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FROM 'POST TRUTH' TO E-PERSONS, CONTEMPORARY ISSUES IN SCIENCE COMMUNICATION

The changing face of expertise and the need for knowledge transfer

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Abstract

New public participatory modes of practice are emerging in fields as diverse as politics, healthcare and research. In part, these DIY and citizen-led initiatives have gained momentum from the optimism of new technologies, which allow unprecedented access to previously inaccessible knowledge and tools. Equally, they are the result of a growing frustration with power hierarchies and systems that reinforce elites. Experts are increasingly regarded with suspicion as trust in public institutions is eroded and individuals begin to give more weight to personal accounts, and information shared within networks of peers. In this climate there is a critical need for improved knowledge transfer practices based on improved empathy, understanding and communication of shared values and motivations. In this session we questioned the role of expertise in a changing landscape of knowledge production and practice. Using the lens of science & technology communication and hands-on DIY practices, we explored how to move towards a more inclusive model of knowledge transfer, where different types of expertise are acknowledged and valued.

Keywords

Citizen science; Participation and science governance; Public perception of science and technology

What is knowledge transfer and why the need for it?

Practices that encourage the exchange of ideas, skills and expertise.

A shift in the knowledge and influence economy to include more diverse viewpoints is emerging. Much has been written about the frustration of the public with elites, and populist movements worldwide have started to question the facts presented by "experts" and institutions. Such trends can be seen as a natural manifestation of more deep-rooted issues such as the erosion of trust in the systems that determine the power balance in society.

Some of the new contenders for the role of creators of knowledge — within and outside of academia — are the increasingly prominent citizen science, DIY science

and environmental civic activism movements. Scholars [e.g. Haklay (Muki), 2013; Irwin, 2014; Powell, 2016; Tanenbaum et al., 2013] and practitioners alike [e.g. Dougherty, 2013; Morozov, 2014; Ratto and Boler, 2014; Wylie et al., 2014] have begun to discuss, often divergently, how these new disruptive forces, which speak to the "democratisation of science", will contribute to and contest the knowledge economy of the established scientific elites and whether they risk diluting the quality of the discussion.

During such contested times knowledge transfer brokers can help to mediate the discussions between different sectors and also across geographical boundaries. Knowledge transfer includes the range of practices that lead to effective exchange of ideas, skills and expertise to inform further action, processes or decision making. Knowledge exchange practitioners range from science communicators and strategic consultants to specialists in public dialogues and engagement within institutions. These individuals tend to move between disciplines and help to translate and buffer between groups and bring different perspectives into the arena.

At the latest Science in Public (SiP) conference, five individuals from different disciplinary backgrounds came together in a panel on 'the changing face of expertise' to provoke new discussions around the subject of expertise and knowledge transfer by identifying some of the principal issues that are leading to non-exchange and describing new approaches and culture changes that can help to resolve them. How can we demonstrate the value of expertise and evidence-based approaches in decision making while also giving due consideration to, and encouraging a deeper engagement with, new viewpoints and hands-on approaches?

The nature of non-exchange

Erosion of trust in expertise is in part the result of the traditional power balance between institutions and individuals in relation to topics within science & technology. The perceived inevitability of new technology and the disempowerment of not having a chance to be involved in the conversations around these issues and how they are addressed can breed frustration [Lave, 2015; Morozov, 2014; Ravetz, 2006; Wynne, 2007]. This is particularly true when the issue in question has direct personal relevance such as parents with children affected by autism.

New media, such as social media platforms can have negative implications for effective exchange [McChesney, 2013; Saltelli, Ravetz and Funtowicz, 2016]. On the one hand, they present the opportunity to connect with a greater number of different people worldwide which can help to diversify conversations and action [Crowley, 2013; Hargreaves and Hartley, 2016]. The other side of this is their role in exacerbating societal divides by giving rise to self-created echo chambers that allow us to minimise our exposure to contrary viewpoints while amplifying those of like-minded individuals.

"Pace of innovation" is cited as a top fear that drives distrust in institutions in the Edelman Trust Barometer.[1] Too often we return to the deficit model of public engagement with science, where the expectation is that once the public are

[1] https://www.edelman.com/trust2017/.

"educated" they will agree with the experts [Wynne, 2008] — a position which only asks 'what forms of 'expertise' can publics be deemed to have? Wynne [2008] argues that this position takes for granted the definition of science and the normative constructions of publics. Subsequently, there is no room for the public to help direct the efforts of science, which adds to the sensation of disempowerment and frustration with the system. Another aspect is related to issues of scepticism towards the motivations behind the assurances of powerful (and possibly "corrupt") elites and uncertainty regarding the equal distribution of promised benefits of science and technology across all of society. [Lave, 2012; Williams et al., 2017].

