

ENGAGING SCIENCE CONFERENCE

Science for all: is public engagement engaging the public?

Conference Report

3-4 April 2006
Manchester Conference Centre

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INTRODUCTION

Public engagement with science covers such a myriad of activities, organisations and people these days that it is hard for all the people involved to meet and consider what they are doing. The Wellcome Trust Conference, 'Science for all: is public engagement engaging the public?', was a rare chance to consider the range of experience that has now built up from the remarkable recent growth in efforts to bring science and the public closer together – to hear from those who work in museums, science centres, schools, informal education or new media; from teachers, writers, performers, lecturers, even dancers; and from those with long careers in the field and from some just starting out.

It was, perhaps, a chance to think about what all their efforts add up to. It is just over 20 years since a committee of the Royal Society chaired by Sir Walter Bodmer looked into the public understanding of

science. Not a bad time, then, to take stock of where efforts to bring science and the public closer together have reached. The Trust Conference also provided plenty of opportunity to do just that.

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There are many questions from those early days that still deserve attention, it seems. For example, we are still mulling over figures from Jon Miller in the USA that indicate that, on his quiz-style definition, scientific literacy among the general population remains low, and the level is pretty static. The question is still being asked, perhaps more in hope than expectation, of whether science can be worked into TV dramas and soap operas. And there remain concerns about how

the reward system of science, especially academic science, may penalise those who take time out to communicate outside the lab.

But a whole lot has changed, too. For a start, the words are different. 'Understanding' of science is mostly out, and the less prescriptive 'engagement' is in. 'Awareness' and 'appreciation' were tried, and discarded, along the way. ('Acceptance' was never officially adopted, but some suggest it remains an unspoken goal.) There are other new terms, too – 'BSE', 'MMR', 'genetically modified foods', 'Dolly', 'the human genome', 'the internet' – and some older ones that seem to have achieved new currency. 'Science and society' is not exactly on everyone's lips but is certainly in every research organisation's corporate plan.

Moreover, there has been a rise in the UK Government's science budget to levels once undreamt of. British science no longer needs

saving, apparently, although scientists still worry about what the public thinks of them. The Wellcome Trust has also enjoyed something of an uplift in its fortunes, and has deployed some of the proceeds to promote public engagement with science, especially over the last ten years. In fact, through the efforts of the Trust and others, science communication has become a minor industry. It even has its own professors. And judging from the 300 or so science communicators who gathered in Manchester for two days, they are an impressively energetic, creative and committed bunch. So what are they all up to? What effect is it having? And what might they do next?

SCIENCE IN THE CLASSROOM

Start in schools, because that is where experience of science starts. Well, not science, exactly. School science is not the same thing as real science. And it is not much of a substitute, it seems. In 1985 the official paper 'Science 5–16' was published, foreshadowing the optimistic slogan of 'science for all' linked to the new National Curriculum. There is now fairly general agreement that, while primary science does many good things, the early hopes for the new school science have not been realised. Secondary science is often perceived as "boring and irrelevant", according to the Association for Science Education Chief Executive, Derek Bell. The diagnosis is of an over-assessed, fact-stuffed curriculum. It fails to help develop a scientifically literate population because it is still wedded to meeting the

needs of future professional scientists and engineers. And, a familiar lament perhaps, science is not cool with teenagers.

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There are new initiatives that ought to remedy some of these shortcomings. Curriculum developments such as the already proven Science for Public Understanding AS level and the new Twenty First Century Science GCSE package bring contemporary scientific issues into the classroom. They may not make science cool, but they should make it more meaningful.

The new curricula will both respond to and reinforce demand for treatment of up-to-date science and current debates. This will mean supplementing the core materials, which change relatively slowly, from other sources, including news media. It will involve continuing education for teachers, part of the business of the new National Science Learning Centre and the network of nine similarly aimed Centres around England. And, as John Holman, Director of the National Centre, hoped, it will exploit the powerful influence of hearing in person from professional scientists through continuing initiatives

“Science in schools is sterile, dull, sliced, diced, SATTed and certified” discussion comment.

like the Researchers in Residence scheme. There may also be scope for more experiments in which children themselves set the agenda, as in the example Jill Turner of Bristol University described of Young Research Ethics Committees – a project aimed at teaching moral reasoning and involvement in decision making. As she emphasised, echoing many others, schoolchildren “really want the science and science and society issues to relate to themselves and their everyday life”.

