Facilitating creativity in art-science. A methodological experiment

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Abstract: In this paper we bring together thoughts and experiences of employing facilitation towards creative emancipation in art-science based on our experiences of working on an art-science project. We suggest that this space is a trading zone in which novel links and relationships can be created. We introduce the notion of 'boundary method' to describe facilitation as a method that can endure different meaning-making and meanings by stakeholders yet retain its instrumental form of encouraging creativity at a cross-disciplinary interface rather than within a dominant discipline.

Keywords: Art-science, boundary method, community of practice, emancipation, facilitation

Hybrid spaces and outcomes

The art-science interface can provide a level playing field for stakeholders, helping to emancipate participants somewhat from the expectations and restrictions of their respective disciplines. In this paper we discuss project facilitation as a methodological approach that fosters creative collaboration – facilitation as a moment of what has been termed the 'third space' [1] between the domains of sciences and arts. For us, the aim here is equal stakeholdership.

Whilst arts and sciences have a long mutual genealogy, one tends to be instrumentalised by the other: the arts may appropriate scientific ideas and methods, the sciences may use artists and artistic approaches to communicate science. Our question has been how – if at all – art and science stakeholders can step outside their disciplinary frameworks to create new ideas based on equal contributions. Encouraged by some examples of art and science working together in developing creative epistemological and ontological ideas [2][3], and influenced by primarily British and European science policy debates around science in and for society, we suggest that there is potential for art-science and its practitioners in taking an epistemologically and ontologically active role [4]. Furthermore, we argue that this role can be fostered through active work by facilitators. Facilitation we understand as a boundary method that operates as a trading zones of 'interactional expertise' [5], encouraging stakeholders to engage with each other and new ideas. The notion of the boundary method borrows from Star and Giesemer's 'boundary object' [6]. Whilst the latter describes any material object that does not change its shape but changes its meaning for its diverse user communities, the former focuses on processes of translation and interpretation – that can help cross borders between different knowledges and practices. Using facilitation, the aim is to develop (a sense of) a community of practice [7] to encourage learning, and inform and

develop the practice of its members. This can be an extradisciplinary space that is focused on a problem. Extradisciplinarity refers to practices that take place outside individual disciplines, yet can feedback new ideas into disciplinary practice. In this paper, we focus on the problem-led process of facilitation in fostering a community of practice at the art-science interface.

In doing so, we have been influenced by science policy debate, specifically in the United Kingdom (UK). Here, a relatively rich funding landscape has encouraged collaborations at some parts of the art-science interface, with research intermediaries such as the Wellcome Trust and the Engineering and Physical Sciences Research Council providing sponsorship. The growing opportunities for artists and scientists to mutually and critically engage with each other are in part owed to an expectation of greater accountability of both publicly funded science and consumer-oriented technology development to public and policy stakeholders. Note, for example, increasing requirements by funders such as the Wellcome Trust and the Research Councils UK for their grant applicants to justify sponsorship in terms of what has widely been termed 'impact', and the increasingly creative ways in which those research intermediaries themselves, as well as researchers, can respond to public impact agendas by producing different impact regimes, measurements and discourses. Beyond this logic of accountability, however, a critical and challenging rationale for art-science has emerged. In the context of risk and uncertainty discourses [8] [9] and, increasingly so, in debates around responsible and societally relevant innovation [10], public engagement and art-science provide novel modes of exploring the ends and means, the societal understanding and role of science and technology, and of demonstrating responsibility and societal impact of research and its funding [11].