In tandem, a false assurance of our own expertise, recently christened "The Knowledge Illusion",[2] results in a heavier weighting of our own viewpoints in comparison to others. Psychology research on decision making has long pointed to the tendency of individuals to seek evidence that reinforces their own point of view while discounting sources of alternative viewpoints, in a phenomena known as confirmation bias. In very real terms this translates into members of the public reporting that they consider personal experiences and accounts to be as convincing as inferences from data and statistics conveyed by experts.[3]

The blame for non-exchange and ineffective communication is sometimes laid directly at the feet of individual scientists and academic institutions. It can be argued that like other non-private entities, the scientific establishment has a responsibility towards accountability and transparency, as much research is funded by the public purse. And yet, communication practices can often break down or appear tokenistic if they are mediated by either individuals without training or interest in public engagement or those skilled in outreach but without a keen understanding of the underlying science.

The exchange between policy makers and scientists is a vital example of knowledge transfer that can drive more evidence-based decision making. Mechanisms of scientific advice to policy makers are growing in prominence and yet the academics invited to fill these advisory roles have been criticised for their lack of diversity and failure to recognise other valuable sources of knowledge.[4] Thus, even within the scientific establishments, the prerogative to contribute to advisory mechanisms and communicate outside the field can be confined to a select elite. In addition, the association with politics can be damaging to scientists in the eyes of the general public and may result in a reluctance to engage with and trust in the assurances of experts — a concern shared by all perspectives in our panel at SiP.

Opportunities for better exchange

Defining the terms, platforms, rules for discourse to take place and getting everyone to subscribe to them is difficult. Movements to reclaim access to scientific methods and knowledge for the public realm may be seen as widening the gap between society and expertise, a natural product of the frustrations of citizens who feel let down by institutions and the systems that maintain their power. On the other hand, they are also opening up new platforms and formats to allow for productive exchanges to help ease some of the tensions [Hargreaves and Hartley, 2016; Ratto and Boler, 2014; Wylie et al., 2014].

[2] https://www.panmacmillan.com/authors/steven-sloman/the-knowledge-illusion.
[3] https://www.edelman.com/trust2017/.
[4] http://www.ingsa.org/wp-content/uploads/2016/11/GYA_JRC_INGSA_Workshop_2016.pdf.

The Public Laboratory for Open technology and Science (Public Lab) in the US and the Waag Society in Amsterdam are two of the many organisations emerging worldwide that promote the concept of "post-normal science" (as described by Funtowicz and Ravetz [2003]), where science is brought into the public realm through practices of DIY environmental monitoring and DIY biology. Public Lab is "committed to reimagining the research/participant model as a place where people can collectively learn, build, and create together in a way that recognizes expertise within each individual, whether it be in a scientific field, as community organizer, or environmental educator" and they do this by building a community that creates accessible, low cost civically engaged monitoring methods and focusing their efforts around community science and data advocacy [Public Laboratory, 2013]. The four guiding principles of the activities hosted by the Waag Society are autonomy, equality, freedom and agency. As well as hands-on sharing of research methods and techniques, they have created spaces for their users to be involved in ethical discussions about the legitimacy of scientific innovations such as the CRISPR toolkit[5] prior to making use of them.

There is value in grounding these debates in the public sphere within contexts where individuals have access to the tools themselves. This echoes the success stories of collaboration between trained scientists, technical specialists and individuals on citizen science endeavours. The addition of a personal or localised relevance can help identify values and motivations or at least develop an empathy and respect for one another's viewpoints, which seems a necessary step to yield effective knowledge transfer. Importantly, the value of these exchanges is not merely one-way.

Earlier this year, Emma Johnston rallied the wider scientific community to rise up and accept the challenge of voicing their expertise in public in order to help everyone else navigate "the cacophony" of information crowding our lives [Johnston, 2017]. She conceded that communication is key in this respect and that more scientists need to become adept at reaching new publics with their message. Professionalisation of science communication, ensuring that practitioners have both the scientific understanding to avoid media sensationalism and the true interest in connecting with the public can help rebuild trust with experts by revealing the people behind the institutions. Skilled science communication does not set out to transform the public into experts, rather it focuses on improving and increasing the ability of both sides to understand each other. It is unfair to expect all scientists to naturally possess this skill, so using a two-way communication approach can help to overcome difficulties on both sides. The value of this interaction is felt by scientists as much as the public, often due to the real-world contextualisation for their work.