This was all very hopeful, and along with many of the other projects aired at the Conference perhaps signals an overdue *rapprochement* between the new cadre of science communicators and science teachers, who have always been science communicators in their own way. The new directions in schools could also benefit, as Derek Bell argued, from a close relationship between formal and informal education.

Remaining concerns included the future of higher-level science. Even if 'citizen science' or scientific literacy is taken care of by the new GCSEs, there may still be a lack of takers for science A levels. If this leads to too few science graduates, and a shortage of good science teachers, it might be self-perpetuating, according to Mary Doherty of the Training and Development Agency for Schools. And as John Holman pointed out, training needs were likely to become more complex. The future cohort of science teachers would still need to be trained for

specialist science. But they must also be prepared to deliver a science curriculum intended to achieve wide scientific literacy. And some aspects of this, such as the nature of science, were difficult to teach.

More radically, the education policy consultant Stephen Heppell argued that in the 21st century, delivering the curriculum was the wrong metaphor. It smacked of delivering coal or milk. Education needs to recognise and embody the value of autonomy, personal choice and peer-to-peer exchange, and to abandon subject specialisms and age streaming. He cited a number of examples of learning spaces that were more collaborative than most existing schools, though almost none was in the UK. The vision of future science education, it seems, is still healthily contested.



A HUNGER FOR INFORMATION?

Those who have done with school are the targets of a large fraction of the effort devoted to public engagement with science. Is it having an effect? Michele Corrado of Ipsos MORI was one of the few to answer the question posed in the Conference title: is public engagement engaging the public? Her answer was 'yes', but the details of recent social surveys show a complex picture of current knowledge and attitudes. Few adults regard science as a priority interest, but they mostly think it does good, and they say they would like to know more. Contrary to rumour, there is a fair degree of trust that scientists will tell the truth, especially if they work in universities. They are certainly trusted more than companies, politicians or journalists.

“How would a physical breakthrough which permitted walking on water be reported today?”

Significantly for current political debate, eight out of ten people feel the public should be consulted on decisions about scientific developments, though 'a fair amount' rather than 'a great deal' of consultation would satisfy most of them. Dialogue fatigue might set in, perhaps. But her conclusion was that “there is a great hunger for information” among the public, and many express a wish to know about new developments earlier – they

still remember being startled by Dolly. She urged that institutions recognise that people would not be content with consultation for consultation's sake. They expect their views, if sought, to be heeded. They are likely to be cynical about outcomes and can quickly tell when a discussion is simply a talking shop.

This outline of the landscape raises further questions, of course. If people genuinely want more influence on science, and even on what research gets conducted, how might this happen? How does one arrange an upstream discussion of a rather ill-defined new set of possibilities such as those offered by nanotechnology, for example? There was still scope for more effort on the part of public research funders, some believed. Chris O'Toole of the Human Fertilisation and Embryology Authority believed that their extensive consultation machinery



“I do like science, but it’s not very interesting” video interviewee.

could be taken up by other bodies such as the Medical Research Council: “The type of science that is going on in this country should be in the public domain.” But there was a problem with the increasing industrial involvement with academic research, in terms of both trust and increasing confidentiality.

If the issue was right, though, Steve Hill, Deputy Chief Executive of the Environment Council, was optimistic about direct engagement. There is no single solution or technique, but as long as you try to understand what is in it for them, there are ways of drawing people in. Andrea Bandelli, an independent adviser on science communication, reflected on experience in science centres and came to a similar conclusion. Emphasis on learning for the non-engaged meant they faced an entry threshold, and denoted a lack of trust. It was more constructive to envisage that all parties might learn something: “Only if we construct public engagement as a learning experience for ourselves can we start to engage the public.”

More direct forms of engagement are only reaching a minority, however. Most people get their science news from the media, especially TV, and expect to go on doing so. The media landscape is shifting fast in the multi-channel age, and speakers at the session dedicated to TV programming outlined some of the current features of their world. Science commissioning editors are

now even more aware than in the past that there is a choice between trying for a large audience, with lower science content or softer science, and bringing heavier science content to a smaller group of viewers. New programmes have to fit the style and identity of each channel. However, although styles have changed so much, there is still a solid audience for a long-running format such as *Horizon*, which now typically draws more viewers in our multi-channel world (some 3 million or so) than the days of only four channels.

In the print media, science sections come and go, and despite the best efforts of the Science Media Centre, there are still problems with science reporting. And Raj Persaud wanted to see a more general effort to report the process of science as well as the product. Without details of the mechanism of research, and the way claims can be supported, new developments are described in the same frame as biblical miracles, he suggested. He offered a thought-experiment to ponder: “How would a physical breakthrough which permitted walking on water be reported today?” Never mind comparing with 1985 – in his view the story would not have changed much from the way it was told 2000 years ago.

