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Beyond dissemination — science communication as impact

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Abstract

The drive for impact from research projects presents a dilemma for science communication researchers and practitioners — should public engagement be regarded only as a mechanism for providing evidence of the impact of research or as itself a form of impact? This editorial describes the curation of five commentaries resulting from the recent international conference 'Science in Public: Research, Practice, Impact'. The commentaries reveal the issues science communicators may face in implementing public engagement with science that has an impact; from planning and co-producing projects with impact in mind, to organising and operating activities which meet the needs of our publics, and finally measuring and evaluating the effects on scientists and publics in order to 'capture impact'.

Keywords

Public understanding of science and technology; Science communication: theory and models

Introduction

The current international research landscape is placing greater emphasis on deriving impact from research, itself perhaps a symptom of the drive to gain greater value for money from research funding [Wilsdon, 2015]. However, while the term has considerably infiltrated modern research culture, there is a notable lack of agreement on what the term 'impact' and its first cousin the 'impact agenda', actually mean. One of the definitions in the Oxford Dictionary (leaving aside the other, of 'forcible contact'), is that of having 'a marked effect or influence' [Oxford Dictionaries, 2015]. It seems this is loosely what the U.K. Research Councils (RCUK) means in its definition of impact in terms of 'the demonstrable contribution that excellent research makes to society and the economy' [RCUK, 2015]. This in turn is closely related to the definition created by the Higher Education Funding Council for England, the body that leads the Research Excellence Framework (REF) in the U.K., that impact is a measure of 'an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia' [HEFCE, 2014].

Yet, as described in a recent editorial in this journal [Weitkamp, 2015], impact has been largely interpreted by U.K. universities (as evidenced in the REF 2014) in terms of the low-hanging fruit; the changes, patents, and direct knowledge transfer which can be easily measured. In other words, it is about 'impact capture' [Watermeyer, 2012b]; counting measureable outputs, rather than some of the more

intangible benefits that might result from 'public engagement with science' (PES). So where does the focus on tangible outputs leave research and practice in science communication?

The rhetoric of PES has certainly kept up with the impact agenda, with responsible research and innovation (RRI) deemed to be exemplified by PES approaches; with governments, universities, and funders all urging scientists and engineers to undertake engagement as part of their role [Stilgoe, Lock and Wilsdon, 2014]. As used here, PES specifically describes mutual learning by an engaged public and engaged scientists with respect to the development and application of science and technology in modern society [McCallie et al., 2009]. While terms such as 'outreach' and 'science communication' are often used inter-changeably [Illingworth et al., 2015], the use of PES has become a 'buzzword' to denote a culture change in science [Bensaude Vincent, 2014], indicating that communication and participation are now considered to be integral elements of the scientific process [Burchell, Franklin and Holden, 2009]. Funders now require evidence of engagement as part of their grant conditions [Palmer and Schibeci, 2012], the RCUK has published a Concordat on engagement with research [RCUK, 2010], and the National Co-ordinating Centre for Public Engagement (NCCPE) encourages U.K. universities to sign their manifesto on engagement [National Co-ordinating Centre for Public Engagement, 2010].

However, this entwining of the concept of impact and the concept of PES has the potential to become problematic for researchers — should public engagement be regarded only as a mechanism for providing evidence of the impact of research or as itself a form of impact [Grand et al., 2015]? Weitkamp [2015] discussed the example of the Wellcome Trust's [Wellcome Trust, n.d.] identification of three reasons for exploring the impact of public engagement projects (instrumental, economic, or experimental); but should we question that all three of these reasons foreground the ability of engagement to measure, evaluate, and provide evidence of accountability? If engagement becomes more about evaluation and measurement than about altruism, mutual learning, and respect, then as Watermeyer [2012a, p. 120] argues, the potential long-term effect of the definition of impact posited by the REF could be to transform public engagement from an altruistic, publicly-focussed activity into the 'engine powering the conceptual, critical and methodological framings and motivations of impact'.

