without nuance, leading to distorted implementation in schools.

Hillier used the government’s **Initial Teacher Training (ITT) market review** as a key example, criticising its recommendation for “intensive practice” weeks by stating that teaching is founded on relationships and children are not “pommel horses” for trainees to practice on. She also pointed to the misapplication of research on classroom “distractions”, which led some schools to remove valuable learning displays like the periodic table from classrooms. To improve this dynamic, Hillier stressed the importance of building trust and maintaining an ongoing dialogue between all parties. She concluded by **advocating for “critical listening”, urging policymakers and researchers to value the on-the-ground expertise of practitioners, who should be at the forefront of educational conversations**.

5. <https://www.shu.ac.uk/sheffield-institute-education-research/projects/wellcome-cpd-challenge>

6. Department for Education. (2021). Initial teacher training (ITT) market review report. <https://www.gov.uk/government/publications/initial-teacher-training-itt-market-review-report>

Reflections on the research-policy interface

Jonathan Osborne

Kamalchari Professor of Science Education (Emeritus), Stanford University

Jonathan Osborne argued that **the primary challenge in education is not a lack of research, but a fundamental failure to disseminate and implement existing knowledge**. He noted that while a vast body of evidence exists on effective practices, little of it makes its way into the classroom. For instance, he cited clear evidence on the power of extending teacher “wait time” from less than a second to three seconds, which dramatically increases the length of student responses. He also pointed to other well-evidenced but underused findings, such as the benefits of interactive dialogue and the proven success of peer-to-peer instruction over traditional university lectures. Osborne attributed this implementation gap to a natural resistance to change, which he framed as teachers’ desire to maintain their sense of “competence, control, and comfort” by using familiar methods.

Using the historical success of the 21st Century Science curriculum, he highlighted that **a supportive policy environment is critical for any reform to take hold**. The initiative addressed the enduring dilemma of serving both future specialists and future citizens, an issue identified as far back as a 1918 government report. Osborne argued its success was less about the project’s inherent value and more about the uniquely favourable climate into which it launched. This supportive environment included the *Beyond 2000* report, interest from funders like Wellcome and Nuffield, a receptive House of

Commons committee, and a key champion within the QCA. This alignment, he suggested, explains why many well-evidenced initiatives have failed to endure once that specific supportive context disappeared.

As a provocative solution, Osborne proposed that **the teaching profession codify its essential knowledge**, following the model of the nursing profession’s Nursing Interventions Classification (NIC).⁷ This system details hundreds of specific interventions, creating a shared professional knowledge base. Drawing on the book *Sorting Things Out*,⁸ he argued that such classification makes the craft of teaching visible, understood, and discussable, enabling comparability and professional control. He envisioned a similar classification for teaching not as a rigid manual, but as a foundation for professional dialogue that establishes a core body of knowledge for all practitioners, professionalising the field and moving beyond a system where educators are often left to invent their practice in isolation.

“Education is fundamentally, in the end, about values, and values are influenced by scholarship, much of which is possibly non-empirical.”

Jonathan Osborne

7. Wagner, C. M., Butcher, H. K., & Clarke, M. F. (2023). Nursing Interventions Classification (NIC) (8th ed.). Elsevier.

8. Bowker, G. C., & Star, S. L. (1999). *Sorting things out: Classification and its consequences*. MIT Press.
<https://doi.org/10.7551/mitpress/6352.001.0001>

Science Education Policy Alliance session

How do learned societies engage with research evidence for policy and how can researchers contribute?

Athene Donald

Professor Emerita of Physics, University of Cambridge

Peter Finegold

Head of Education Policy, The Royal Society

Lauren McLeod

Head of Education Policy, Royal Society of Biology

Dame Athene Donald, Chair of the Science Education Policy Alliance (SEPA), framed the core challenge of translating research into policy. She positioned **SEPA as a “broker” but highlighted a disconnect where political desire for short-term, measurable results often overrode evidence**. She used the example of a past government initiative to encourage more girls into physics and engineering. She criticised the move as too late to be effective, noting it exemplified politicians’ tendency to prioritise quick, measurable results over meaningful long-term educational change. She encouraged researchers to align their work with the DfE’s published research interests.

Peter Finegold, from the Royal Society, presented findings from a joint report with the British Academy analysing the UK’s educational research system. He revealed **the field was fragmented, with research excellence spread across many small units that were overly reliant on short-term grants (two-thirds lasted under three years)**. This has led to significant research gaps in areas like curriculum design, EdTech, and large-scale longitudinal studies. The report identified the stark funding disparity: education research received only 0.05% of its sector’s public spending, compared to 1.7% in health—a difference of a factor of 34. Consequently, the report’s recommendations were a significant increase in funding and a shift towards longer-term grants to foster stability.

