Synthetic Biology Dialogue – Impacts

Introduction

As investors in research, BBSRC and EPSRC take seriously our responsibilities to invest public money in an appropriate, thoughtful and accountable way. In summer 2009 two Research Councils, BBSRC and EPSRC, commissioned the Synthetic Biology Dialogue[1]. We recognised that synthetic biology has enormous potential to address some of the major challenges facing society but also know that it is important to consider the social context in which the research is done, and the society in which the research hopes to find application. The dialogue aimed to begin a discussion to explore people's hopes, concerns and aspirations around synthetic biology.

In summer 2010 a report of this Dialogue was published, bringing together the thoughts of members of the public and of people with a professional interest in the field. In November 2010 the Chief Executive Officers of BBSRC and EPSRC responded in a letter[2] to the positive points the report highlighted and the concerns it raised.

This document is an update to that original response letter illustrating how the Synthetic Biology Dialogue has, as described in the original response, been 'a platform for ongoing discussions'. It illustrates many of the ways in which the dialogue has been influential both within, and beyond, the Research Councils.

Key findings from the dialogue

Some of the findings from the Dialogue relate directly to synthetic biology; people were excited by its potential, but they also found the technology scary and were concerned about the suitability of current regulations to cope with this new field and about the wider impacts of the technology. However, people's interest went beyond the outcomes of the science and encompassed the process of science and scientists' motivations. Many of the dialogue findings can therefore be applied not just to synthetic biology but also to research more widely. This was reflected in the response that the Research Councils made in 2010 and has continued to inform activities since.

Impacts of the dialogue

The original Research Council response was divided into five categories and these are used again here to describe a selection of the actions taken arising from the dialogue and examples of where the findings have influenced other activities.

As the two Research Councils that have led dialogue around synthetic biology, BBSRC and EPSRC have continued to work together on these issues and have involved other Councils, including the Economic and Social Research Council and the Arts and Humanities Research Council, and organisations outside of the Research Councils family, the Technology Strategy Board and the Department for Business, Innovation and Skills.

1) Disseminating the report's messages

After the launch of the dialogue report in June 2010 copies of the report were circulated widely to those involved with the dialogue as stakeholders and participants, as well as other interested groups and individuals. Further, a user-friendly summary of the report was produced and both

[1] The Synthetic Biology Dialogue was a stakeholder and public consultation exercise commissioned by the Biotechnology and Biological Sciences Research Council (BBSRC) and the Engineering and Physical Sciences Research Council (EPSRC) with support from Sciencewise-ERC, it was carried out by TNS-BMRB and independently evaluated by Laura Grant Associates. Details here: http://www.bbsrc.ac.uk/documents/synthbio-dialogue-response-letter-pdf/

[2]

reports continue to be distributed in hard copy and accessed online[3]. The evaluation of the Dialogue was published online in April 2011 and again, continues to be accessed[4].

The report findings have also been disseminated and discussed in person in the UK and internationally, for example:

- Parliamentary and Scientific Committee, December 2010.
- Department for Business, Innovation and Skills, October 2010, specifically to consider how the concerns and hopes for regulation might be addressed and taken forward. Letters have since been exchanged between Professor David Delpy and Professor John Beddington, (the Government's Chief Scientific Adviser at the time).
- 6 Academies Symposium, China, October 2011
- European Commission, Brussels, 2011 and the Hague, 2012
- ERASynBio First Strategic Conference, Switzerland, 2013

In addition, BBSRC is careful to reference the Dialogue in appropriate synthetic biology-related news stories[5] and features such as 'Biology by design' that highlighted the work of some of the leading synthetic biology researchers in the UK[6].

2) Incorporating the report's messages into our ways of working

The dialogue highlighted that research funders and researchers themselves should consider the social context in which research is done. In our original response we committed to supporting researchers to consider their motivations for doing their research and to be aware of, and sensitive to, the broad issues raised in the dialogue. BBSRC and EPSRC have both modified their internal processes in response to this commitment and have been involved with a number of projects where the dialogue findings have influenced others external to the Research Councils.

Internal changes

BBSRC has reviewed how it asks its research community to consider its research in a wider context and has introduced new measures to encourage thoughtfulness and reflection as part of its ethical and social issues monitoring processes. All applicants will now consider ethical and social issues when they are applying for grant funding, rather than later in the process. Clearer guidance has been developed to help applicants explore the full range of possible issues. BBSRC explored the use of input from members of the public to help shape these changes but this was not found to be a practical option at the time. Adjustments were made on the basis of the findings from this as well as previous dialogues. BBSRC continues to develop the mechanisms by which public views are incorporated into policymaking and strategy including the current distributed Bioenergy Dialogue and a recent dialogue around one of BBSRC's strategic priorities.

BBSRC have also developed a public engagement training course, open to all BBSRC-funded researchers, which includes elements focussing specifically on social and ethical dimensions of research. The training will help develop awareness within the research community of the social

[3] Full report: http://www.bbsrc.ac.uk/web/FILES/Reviews/1006-synthetic-biology-dialogue.pdf and user-friendly summary: http://www.bbsrc.ac.uk/documents/synbio-summary-report-pdf/
Synthetic Biology Dialogue Evaluation report http://www.bbsrc.ac.uk/web/FILES/Reviews/synbio-dialogue-evaluation-final.pdf
[5] BBSRC new stories and features that link to the Dialogue:
[Reference/webpage no longer available – Feb 2016]

Biology by Design feature [Reference/webpage no longer available – Feb 2016]

and ethical issues that their work raises and encourage engagement with the public with those topics. It draws directly on the Synthetic Biology Dialogue, for instance by featuring the 'five questions' from the Dialogue report.