Creativity from interacting methods

Art-science research can aspire to constitute a mutual exchange and co-production of methodological insights. It suggests a form of hybridity that draws on logics of mobility and transformation. If we perceive the art-science interface as an experimental space – with methodology, collaboration and outcomes – then its projects can provide a meeting point for different epistemic cultures such as they exist in the various disciplines of arts, humanities and social sciences, sciences and engineering, and in the public domain. The art-science interface can operate as protected space for the extradisciplinary interaction between these fields: the production of knowledge outside of the disciplines yet (critically) drawing on, and feeding back into them. O'Riordan suggests 'there are some conditions under which art projects do operate as a kind of interstice' [1]. The case made here is about art engaging with biology, opening up the aims and processes of the bioeconomy by critically challenging some of its discourses and practices. O'Riordan aims to mobilize an understanding of art-science as a 'third space' – a space that encourages re-thinking of dominant economies (their values and norms, methodologies and frameworks), but arguably also of epistemic cultures [12]. With a focus on interaction, on the interface nature of the field, and more importantly on the contribution the field can make to the involved disciplines and epistemic cultures, we follow Barry and colleagues' suggestion that cross-disciplinary work [13] does not have to be a synthesis of disciplinary knowledges, or a response to a perceived lack of knowledge, but can also be a critical reflection of existing knowledges and their limitations. They term this mode 'agonistic-antagonistic', 'intended to effect more radical shifts in knowledge practice, shifts that are at once epistemic and ontological' [14].

Whilst we do not expect any radical shifts, we aim to develop a basic framework for the fostering of interaction between scientific and non-scientific epistemologies and their practices, an interaction that emancipates from respective stakeholders' disciplinary restraints whilst drawing on their knowledges and competencies, and that through this emancipation

enables a freely creative engagement at the art-science interface. As Hilary Rose suggests in her programme for a feminist epistemology for the natural sciences, to bring together different methodologies in the process of knowledge production means to counteract processes of losing the sense of materiality and actuality [15], and the interactions of scientific work with social norms and values, and its impact on society beyond the laboratory. For the purpose of this paper, Rose's programme is interesting in providing a parallel to the emancipatory work the art-science interface offers. Stakeholders in cross-disciplinary engagement at the art-science interface are asked to reflect on social identities and relationships in interacting with collaborators, to problematize the specific efforts and values of knowledge production situated in both cultures. This can mean two things. First, Rose refers to avoiding the 'renaturalisation' of the labour of those involved. For art-science interactions this means ensuring that the work of artists working with scientists and on science-related issues, and of scientists keen to engage with art-science, is not taken for granted, or seen as something intrinsically artistic or scientific, but rather as being at the interface of both. Significantly, their work and roles need to be emancipated: the artist is not simply responding to the science, and the scientist is not only providing scientific knowledge. Second, and related to the first, the manual and mental labour of art-science is built on and aims at establishing relationships, between knowledge, people and locations as well as things. For scientists this could mean engaging with the personal perspective and social implications of their work, with the practice of making meaning from knowledge. For artists this could mean engaging with the materiality of scientific knowledge – often forgotten in ubiquitous analogies relating DNA to a 'code' or the 'book of life' – and with the social and cultural aspects of both cultures, the use of innovative metaphors, and the genesis of scientific 'facts.'

Rose's programme not only encourages the agonistic-antagonistic mode of knowledge production. It also reflects on the problematic of art-science as a third space emerging in

practice [16]. The art-science field as an epistemic and ontological programme, particularly its aim to move beyond the logics of accountability and legitimation as well as innovation, is faced with an issue that Jean-Paul Fourmentraux has pointed out for the interface between art, science and industry: 'the interdisciplinary hybrid known as "research and creation" lacks a stable identity' [17]. Art-science collaborations are mobile and temporal, usually project-based, comparable with 'boundary organisations' [18][19] that emerge out of a need and problem at an interface, and may eclipse their requirement. Fourmentraux's notion of 'research and creation' is valuable in conceptualising the effort of re-imagining art-science as a mobile interface based on experimenting towards changing the relationship between its objects and their audiences; between the stakeholders at that interface; but also in the experimentation and research of methods as meeting points. These meeting points can be conceptualised as (temporary) communities of practice [7]:

1. As a domain of shared and/or overlapping identities and interests – rendering art-science engagements an extradisciplinary and professional interface, informing the cultures of art and science and improving output;
2. As a community arising out of interaction in joint learning and generating new ideas and insights, and a sense of mutual responsibility contributing to communal identity building;
3. As a shared repertoire of practices.