Lauren McLeod, from the Royal Society of Biology, detailed **the practical ways SEPA organisations influence policy**, from sitting on expert panels to commissioning their own research. She used the long-standing issue of double and triple science GCSEs as a central case study, explaining how the two-tier system creates problems with equity, timetabling, and progression. **For years, SEPA have advocated for a single, equitable science qualification for all**. However, she revealed that to align with the current political climate of “evolution, not revolution”, they had strategically pivoted. Their core proposal—a single, manageable science pathway for all—is now framed as “triple science for all”, a politically savvy reframing to advance their principles within a constrained policy landscape.

The subsequent Q&A session explored the difficulty of large-scale curriculum reform and the strategic use of messaging. One question focused on the challenge of influencing an ideologically driven government, to which Athene replied that major curriculum change was extremely difficult, forcing SEPA to focus on more achievable goals. Another discussion centered on the tension between using a simplified slogan like “triple science for all” and conveying the complex reality of teaching. McLeod mentioned that the slogan was a necessary “hook” to open dialogue with policymakers, after which the nuances and complexities could be introduced.



“Politicians want something they can say, ‘Look, I did this and in a year’s time we have transformed’—and that’s just not how education works.”

- Symposium Participant (Researcher)

Mapping research onto policy

What research do universities produce, and how can it inform policy in science education?

The Policy Mapping session was a structured workshop designed to explore the connections, challenges, and opportunities at the intersection of science education research and policy in England. Facilitated across four groups, the session prompted researchers and learned society representatives to share current research projects and collectively map them onto the existing policy landscape.

Research and policy connections

Researchers presented a variety of projects, creating a foundation for the policy discussions. Key areas included: the assessment and pedagogy of practical work; the implementation of interdisciplinary STEAM education; strategies for evaluating misinformation; the experience of underrepresented groups in physics; and the challenges of translating academic knowledge for teachers.

Participants identified **several potential “policy windows”**. Research demonstrating that hands-on practical work leads to better GCSE results than video-based instruction was seen as a powerful message for a government focused on attainment. Discussions on assessment were prominent, with many seeing the current curriculum and assessment review as a crucial opportunity. The rise of AI and concerns about misinformation were also viewed as key levers, creating policy demand for research into critical thinking, media literacy, and new forms of assessment, such as oral examinations, that are less susceptible to cheating.

Barriers and challenges

A significant portion of the discussion focused on the formidable barriers to translating research into policy and practice. The most consistently cited challenge was **the fragmented and marketised nature of the English education system**. Participants repeatedly highlighted the growing influence of Multi-Academy Trusts (MATs), describing them as a new layer of policymaking. Researchers and learned societies reported significant difficulty in accessing MAT leadership to share research or influence practice, noting that MATs can operate as closed systems, sometimes seeking to appropriate successful resources for their own commercialised curricula.

Another major barrier was **the persistent gap between academic research and classroom practice**. Participants discussed the different “languages” used by researchers and teachers, and the need for a skilled “intermediary” or “broker” role to translate complex findings. The lack of teacher time and specialist training was seen as a fundamental obstacle preventing engagement with research, even when the will exists.

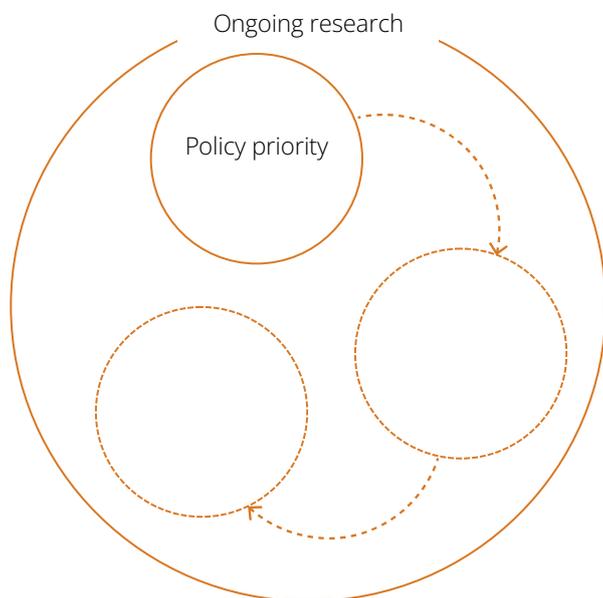
Finally, the group identified **the overburdened GCSE specification—as distinct from the national curriculum—as a key structural problem**. This pressure was seen to squeeze out time for innovative pedagogical approaches, such as interdisciplinary projects or inquiry-based practical work, forcing a focus on content delivery for high-stakes exams.