EPSRC gave an undertaking in its last Delivery Plan to promote Responsible Innovation. In conjunction with ESRC, a piece of work was commissioned in 2011 to help Research Councils and researchers to better understand the benefits and risks of emerging technologies early on in the innovation process. The work was conducted by Professor Richard Owen and Professor Phil Macnaughten. EPSRC Council have endorsed a strategy for ensuring that responsible innovation is incorporated into the organisation's strategic thinking and they will shortly be placing a statement on their website reaffirming EPSRC's commitment to responsible innovation, their organisational responsibilities and setting expectations for researchers and their research organisations.

Jointly, BBSRC and EPSRC organised a workshop in February 2011 to bring together the synthetic biology research community and others to discuss the report's messages and our response. A short evaluation/summary of the workshop can be found in the final evaluation report[7].

RCUK are leading on a project being delivered by the National Coordinating Centre for Public Engagement (NCCPE) to develop social and ethical training. The course aims to inspire and support researchers to explore the social context of their research and consider ways of increasing the impact of their work through engagement and partnerships.

Working with others

The findings of the Dialogue informed BBSRC's thinking about, and contribution to, the Government's Synthetic Biology Roadmap[8]. The Dialogue was influential in informing the broad make up of the independent panel of experts that produced the report, the topics covered by the report (e.g. governance), and it featured as a case study.

The funding call for Joint Synthetic Biology Initiative[9] was influenced by the dialogue findings and asked for specific details to address potential social and ethical concerns. In addition, a workshop was run with lead researchers on funded grants to help them explore the social and ethical dimensions of their work. This included direct reference to the Synthetic Biology Dialogue and its findings.

BBSRC and EPSRC are pleased to be working with colleagues at TSB to consider the implications of the Dialogue for their funding in this area, including drawing on the Synthetic Biology Dialogue when developing the joint call for an Innovation and Knowledge Centre in Synthetic Biology[10] and as TSB prepared an Responsible Innovation Framework for a Synthetic Biology Feasibility Studies competition in 2012.

The dialogue informed BBSRC's contribution to the consultation for the Nuffield Council on Bioethics 'Emerging Biotechnologies: technology, choice and the public good' report.

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[7] Synthetic Biology Dialogue Evaluation report: http://www.bbsrc.ac.uk/web/FILES/Reviews/synbio-dialogue-evaluation-final.pdf

[8] Synthetic Biology Roadmap [Reference/webpage no longer available – Feb 2016]

[9] The Joint Synthetic Biology Initiative made up to £2.4M available from the Biotechnology and Biological Sciences Research Council (BBSRC), the Defence Science and Technology Laboratory (Dstl), the Engineering and Physical Sciences Research Council (EPSRC), and the Medical Research Council (MRC) [Reference/webpage no longer available – Feb 2016]

[10] Call details for Innovation and Knowledge Centre in Synthetic biology [Reference/webpage no longer available – Mar 2016]

Internationally the dialogue informed, and continues to inform, an ERANet in Synthetic Biology, ERASynBio[11]. BBSRC and EPSRC have provided advice to the Lawrence Berkeley National Laboratory and UC Berkeley as they engage the public around a new laboratory facility for synthetic biology and to SynBERC in the US and the Observatoire de la biologie de synthèse[12] in France as they plan their own dialogue projects. The dialogue was also featured in the European Science Foundation publication 'Science in Society: a Challenging Frontier for Science Policy'[13].

3) Continuing the discussions

The original response highlighted our Synthetic Biology Networks as a route by which dialogue around synthetic biology might be continued. The Networks were encouraged to develop and share public engagement tools as part of their funded activities and their final reports show that they were engaged with the dialogue both in terms of participating in it and in terms of awareness of the findings. One Network invited dialogue participants to attend their annual workshop in July 2011, which focussed on ethical, legal and social issues.

In addition to funding streams mentioned in previous sections, other current major funded projects also include elements aimed at discussing the potential benefits and concerns associated with synthetic biology. These include BBSRC Strategic Longer and Larger grants[14] and a significant award made to a consortium of Universities to develop synthetic biology infrastructure[15].

4) Ongoing oversight

BBSRC and EPSRC's top decision making bodies – their Councils – have monitored, and will continue to monitor, developments in synthetic biology.

5) Learning from dialogues

RCUK with the support of Sciencewise, commissioned a study to review this dialogue and previous Research Council dialogues so that lessons can be learnt about what works well and what doesn't with respect to dialogue[16].

Conclusion

The above examples illustrate how influential the Synthetic Biology Dialogue has been both internally to BBSRC and EPSRC, and in other organisations. There are existing processes that have been modified as a result of the Dialogue findings and there are also instances where the Dialogue has informed activities that weren't yet planned when our original response was made. The Dialogue will remain a significant reference point for BBSRC and EPSRC as Synthetic Biology and the discussion around its potential impacts, develops.

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[11] ERASynBio: http://www.bbsrc.ac.uk/research/international/eranet/era-syn-bio.aspx
[12] Observatoire de la biologie de synthèse: http://biologie-synthese.cnam.fr/
[13] European Science Foundation publication 'Science in Society: a Challenging Frontier for Science Policy'

[14] BBSRC Synthetic Biology Strategic Longer and Larger Grants [Reference/webpage no longer available – Feb 2016]
[15] An infrastructure for platform technology in synthetic biology, Grant details: http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/J02175X/1
[16] Review of Research Council Dialogues [Reference/webpage no longer available – April 2018]