Despite changes in research culture and rhetoric, planning, funding and measuring impact from research remain elusive within the field of public engagement. Moving from the deficit model of dissemination (first order engagement) to a societal context of mutual learning (third order engagement) [Irwin, 2008] requires the development of new ways of measuring change over time, rather than just outputs from a single intervention. However, for individual practitioners, this presents some difficulties due to constraints in time, funding, and evaluative knowledge [King et al., 2015; Weitkamp, 2015].

This dilemma was the focus of the international conference 'Science in Public: Research, Practice, Impact', held at the Science Communication Unit at the University of the West of England, Bristol, U.K. in 2015. The conference brought together 80 researchers and practitioners for two days of intense discussion and debate in four workshops and 35 individual presentations. The conference covered a huge range of topics, including the power of storytelling in science

communication, evaluating and measuring the impact of research, identifying publics, communicating controversial issues, theatre and the performing arts, online communication, and informal communication through makerspaces and science cafes. Observing the breadth and depth of many of the presentations informed our thinking about the impact of PES, and this is what we set out to capture in this special issue of JCOM. The invited commentaries described below coherently pull together a narrative of impact; providing insight into the workings of researchers and practitioners as they plan, design, measure, and evaluate the impact of science communication activities.

Ships, clocks and stars: the quest for impact

Planning for research that has an impact plays an increasingly important role in funders' agendas, as shown by the 'Pathways to Impact' that all applicants for grants from the U.K. Research Councils are required to include in their applications. Katherine McAlpine's commentary is written from her personal perspective as a Public Engagement Officer on a long-term project that was a collaboration between a major U.K. university and an internationally-known museum. She explores two of the engagement strategies used in the project to consider how they served to disseminate the project's key messages.

Like all museum-based projects, *Ships, clocks and stars* needed to engage with a variety of audiences, from science enthusiasts and marine historians to family audiences. McAlpine discusses how starting from a viewpoint of the history of science can be a way to connect with multiple audiences who might not necessarily think of themselves as interested in science. She goes on to connect this with the importance of understanding the target audience at the very beginning of exhibition design, through a consideration of the potential conflict between audiences' demand for 'the human story' and historians' mistrust of the simple hero narrative and desire to communicate the full, and often complex, account of a technological development.

Beyond the dissemination of Earth Observation research: stakeholders' and users' involvement in project co-design

Further developing the impact planning process, Alba L'Astorina and colleagues present an Italian case-study on the involvement of stakeholders, exploring co-production implemented in the sector of Earth Observation downstream services at a regional level. The project ran from 2013 to 2015 and aspired to support the agricultural management sector of the Lombardy Region in Italy, as well as providing new business opportunities at regional and local level. Researchers and stakeholders worked together to co-design the project, and in this commentary, the authors explore its participative approach, as well as its impacts, benefits, and challenges.

In particular, L'Astorina and colleagues describe the challenges they faced, with three main barriers identified: behavioural (weakness of management support, conflicts with traditional agricultural methods), economic (prohibitive costs of technological innovations and asymmetry between costs and benefits) and institutional (low institutional support and a lack of regulatory framework). Their commentary draws to a close by outlining the importance of a long process of reciprocal listening and understanding between stakeholders and researchers.

Reflections on the 'impact-spheres' of (playful) deliberation processes in contexts of responsible research and innovation

Impact in the age of Responsible Research and Innovation (RRI) is explored by Marjoleine van der Meij, who considers whether science communicators need to think differently when committing to RRI, in particular how far we can have an impact on research and innovation processes. Van der Meij's interests lie in the designing of 'playful' tools for stakeholder and citizen deliberation and so she deliberately adopts a playful, epistolary approach to the format of her commentary. First, she asks how we can make visible the processes of science communication around controversial techno-scientific concepts, such as synthetic biology, and how deliberation and reflection can be coupled to action.

