

# From a candle to content creation

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This article gives a short tour through the changing faces of science communication, including dissemination, public understanding of science and public engagement with science and technology to engaged research.

In 1848, in the Lecture Theatre of the Royal Institution, Michael Faraday led an audience of young people into the glowing heart of a candle flame. Mixing lecturing with demonstrations, explosions and bright lights, he took this familiar, homely object and used it to explore the nature of combustion with his young audience. Faraday had little formal education. A largely self-educated person, he encouraged his ‘fellow philosophers’, as he called them, to try simple experiments at home – with ‘proper attention to safety’! – so they could learn more for themselves through personal experience.

In the early to mid-19th century, the Royal Institution was not only a centre for scientific research; it was at the heart of fashionable London’s cultural life. Such was the demand to hear the latest scientific insights that to cope with the flood of carriages, the road it stood on became London’s first one-way street. Gentlemen – and even ladies! – packed the lecture theatre, while working men crowded the cheaper seats in the gallery above.

However, by the mid-20th century, things had changed. Scientists seemed to have retreated to ‘ivory laboratories’ and the few who ventured on to a public stage were frowned on by their colleagues. Science had become remote from people’s daily experiences – something that wasn’t done by people like them and that they wouldn’t understand. Worried that people’s lack of understanding might lead to lack of support for research, the Royal Society commissioned a report into the state of public understanding of science. The *Bodmer Report* (Royal Society, 1985) concluded that part of the duty of being a scientist was a responsibility to communicate the benefits of science to the public. Improved public understanding of science, it felt, would not only be a good thing in itself but would (hopefully!) also mean people would be more supportive of research and enthusiastic about science.

Science centres were built. Scientists gave public lectures about their work. Popular science books were written. However, starting from the assumption that people essentially lacked scientific knowledge, that they had a deficit that needed to be remedied, ignored the considerable, if informal and personal, understanding

and expertise that people possessed. In 2000, an influential report from the House of Lords (House of Lords, 2000) argued the case for a shift from Public Understanding of Science to Public *Engagement* with Science and Technology, partly in response to a period of intense scrutiny of science, fuelled by issues such as the production of genetically modified crops, the use of animals in research and the emergence of bovine spongiform encephalopathy (BSE) that highlighted the ethical and social dimensions of science.



To explore the power dynamics of co-production in health research, Emily Ahmed (PhD student in Health Sciences, University of Warwick) has created a 1.6 m balance and a hundred labelled beanbags. She invites participants to choose beanbags holding words that resonate with them, reflect on what the words mean, then place the beanbag on the scales and see if the scales of power can be re-balanced. © NCCPE, 2024

From this time, funders, including the UK research councils, the Wellcome Trust, Leverhulme Foundation and the learned societies (including the Biochemical Society) invested in support for public engagement, either through specific grants or as part of the activity of larger grants. Large-scale initiatives, such as the Beacons for Public Engagement and the Catalysts for Public Engagement with Research programmes, were established to develop a culture of public engagement in the UK higher education sector. The National Co-ordinating Centre for Public Engagement (NCCPE)

was established as part of the Beacons programme to embed support for effective public engagement.

Science festivals blossomed in cities and towns around the UK. Cafés scientifiques (science cafes) mushroomed. Families flocked to science centres. Gradually, public engagement became something that was taken seriously; both an emerging field of academic research and scholarship and an activity that could be a valued, paid for, part of a scientist's working life, rather than something that could only be done voluntarily, for free, in their own time.

Scientists undertake public engagement for many reasons; probably as many reasons as there are scientists. For some, it is important simply to engage with non-specialist publics. Others see it as a way to be accountable, especially if their research is funded by public money. Some feel the urge to educate; others to inspire young people into careers in science and technology.

But public engagement also has impacts on scientists. While some remain wary, for many, seeing people's interest in and response to their work reminds them why they wanted to be scientists in the first place. They see the value of engaging with, interacting with, listening to and learning from publics: children and families, teenagers and adults, patients and doctors, teachers and students, business and industry people and policy-makers. Public engagement gives fresh perspectives, provides pathways for new ideas and insights, shows the impact of science in everyone's lives and improves the quality of research by widening horizons.

Public engagement also gives scientists the opportunity to develop their skills in engagement, communication, dialogue, influencing, networking and creativity. Many still give public lectures; many still visit schools but they also write computer games, make videos, take part in Citizen Science programmes, record podcasts, write plays, create YouTube channels, use social media, run pop-up activities in supermarkets, put labs in lorries and on buses that take science to communities far removed from the university and take part in public dialogues and citizens' juries about emerging areas of science and technology.

And as scientists' public profiles increase through their engagement, they also increase the reputation of their universities, as the university's name appears in newspaper articles, television and radio broadcasts. Students have been attracted to apply to specific universities for specific courses because they have engaged with researchers.

The increase in public engagement since the early 2000s has shone a spotlight on science, opened it up to public scrutiny and accountability and brought the fun and excitement of science to many audiences. But there can be something of a sameness about the audiences, a feeling that they are the people who would have come

anyway. People who were always interested in science, who think it is important for their children to experience science. What about the communities who are not 'in the room'? The marginalized, the socio-economically disadvantaged, the minoritized, the people with personal experience of illness and inequities, the colonized; their expertises and experiences are surely valuable too?

In the last 10 years or so, the field has evolved and a new route for engagement has joined public understanding of science and public engagement with science, with the emergence of transdisciplinary, participatory, engaged research. Funders now frame research as a social contract that can only reach its full potential through the full involvement of members of society. Engaged practice embeds the perspectives of all its collaborators – researchers and people with lived experience, academics and non-academics. It can happen at a single point in the research cycle, or at all points, from framing the research question, to co-designing the research method, to collaborating on monitoring and evaluation.

Because it responds to the context in which it is being conducted and the communities who are participating, engaged research looks very different in different disciplines. A clinical research project that is looking at treatment regimes for people living with cancer won't use the same methods as an education researcher co-developing A-level chemistry resources with teachers, or biologists and members of a wildlife trust collaboratively mapping an endangered habitat. But they will all be based on principles of fairness, respect and equity. Done well and done with enough time, engaged research can make for better research and enrich the social and economic impact of research (Holliman, 2017). Like public engagement, the NCCPE has evolved over time. Our mission is to support culture change to build 'an inclusive higher education sector where communities can contribute to, and benefit from, knowledge, teaching and research' (NCCPE, 2024c).

In public engagement, you are never alone. However you frame your communication activities – as understanding, as engagement or as collaboration – a range of resources is available to support you. The Biochemical Society offers resources, guides, tips and funding for public engagement (Biochemical Society, 2024). If you're interested in university programmes and courses in science communication, there are undergraduate, Master's and PhD programmes around the world; the PCST Network has an ongoing project to map courses and programmes (PCST, 2024). If you're interested in UK funders' priorities for engagement, UKRI's new public engagement strategy is a good place to start (UKRI, 2024). The NCCPE has reports, reviews and guides available online, or you might be interested in our Engage Academy programme (NCCPE 2024a-d).

These days, Michael Faraday might be uploading his lectures to his YouTube channel, competing for attention with the output of around 60 million other content creators. He might be on TikTok, alongside a million or so other creators. But his ideas about communicating science were revolutionary for his time. So it's more

likely he would be doing something we haven't imagined yet. We don't know what the next (r)evolution in public engagement will be, or where it will emerge but knowing where we've been can help us see where we're going. Where will the next candle be lit? ■

## Further reading

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