We suggest understanding the art-science interface as an experimental setting for testing and developing methods. Disciplines of both epistemic cultures draw on a range of comparable techniques and values that have general methodological aspects in common: research into the investigated subject, established frameworks (or schools) of technique and technologies, experimentality, rigour, peer-review, emphasis on originality, aesthetics, and claims to interpretations of reality. Both fields mobilise disciplinary frameworks, and have professional standards. Bulwer-Lytton's suggestion that 'art and science have their meeting point in

method' is also reflected in suggestions that aesthetic values can be part of physical science and mathematical theory [20][21].

Facilitating art-science collaborations – lessons learnt

In 2012 we ran an art-science pilot project that brought together a small number of practitioners across different artistic and scientific disciplines with the aim of producing creative outcomes loosely inspired by or connected to genetics and genomics. The aims of this pilot were to identify how to effectively develop a sense of an art-science community of practice and enable future practitioners. The project paired six participants and required them to create something over the course of nine months – two scientists were paired with two artist-practitioners (one of whom was Goldschmidt who is an ex-scientist but not an expert in this field), and the third pair consisted of two artists from different disciplines (poetry and photography).

It seemed inevitable at the time that the science would be seen as the starting point because that was the most visible focus and content within the institutional context of the ESRC Genomics Forum (now defunct), and in the context of the funders' interests in making genomics publicly more accessible. Participants from the arts expressed feeling a disadvantage in not being 'experts' in this scientific discipline. In response, facilitation between the science and the artistic approaches and between participants emerged as a vital method. The two facilitators (one was Goldschmidt) tried to shift the interests of the group into a deliberately wider territory by fostering a discussion bounded by quotes about artistic and scientific practice from a wide range of artists, musicians, philosophers and scientists. This discussion had the benefit of allowing all the participants to identify their own interests and (indirectly) their expertises, and visibly supported them in feeling that they were participating in a more level playing field. It was interesting that the artists' use of and interest

in technology (such as photography) helped them to establish common ground with the scientists and allow a 'way in'. Three key learning points emerged. First, facilitation is vital. Particularly in the first phase of the engagement, the practitioners look to the facilitators to identify and determine the boundaries of a complex, multi-dimensional space. The facilitators in this pilot tried to convey the fact that they considered the boundaries to be permeable and flexible, and after a period of time of discussing and working together it became clear that the practitioners had gained confidence in setting their own boundaries and areas of interest. Second, initial acknowledgment of practitioners' professional achievements and interests is important; if we imagine each practitioner's work in this type of project as a journey through this multi-dimensional bounded space, then it is helpful to allow practitioners to identify for themselves their starting points, usually based around their own expertise, in this space. Third, it takes time to establish trust between practitioners. This seems obvious but projects which are goal-oriented and funded by organisations keen to see visible outputs may not have enough time built in with no purpose other than to create good working relationships. We used informal 'play' with physical objects such as fridge magnets, plastecine and coloured pencils to help break down barriers between practitioners, and allow them to generate ideas. Whilst we expected that participants may find this, indeed, 'child's play', the contrary became apparent: scientists quickly associated these approaches with their own practice of presenting research ideas. Identifying a project as being ostensibly 'about' or 'inspired by' a scientific subject (in this case genetics) creates tension about the resulting 'accuracy' of the outputs. And when their professional reputation relies on accuracy, scientists find it hard to let go. In this project it was found helpful to remind participants that its aim was not to narrate or communicate science, but to create something inspired by a scientific issue.

One of the aims of this pilot was to see if the scientists were willing to work alongside the artists and jointly produce a creative output. This happened in one of the partnerships, where

the artist visited the scientist in her lab and then wrote a poem, which the scientist decided to illustrate using visual images from her work. It is easy to see the genetics as the starting point of this pilot, as in the more traditional model of art-science collaborations. But there is another way of looking at what happened in this pilot – not just through the content but also through the process. Were the scientists able to do something different to their usual 'scientific' processes? To answer the question fully would require a proper consideration of what their daily scientific work actually entails but enriching a poem using scientific metaphors and images may be a step away from the scientific process, or it may be considered essentially similar to conveying ideas in a paper. More generally, an attempt to move art-sci projects into a more 'symmetrical' space will need to start by identifying exactly what is entailed in the practices of the relevant sciences and arts.