Van der Meij discusses whether we should eschew 'easy' impacts, such as raising awareness, in favour of more profound impacts on research and innovation practices, governance, institutions and society, or whether personal, micro-level impacts should be the most important impacts to aim for, especially since playful tools have the potential to make these micro-level impacts influential. She proposes a typology of 'impact spheres'; levels of impact that we might wish to aim for when designing science communication events. These impact spheres are designed to be flexible and responsive, capable of being interpreted to demonstrate impact on both academic and non-academic participants in events and capable of indicating the success — or otherwise — of playful deliberation.

Evaluating impact in the 21st century: using technology to narrow the gap between science communication research and practice

Whilst we can design and plan to enhance impact, at some point science communicators need to evaluate whether the outcomes of their projects match up to their original aims and objectives. In Eric Jensen's commentary, careful consideration is given to the issues practitioners face in funding, designing, and analysing science communication evaluation. He argues that the current relationship between research and practice is poor at best, with researchers not meeting the time-bound, fast-paced needs of practitioners to review and continuously improve interventions; while practitioners are employing second-rate anecdotal methods in search of positive reinforcement for their practice.

His commentary outlines the need for automated systems of rigorous measurement and feedback that enable practitioners to receive evaluated outcomes in real time. Social science research input is still needed to design the methodology, but once created, the technology does the rest. Two methods of feedback are described; a smartphone system called Qualia, and online automated surveys emailed to participants. While the possibilities for such systems are endless, Jensen also outlines their potential limitations — namely that this advanced technology may leave behind the digitally illiterate, or fail to reach those who can't afford access. A note of caution is also urged, in that to understand and reach a wide variety of audiences in science communication, enhanced quantitative measurements still need to be aligned with in-depth qualitative research. However, he argues that advances in evaluation techniques to bridge the gap between research and practice are urgently needed.

Moving beyond the seductive siren of reach: planning for the social and economic impacts emerging from school-university engagement with research

The thorny issue of assessing the effectiveness of public engagement is further explored by Richard Holliman and Gareth Davies. Through their work on school-university engagement, they explore the dichotomy of reaching a large audience in a short time (reach), versus longer-term in-depth relationships with fewer people (deep engagement). Within the context of the U.K. Research Councils' School University Partnership Initiatives (SUPI), they describe the challenge of moving time-deprived academic researchers beyond aiming for extensive reach, instead aiming for collaborative, smaller-scale projects which may have more impact on the individuals involved.

A key difficulty was the lack of a metric to assess the relative worth of each of these approaches. Holliman and Davies describe the process of developing a planning tool to assess the 'SUPI-hours' involved in each style of engagement. Through assessing the hours of development and contact involved, the tool indicates that one lecture reaching 237 pupils can be as effective as just one pupil engaged in a long-term research placement. While noting that qualitative research and expert judgements are also valuable for impact assessment, Holliman and Davies are hopeful that their tool will help researchers to justify time spent on public engagement to university leaders and funders, perhaps moving the impact agenda on from the 'seductive siren of reach'.

Conclusion

In presenting these commentaries, we aim to provide a reflection of the path through the impact agenda for science communicators. The commentaries reveal the issues we may face in implementing PES that has an impact; from planning and co-producing projects with impact in mind, to organising and operating activities which meet the needs of our publics, and finally measuring and evaluating the effects on scientists and publics in order to 'capture impact'. The various perspectives in the process highlight the complications faced in the PES field as practitioners and academics adapt to this new agenda; meeting a dual role of disseminating and engaging publics with the impacts of research, as well as delivering impact from our own projects.

While none of the commentaries provides a complete response to the issue of impact, taken as a whole, we hope they offer insights into insight into the evolving concept of the purposes and outcomes resulting from PES and science communication. Thoughtful planning, production, organisation, and evaluation of PES can only be a good thing, as practitioners and academics work towards projects that have greater impacts — with the word 'impact' intended here to reflect projects which have meaning for those involved, as well as the more nuanced definition of impact that meets policy-makers' and funders' requirements. Ultimately, these connections and insights between practitioners and academics should serve to drive our field forward, aiming to achieve long-term positive change for both publics and scientists.

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