GETTING INFORMAL

So print and broadcast media remain the main sources of information about science and technology for most people. But there is more chance that people will encounter science in other contexts these days, perhaps when they are not expecting it. Much of the creative energy invested in science engagement has gone into new spaces, from shopping malls to science centres, and new contexts, most notably in science–art collaborations. Individual audiences may be small, but cumulatively this whole set of activities offers chances to reach new people in new ways. Watch the Indian dance with choreography inspired by epigenetics performed by Croydon schoolchildren for IMPACT Danscience, for example, and you see a stimulus to ponder the latest findings in cell biology that would almost certainly not have happened a decade ago. And the



feedback suggested that some young people, at least, took some new ideas back home after seeing the show.

But although such work is delightful to see, this whole area probably raises more questions than answers. It can inspire renewed efforts from scientists. As Harry Witchel of Bristol University put it, “supermarket science” is enjoyable because “it is the one time you are not preaching to the converted”. But even the larger-scale efforts have effects that are largely unknown. Alan Friedman of the New York Hall of Science reported that 21 per cent of people in the USA visit a science centre each year. Extend the category to include zoos, botanic gardens, traditional museums and so on, and a rather startling 60 per cent of US adults visit some informal science institution at least once a year. But while US science centres are working to broaden and deepen their public engagement, especially in terms of diversity of audiences, there was hardly any good evidence about impact. “We need to do real research on what we’re doing and how we’re doing it”, according to Dr Friedman. He did report good results, though, from a determined effort in his own centre to recruit staff who come from the diverse communities it serves. It really helps if the people you see when you venture through the door look like you.

Science centres have proliferated in the UK, too, and are often a focus for community-

“Creativity is always engaging”

discussion comment.

related discussion. At-Bristol, for example, has included discussions between scientists and the public on drugs and drug use in an effort to extend the reach of the centre by responding to local concerns. And, while not tied to any one centre, the Foundation for Science Technology and Civilisation is exploring the scientific heritage of Islam through exhibitions, as well as a website and resources for schools.

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Assessing the impact of sciart ventures is perhaps hardest of all, engaging though they undoubtedly are. And if experiencing science mediated through anything from dance to installation art can make new connections for audiences, what effect does it have on the scientists involved?

The answer naturally varies with the project. There is little effect on actual scientific practice, according to Darren Monckton of Glasgow University. He had a rewarding time working on two projects on the experience of myotonic dystrophy, and the history of research on the disease, with artist Jacqueline Donachie. Clinicians who got involved certainly learned new things about what patients need to know and how they regard their condition. But as a laboratory

investigator, he felt that it “has not consciously affected the way I do science”.

Richard Goldstein, a mathematical modeller at the National Institute for Medical Research, felt that the project he had become involved in with artist and director Phoebe von Held meshed well with his own attitude to science. He is one of a number of researchers responding to the materialist speculations in Diderot’s *D’Alembert’s Dream*, and saw Diderot as a kindred spirit from another century. “I think of theories as mostly metaphors,” he mused, so he could have a metaphoric exchange on various conceptions of the nature of the world. But this was still a reflection on the nature of science rather than a direct effect on scientific practice.

A striking example of such an effect was on offer, from heart researcher Philip Kilner of the Royal Brompton Hospital. But, tellingly perhaps, it had emerged from his own excursion into sculpture, during an extended break from medical research. His investigation of fluid flow and rhythm in artwork had informed his gestalt approach to the working of the heart in his research on medical imaging. He saw art as a way of illuminating underlying assumptions in science and helping to develop an informed imagination. But the beauty of both his artistic and scientific projects suggested, perhaps, that one of the best ways of getting successful multidisciplinary work is still for a single person to take time to investigate both disciplines thoroughly – still a rare feat.

THE INTERNET AND NEW MEDIA

Science communicators do not have to be technology buffs, but one thing shaping their work has been that the whole science communication industry has been developing at a time when media are changing fast. This is not just a matter of the profusion of new channels transforming the broadcasting scene. The new electronic media offer many additional possibilities.

It would be foolhardy to predict the impact of all this, but the Conference abounded in examples of how technology can encourage new communication and interaction. Many are geared to the needs of schools, for curriculum support or enrichment. Examples here include the BioEthics Education Project at Bristol, and the 'edu-game' Science Supremo, in which GCSE students can follow the process of drug development from early testing through to clinical trials.