Some of the key challenges of cross-disciplinary projects relate to the nature of the collaboration and the identification of the relevant tasks, such as agenda-setting, communication, and social interaction. Participants may find it difficult to understand – or even communicate – each other's skills outside their disciplinary frameworks and may find it necessary to remind each other of their qualifications. Scientists can feel that their work and research programme may be undermined or criticised through the process of opening it up to outsiders. Facilitation can ensure that the communication between collaborators commences and continues. The facilitator opens up space to exchange and explore via the use of various imagery, tactile work (for example in reproducing metaphors and images as well as practices by using materials) and the play with words, their meaning, and their relationship to the scientific issue. Simultaneously, the facilitator sets broad boundaries to the 'problem' to be addressed by the collaborators who will look to the facilitator for indication that what they are doing is within the terms of engagement. Facilitation thus aims to aid understanding of the different methodologies and experiences at the interface. Furthermore, facilitator can foster an

environment in which the competencies and knowledges of participants are respected and equally involved in the engagement process. There is a certain amount of pressure on the facilitator in framing the problem yet the facilitation process needs to encourage and prepare space for discussing a subject matter arising out of science and technology in mixed contexts, that is, not purely as a scientific issue to be responded to in artistic ways but also as an opportunity for the scientist to re-think scientific work 'outside the laboratory.' It is critical for the engagement process, as well as outputs, to ensure that the scientific content does not solely drive the engagement, and that the scientists are involved in the intellectual and physical production of art-science methodology and outputs. How, for example, might a scientist respond to a creative piece of writing about science, and in turn create herself a piece of literary text, painting, sound, sculpture etc.? Or could participating in the art-science process influence scientific practices? [2] Similarly, for the artist the interaction offers choices about exploring different methodologies and metaphors. All of the above points require the facilitator to acknowledge, and indeed problematize, the inherent power asymmetries in art-science collaboration. Initially, an artist might have more control over the output generation whilst the scientist has a stronger notion and understanding of the scientific subject. As the facilitation programme of the art-science interaction encourages collaborators to challenge and develop views, the asymmetries shift. Eventually, a vital issue is that of impact of collaborative work. This work needs to be made visible not only to the collaborators as publics of each other, but also to wider audiences. The framing of the work changes its reception, be that to the collaborators, other practitioners and scientists, funders and the wider publics. The subject matter of the engagement has a considerable role to play in developing facilitation at the art-science interface.

Concluding remarks

Technoscientific practices and discourses spanning science and society provide a rich subject matter for art-science interaction. Similarly, facilitation provides an opportunity for testing personal and professional tools and processes for their suitability to the interaction, its aims and audiences. Participants act as each other's audiences of the interactional processes in their experimenting and introducing ideas and methods. An obvious question this raises is why any scientist should be interested in such an engagement, particularly when illustrative modes of art-science seem to serve science well? Whilst two structural drivers may encourage commitment in art-science projects – that of funding for artists, and that of impact demonstration by scientists – interest in shared problems and the cross-disciplinary experience play a significant role in such engagements. Both the interest in exploring a scientific concern from a different perspective and broadening the scope of established methodological approaches and metaphors can be drivers for the involvement of scientists and artists alike. Researchers whose practice brings them in contact with other disciplines and methodologies within and outside their field may find it more interesting and 'easier' to engage at another interface, that of art-science. Developing cross-epistemic engagement and outcomes and outputs requires individual investment. The interest and belief in collaborating with different, and likely unfamiliar, epistemic cultures form part of the basis for actual cross-disciplinary practice and knowledge production, to challenge existing cognitive and affective boundaries and constructs.