Learning to talk to companies and citizens based on the values and motivations that they share is an approach that has been successfully undertaken by the Scottish Environmental Protection Agency (SEPA) as part of their One Planet Prosperity agenda.[6] Specifically, by focussing on an economic argument and the importance of customer perception, SEPA have worked with the whiskey industry to improve sustainability practices throughout the industry's supply and distribution chains. Equally, SEPA has been leading in recognising the value of citizen contributions to

[5] http://www.the-odin.com/diy-crispr-kit/.
[6] https://www.sepa.org.uk/media/219427/one-planet-prosperity-our-regulatory-strategy.pdf.

monitoring schemes, which can complement the traditional in-house expertise of ecologists and environmental scientists. Results from the UK's voluntary Rain Gauge Network which includes monitoring by amateurs, is used by the agency to verify their own models for accuracy. The long history of such citizen-led environmental monitoring practices may hold valuable lessons of how to build synergistic collaborations between institutions and society for the fields where citizen and DIY science is newly emerging.

Through these examples we can see that effective knowledge transfer results from all actors having a stake in the outcome and a power dynamic that accommodates the potential for a meaningful contribution from all sides. Developing an understanding and empathy for each other's perspectives as well as limitations is an important starting point. The concept of Responsible Research and Innovation (RRI) is an attempt to promote and embed these values across academia and industry (see rri-tools.eu). Born out of the recognition that the science establishment needs to be brought closer to society, it can be seen as the natural result of several high-profile negative public reactions towards issues such as vaccination and genetically modified organisms (GMOs). Such cases initially drove many in the academic community towards a defensive stance that only perpetuated the post-fact condescension typically found in public dialogue exercises. RRI dialogues have attempted to create a more equal and empowered exchange by promoting the importance of public dialogues throughout the research process, from agenda setting of research funding to the decisions related to how research findings are translated into a real world context. This inclusive approach causes a shift in the power balance between institutions and the public, and can help to rebuild mutual trust.

Conclusions

As society struggles with issues of trust between institutions and the public, the challenge to expertise can be interpreted as a call for more effective communication and new approaches; ones that allow for the exchange of ideas and disrupt the traditional deficit model of elites "educating the public". Trained science communication professionals can help to determine the most effective means of exchange between different actors and the democratisation of access, leading to more effective communication and mutual understanding. This does not take away the need for expertise, on the contrary — it can help build appreciation for and demonstrate the value of expertise on both sides, whether this is local knowledge carried by ordinary citizens or a peek beyond the walls of the ivory towers.

Increasing the accessibility and opportunities for members of the public to engage more deeply with the scientific endeavour through citizen science and DIY practices can also be vital in driving a more equal debate on issues where the latest research has a valuable contribution to make in terms of the challenges facing our societies globally, such as climate change and disease outbreaks.

Increasingly, traditional institutions are starting to realise the value of such practices. We see this through participatory democracy schemes promoted by policy makers,[7] health services and pharmaceutical industries move towards

[7] https://idee.paris.fr/; https://unhabitat.org/; https://ec.europa.eu/info/consultations/public-consultation-european-citizens-initiative_en.

patient-driven healthcare,[8] regulatory agencies involving citizens in their monitoring efforts and even young academic fellowships questioning the lack of diversity in those who are recognised as knowledge creators.[9]

Knowledge transfer practices can be seen as a step-by-step move toward creating shared lexicon (what we're talking about), shared meanings (values and empathy), and shared interests (motivations and respect) [Carlile, 2004]. The value of knowledge brokers is in creating spaces for exchange, co-developing prototypes and establishing an adequate common knowledge as a political process of negotiating and defining common interests. This process moves towards ownership over co-creation of knowledge and meaning and aims for a positive 'changing face of expertise'.

This commentary is based on a panel held at the 2017 'Science in Public' conference in Sheffield. The panel aimed at discussing the non-exchange between actors and value of expertise in the changing landscape of knowledge production and practice, where facts are constantly questioned, values in dispute, and decisions urgent. The panel brought together five different stakeholder perspectives: the DIYbio community — represented by Pieter van Boheemen, from the Waag Society and member of the European DIYbio community; the government agency — represented by Johan Schutten from the Scottish Environmental Protection Agency; the policy connection — represented by Hilary Sutcliffe of Society Inside; academia — represented by Prof Harry Collins, from Cardiff University; science communication — represented by Stephan van Duin, an entrepreneur and biologist turned science communicator at The Online Scientist. This panel was convened by Cindy Regalado from University College London and Aleks Berditchevskaia of Tekiu Ltd as part of the EU-funded Horizon 2020 project 'Do It Together science'. Tekiu is a knowledge transfer company passionate about creating opportunities for policy and decision makers to engage in communal experiences and develop a positive group dynamic around knowledge sharing. Tekiu takes mixed delegations to international locations where they meet with their counterparts and organisations that are pushing the boundaries of innovation within a particular policy topic.

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[8] https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/pharma-and-the-connected-patient.html;
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[9] http://www.ingsa.org/wp-content/uploads/2016/11/GYA_JRC_INGSA_Workshop_2016.pdf.

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