Naked Scientist discussions are still broadcast via various radio outlets, but also made available as podcasts – notching up around a million downloads.

The web can also be used to build on successful work in other media. Y Touring's well-known theatre productions for schools have been seen by live audiences in hundreds of venues – and their latest drama was performed at the Conference. But they are also reaching beyond live audiences through their reconfiguration as sets of digital 'news reports' on the impressive Genetic Futures News website. Subjects covered include xenotransplantation, genetically modified crops and stem cell research, and the site amounts to a guide to new biomedical technologies and the issues they may pose for relationships between people.

Alternatively, the web can be integrated directly with other media. Perhaps the most developed example of this is the latest incarnation of the Naked Scientists, the Cambridge-based team who make weekly topical science radio discussions. These are still broadcast via various radio outlets, but also made available as podcasts – which have notched up around a million downloads. Further, their website also supports a range of science forums that give the team useful signals about what

“If I ever have a cow with mastitis, I definitely know which website to go to” participant in workshop on digital interactives.

people are discussing and what they find interesting, which feed into choice of topics for future programmes.

This integration of digital media to help match content to user needs and interests is only one kind of interaction. A whole other set of developments that seek to exploit the possibilities of the web are linked to the notion of e-democracy. As David Newman of Queen's University Belfast outlined, there are many ways of using new information and communication technologies to support consultation and dialogue. They can help to bridge gaps between what consulters expect and what consultees want. As with more conventional consultations, though, it is important to clear what the process being supported is designed to achieve, and how far any views developed will influence actual decisions.



And as far as e-democracy is concerned, Ross Ferguson of the Hansard Society emphasised that there are obstacles as well as opportunities. Experiments to date have been small-scale, and there are concerns about security, over how many people possess the technological literacy to take part, and about cost. And it would be wrong to expect too much from e-democracy, he suggested. There would still need to be decision makers. Nor is the net the only way to organise debate or encourage participatory discussion, as examples from the large-scale Euro debates on brain science to the Democs card games developed by the New Economics Foundation attest. Still, the web is likely to complement or augment many initiatives in which it is not the main focus, and much is being learned about how to achieve this.

AND WHAT IS IT ALL FOR?

As all these hugely varied activities indicate, science engagement is a mosaic. There are large pieces such as the National Curriculum, which touch many people, and many small pieces, which change more quickly and cover a vast array of topics. Some efforts start from the interest of scientists, while some are prompted by public demands and some by artistic inspiration. And they use technologies, from the latest interactive computer software and web-authoring tools to the simplest model for the public sphere: citizens sitting in a café, talking with one another and exchanging views. Their motives vary, too, from simply sharing delight in knowledge or having fun, to changing attitudes to particular technologies or finding out how to involve lay people in decision making about new science.

So it is not surprising that there is an ambiguity about the new phrase that has emerged as the label for all this effort. Does 'public engagement' with science mean just getting people's attention, or truly connecting with them – in some kind of dialogue? Does it need to engage scientists as well? What are the most important outcomes? And how can they be measured?

You may say there are grey areas here – but they are more interesting than that makes them sound. The difficulty in finding a tight definition of the purpose of all of this can make it harder to define success. But it is clear after 20 years that science engagement

is a moving target. The topics under debate change, the interests and demands of the various publics alter, the goals of institutions respond (or should do). There will always be problems with evaluation when the goalposts are so mobile. But accepting that aims evolve and motives differ can also be a sign of a kind of maturity in a field such as this. An umbrella term that allows such a wide range of initiatives to be devised, and to get funded, has advantages as well as drawbacks. Judging by the projects displayed at the Conference, only some of which are mentioned here, there is an ever-renewing enthusiasm for communicating science. So it may be a matter of channelling it rather than trying to make everything fit some master plan for achieving science engagement on a national or even global level. In the end, people are engaged, if at all, with a particular piece of science in a particular context, not with science as a giant abstraction. So horses for courses may remain the best general advice about how to do it.

“The only hope for mankind is a rational understanding of what it means to be part of nature.”

But there were certainly recommendations about the goals, and the appropriate style, of public engagement. While there is no one best approach, respect for audiences never goes amiss. Democratic goals were more prominent in discussion at the Conference than economic or propaganda objectives,

“It is extraordinary within this community how little evaluation is made public” discussion comment.

though these were present too. “I’m not in it to make people pro-science,” said one delegate, “but to help people make more informed decisions.” There was satisfaction in helping people feel that their voices could be heard in scientific debate, and promoting more deliberative approaches to decisions in place of technocratic models. And there is strong indication of public demand for dialogue on future science and technology. “It was in many respects the public who decided they wanted to be consulted with”, said Michele Corrado.