We have discussed facilitation as an opportunity to emancipate participants from their disciplinary constraints in collaborating creatively at the art-science interface. Our view is practice-informed and influenced by the normative ambition of encouraging and affirming the equality of role and commitment from the sciences and the arts whilst aspiring to encourage collaborative work that can inspire. The art-science interface conceptualised here is constituted in the facilitated creative process, encouraging mutual recognition and an open

mind to the process and potential output. This facilitation process offers a 'third space' emerging in interaction that can and should aim to open up existing economies of practice, of value, and of thought. Facilitation as a boundary method refocuses on the individual scientist and artist as collaborators who have yet to explore each other's position towards a subject matter, negotiating subject, process, techniques and agenda of the boundary-crossing project.

Acknowledgments

This paper was inspired by a pilot project funded by a Knowledge Transfer grant from Edinburgh University [Grant #G79007] and Creative Scotland. We thank Lisa Matthews for her contributions to the project, and all our participants. Thanks also go to the reviewers of an earlier version of this paper.

References

[1] O'Riordan K (2010) *The Genome Incorporated: Constructing Biodigital Identity*, London: Ashgate, chapter on *Imaginative Incorporation: Art and Genomics*.

[2] Webster S (2005) Science and society: Art and science collaborations in the United Kingdom, *Nature Reviews Immunology* 5(12): 965-969.

[3] M'charek, A (2014) Race, time and folded objects: The HeLa error, Theory, Culture and Society DOI: 10.1177/0263276413501704.

[4] Born G and Barry A (2010) Art-science: From public understanding to public experiment, *Journal of Cultural Economy* 3(1): 103-119.

[5] Collins H, Evans R and Gorman M (2007) Trading zones and interactional expertise, *Studies In History and Philosophy of Science Part A* 38(4): 657-66.

[6] Star SL and Griesemer JR (1989) Institutional ecology, 'translations' and boundary objects: Amateurs and professionals at Berkeley's Museum of Vertebrate Zoology, 1907-39, *Social Studies of Science* 19(3): 387-420.

[7] Wenger E (1998) *Communities of Practice: Learning, Meaning, and Identity*, Cambridge University Press.

[8] Beck U (1998) *World Risk Society*, Cambridge: Polity Press.

[9] Power M (1997) *The Audit Society: Rituals of Verification*, Oxford University Press.

[10] Owen R and Goldberg N (2011) Responsible innovation: A pilot study with the U.K. Engineering and Physical Sciences Research Council, *Risk Analysis* 30(11): 1699-1707.

[11] Kearnes M and Wienroth M (2011) Tools of the trade: UK research intermediaries in science policy practice, *Minerva* 49(2): 153-174.

[12] Knorr Cetina K (1999) *Epistemic Cultures: How the Sciences Make Knowledge*, Cambridge, MA: Harvard University Press.

[13] Cross-disciplinary work is not based in any one discipline but conducted across disciplinary and epistemic boundaries in various modes, see for thoughts on relating various forms of disciplinarity: Wienroth M (2009) 'Disciplinarity and research identity in Nanoscale Science and Technologies', in: Ach JS and Weidemann C (eds.) Size Matters. Nanobiotechnology and Nano-Medicine: Ethical, Legal and Social Aspects, Berlin: Lit, 157–177.

[14] Barry A, Born G and Weszkalnys G (2008) Logics of interdisciplinarity, *Economy and Society,* 37: 20-49.

[15] Rose H (1983) Hand, brain, and heart: A feminist epistemology for the natural sciences, *Signs: Journal of Women in Culture and Society* 9(1): 73-90.

[16] Vesna V (2001) Toward a third culture: Being in between (art and technology), *Leonardo* 34(2): 121-125.

[17] Fourmentraux JP (2007) Governing artistic innovation: An interface among art, science and industry, *Leonardo* 40(5): 489-492.

[18] Hellström T, Jacob M and Wenneberg SB (2003) The discipline of post-academic science: Reconstructing the paradigmatic foundations of a virtual research institute, *Science and Public Policy* 30(4): 251-260.

[19] Guston D (2001) Boundary organizations in environmental policy and science: an introduction, *Science, Technology, and Human Values* 26(4): 87-112.

[20] Chandrasekhar S (1987) *Truth and Beauty: Aesthetics and Motivations in Science*, The University of Chicago Press.

[21] Hardy GH (1967 [1940]) A Mathematician's Apology, Cambridge University Press.

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