Towards stronger research-policy engagement

Co-developing recommendations

Prioritise research independence over policy alignment

A central, and at times contentious, discussion challenged the premise that research frameworks should be designed primarily to align with current policy needs. Participants argued forcefully that **the independence of academic research is crucial**. Policy agendas can be transient and politically driven, whereas **a strong research base requires long-term, foundational, and sometimes “blue-sky” thinking**. One group visualised this as a large, diverse pool of research areas, within which the smaller, shifting policy priorities move around.



Rather than forcing researchers to chase the policy issue of the day, the recommendation was **for intermediary bodies, such as learned societies, to act as brokers**. Their role should be to scan the

“It’s our job as the brokers, the learned societies, to take what you’re doing and find the stuff that supports the policy changes we want to make... the body of research design shouldn’t be led by policy.”

Symposium Participant (Subject Association)

existing pool of research, identify findings relevant to current policy debates, and, where needed, commission work to address specific gaps. In this way, societies draw on and extend robust research to inform their priorities and advocate to policymakers, preserving the integrity of the research agenda while enhancing its potential for impact. The recent politicisation of research funding in the US was cited as a stark warning against tying research too closely to government priorities.

Foster strategic partnerships and a collective voice

There was a strong consensus on the need for more effective and strategic partnerships. A key model proposed was a **“triangulation” between researchers, funders, and learned societies to create a more joined-up ecosystem**. A concrete recommendation was for learned societies to take a more active role in convening funders to highlight key research priorities, helping to direct resources more effectively, particularly after the withdrawal of major funders like Wellcome from the field.

“Why would government listen if we can’t align ourselves around the principles and values that we share?”

Symposium Participant (Subject Association)

However, participants stressed that for such partnerships to be effective, the research community must develop greater political astuteness and a more unified voice. A learned society representative noted that the community's tendency to be fragmented or to “bicker” in front of policymakers severely undermines its influence. A recommendation was therefore made for the community to work on developing a shared understanding of the policy-making process and to “speak the same language” when engaging with government, presenting a more coherent and compelling case for evidence-informed policy.

Build sustainable institutional mechanisms for policy engagement

The discussion on sustainability moved beyond person-dependent relationships, which were seen as fragile given the high turnover of civil servants. The core recommendation was to **invest in building permanent, institutional infrastructure to bridge the gap between academia and policy.**

University-based policy institutes, such as Policy@Manchester and Cambridge's Centre for Science and Policy (CSaP), were repeatedly highlighted as excellent models. These entities provide a sustainable mechanism by offering professional expertise, training for researchers on how to write policy briefs, and established networks for dissemination. By creating this infrastructure, universities can embed policy engagement as a core part of their mission, rather than leaving it to the ad-hoc efforts of individual academics. Another

“...not relying on the journal publication as the end goal of your research, but seeing it as the start. Academics need to consider how they can reach the audiences they want and need to reach.”

Symposium Participant (Researcher)

“It's about framing the research in terms of the problem it's trying to solve and therefore being able to tell a story to the policymaker. ‘We know you've got all these problems. Here's the problem where this piece of research is going to help you solve it.’”

Symposium Participant (Learned Society)

suggestion was for research teams to include dedicated policy officers in funding bids to ensure continuous and expert dialogue with policymakers throughout a project's lifecycle.

Transform research communication from an afterthought to a core strategy

The most detailed recommendations emerged around communication. A fundamental culture shift was called for, summed up by the idea that a journal publication should be seen not as the end goal of research, but as the start of the communication process.

To achieve this, a multi-part recommendation was developed. First, **universities must create better incentives for policy engagement**, as the current system overwhelmingly rewards peer-reviewed papers. Second, **researchers, from doctoral students to senior staff, require practical, hands-on training.** The Royal Society's “Policy Primer” residential course was cited as a best-practice model, as it teaches researchers how to frame their work as a story that solves a problem for a policymaker. Third, **communication strategies must be embedded in research projects from the bidding stage, with resources allocated accordingly.** This includes thinking about multiple audiences—from teachers who are no longer reached by traditional journals to civil servants who need concise, actionable briefings—and tailoring the format and channel to each one.



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