Taking a longer view, science engagement work is part of a process of assimilating science as culture, as Andrea Bandelli put it. And that extended to ways of understanding our world and the universe, “our position here, our origin and our destiny”.

That is a rather grand way of putting it, but seems a fitting subject for a conversation. Like any genuine conversation, it is unlikely to come to any neat conclusion.



And conversation seems to be the tone of a great many science engagement activities. It is the explicit goal of the Cafés Scientifiques, of course. But it captures, perhaps, a more general loosening-up of the way we approach science communication. Top-down, prescriptive attempts to abolish ignorance do seem to be fading away, although we do now encounter the paradoxical effort to promote bottom-up initiatives from the top. But conversation abounds – if not always between equals, then between people engaged in the same way. It may be school pupils stimulated to discuss among themselves, scientists conversing with the public, researchers conversing with artists, or policy makers conversing with stakeholders. In all these exchanges, a key feature for success was respect for other people's views, even if derived from different values, and the need to take them into account.

The subject of the conversation varies, too, and there is no way to sum it up that will command general assent. But the formulation offered by a sagacious Mancunian who contributed to the vox pop video that started things off seemed as promising as any: “The only hope for mankind is a rational understanding of what it means to be part of nature.” That, of course, is only one motivation for science communication, but it did show how quickly the stakes can increase when you start to think about what it is all for.

CONFERENCE PROGRAMME

Day 1, Monday 3 April 2006	10.30–12.30	Opening speech: Clare Matterson (Director, Medicine, Society and History division, the Wellcome Trust) Keynote plenary panel debate 'Science for all: Is public engagement engaging the public?': Barbara Myers (chair) Weston Theatre				EXHIBITION	
	12.30–13.30	Lunch Weston Room 1 (lunchtime session: drop-in Wellcome Trust funding surgery Weston Room 2)					
	13.30–15.00	Who are we reaching and how?	Live event	Session	Forum		Workshop
			Debating Matters: Live schools debate competition Room 4	Translating Science: The many languages of public engagement Cockcroft Theatre	Developing Inclusion: Learning from others Weston Room 2		Reaching Out to the Young: Practical ways of engaging 5–11-year-olds with science Room 1
	Tea break						
	15.00–15.30						
	15.30–17.00		IMPACT Danscience performance Weston Theatre	Scientists are Doing it for Themselves Cockcroft Theatre	Science as Culture: Engaging the humanities Weston Room 2		Going Digital: A circus of interactive stations and activities Room 1
17.15–18.30		Café Scientifique - Conference bar (cash bar available)		Meet the Mighty Gene Machine - Weston Room 1 (cash bar available)			
19.30	Conference dinner – Harvey Nichols Restaurant						
Day 2, Tuesday 4 April 2006	10.00–10.45	Opening speaker: Professor Dame Nancy Rothwell (Vice-president for Research, University of Manchester) Keynote speaker: Alan Friedman (Director, New York Hall of Science) Keynote speech: Who can we hope to reach and how do we know if we succeed? Weston Theatre				EXHIBITION	
	10.45–11.00	At the science interface	Live event	Session	Forum		Workshop
	11.00–12.30		Freaks and Geeks: Science on the TV Weston Room 2	Science–Art Collaborations: The scientists' perspective Room 4	Education: To the Future – Science in 2015 Cockcroft Theatre		Stakeholder Engagement and the Avian Influenza Pandemic: Lots of hype or doomsday? Room 1
	12.30–13.30	Lunch and lunchtime session – at the science/arts interface Weston Room 2 Poster session Weston Room 1					
	13.30–15.00	Creating an impact	Every Breath: Y Touring's new theatre performance Weston Theatre	Beyond These Four Walls Cockcroft Theatre	To the Power of 'e': The internet – a virtual or actual tool for democracy? Weston Room 2		Wellcome Monitor Consultation Room 1
	Tea break						
	15.00–15.30	Education, policy and practice	Democs: Policy and debate card game activities Room 4	Education: Contemporary science for all? Cockcroft Theatre	How soon is now? Weston Room 2		Behind the Scenes: Insight into Wellcome Trust funding Room 1
15.30–17.00							
17.00–17.30	Conference dinner – Harvey Nichols Restaurant						

