Source: https://cns.asu.edu/fct

Responsible nanotechnology R&I – Societal engagement practices

Futurescape City Tours

Introduction

NANO2ALL is an initiative funded by the European Union's Horizon 2020 Research and Innovation programme under the Grant Agreement Number 685931. It supports the establishment of Responsible Research and Innovation (RRI) policy and governance on nanotechnologies. NANO2ALL also aims to identify RRI practices, with a focus on societal engagement in nanotechnology research and innovation (R&I) across Europe and beyond, with the purpose to share knowledge, experience and recommendations with other nanotechnology stakeholders and motivate a wider application of such mechanisms in our region.

RRI is an approach that anticipates and assesses potential implications and societal expectations with regard to R&I, with the aim to foster the design of inclusive and sustainable R&I. As a dimension of RRI, societal engagement implies interactions between relevant stakeholders (companies, research organisations, policymakers, civil society organisations (CSOs), consumers, affected citizens and others) in order to align research, development and innovation with the values, expectations and needs of the society. Such interactions can take various shapes, such as brainstorming, scenario workshops, user committees, online forums, dialogues, informal / formal meetings, or other formats.

This brief report provides insights into the Futurescape City Tours, a societal engagement practice developed by the Center for Nanotechnology in Society (CNS) at Arizona State University (ASU). It begins by describing the role of the centre and its early experiences with public engagement on nanotechnology before delving into the methodology specific to the Futurescape City Tours. The final section offers some reflections on the impact and limitations of this practice.

Data for this report were gathered via desk research and interviews with David H. Guston, Foundation Professor and Director of the School for the Future of Innovation in Society, and Cynthia Selin, Associate Professor, School of Sustainability.

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Societal engagement at Arizona State University and the Center for Nanotechnology in Society

The Center for Nanotechnology in Society
ARIZONA STATE UNIVERSITY

The Center for Nanotechnology in Society at Arizona State University (CNS-ASU)[1] was one of several Nano-scale Science and Engineering Centers funded by the United States' National Science Foundation (NSF) and the largest centre of its kind to work specifically on the societal aspects of nanotechnology, integrating research with education and outreach components. While it is no longer extant, a cluster of centres and institutes at ASU continues to address science and society issues and Responsible Innovation.

CNS-ASU's goals were two-fold: to increase **reflexivity** within nanotechnology research ('a capacity for social learning among individuals, groups, institutions and publics […] that expands the domain and informs the available choices in decision making about nanotechnologies.'[2]) and to increase society's capacity to engage in **anticipatory governance** of nanotechnology and other emerging technologies' (managing emerging technologies while such management is still possible,[3] in particular by building capacities for foresight, engagement and integration, as preparation for challenges that not yet known).[4]

In practice, the centre's work took shape in the **research programme 'Real-Time Technology Assessment'** (with research strands Research and Innovation Systems Assessment', 'Public Opinion and Values', 'Anticipation and Deliberation' and 'Reflexivity and Integration') and **two Thematic Research Clusters on anticipatory governance** ('Equity, Equality and Responsibility', and 'Urban Design, Materials and the Built Environment'). While the term RRI is not explicitly used in the centre's activities, CNS-ASU's research programmes concerned key process dimensions of RRI as understood in the academic and policy frameworks in a European context,[5] informed through systematic analyses of research calls in the European framework[6] and global exchanges in the Virtual Institute for Responsible Innovation.[7]

Early on, CNS-ASU proposed and implemented first-ever nationwide participatory consensus conference in the United States: the **National Citizens' Technology Forum (NCTF) on nanotechnologies and human enhancement**[8] took place in 2008 at six sites across the US as a way to obtain informed citizen input on nanotechnology via face-to-face deliberation and online discussion sessions. Results allowed the team to draw the conclusion that deliberation could happen online, albeit with different qualities than face-to-face deliberation. In addition, several indices were measured during the NCTF, and results showed that participants' feelings of 'being competent to discuss issues like those raised in the deliberations' (known as internal efficacy) increased while participants' feelings that 'their opinions or actions can actually affect political outcomes' (known as external efficacy) decreased.[9] One hypothesis postulated to explain this finding was that **the nature of a discussion-based activity – the lack of active doing and making – might have led to a lack of growth in external efficacy**.

[1] "Center for Nanotechnology in Society at Arizona State University (CNS-ASU)," CNS-ASU, accessed March 5, 2019, http://cns.asu.edu/.
[2] Guston, "Anticipatory," 433.
[3] David H. Guston, "The Anticipatory governance of Emerging Technologies," *Journal of the Korean Vacuum Society* 19, no. 6 (November 2010): 433. https://cspo.org/legacy/library/101214F2RN_lib_GustonD2010Antic.pdf.
[4] "About," CNS-ASU, accessed March 5, 2019, https://cns.asu.edu/about.
[5] "About RRI," RRI Tools project, accessed March 5, 2019, https://www.rri-tools.eu/about-rri.
[6] "RTTA 4/3: Integration Policy Studies," CNS-ASU, accessed March 5, 2019, http://cns.asu.edu/research/rtta-4-integration/integration-policy-studies.
[7] "Virtual Institute for Responsible Innovation," CNS-ASU, accessed March 5, 2019, https://cns.asu.edu/viri.
[8] For a detailed overview, consult: Patrick Hamlett, Michael D. Cobb and David H. Guston, "National Citizens' Technology Forum: Nanotechnologies and Human Enhancement," CNS-ASU Report #R08-0003 (2008), https://cns.asu.edu/sites/default/files/library_files/lib_hamlettcobb_0.pdf.
[9] Hamlett, "National," 10.

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As follow-up, the CNS-ASU team reflected on what would be their next stage in the public engagement process and shifted to forms of engagement that included more **active participation and material deliberation** (referring to as 'processes of deliberation and citizen engagement which incorporate an awareness, openness or sensitivity to non-traditional modes of deliberative interaction'[10] such as sound making, discourse making, material objects, bodies, sites and places and emotions and affective experiences). **Futurescape City Tours** can be considered as one methodological innovation that developed from the NCTF experience.

Futurescape City Tours (FCTs)

Futurescape City Tours (FCTs) are a **novel public engagement activity to anticipate societal dimensions of emerging nanotechnologies and explore alternative futures** developed under the 'Anticipation and Deliberation' strand of CNS-ASU's 'Real-Time Technology Assessment' research programme. It is centered on a walking tour in an urban environment where participants go behind-the-scenes, take photographs, have informal conversations with city planners, policymakers, researchers, and civic leaders and deliberate on the future of their cities or communities, revealing the role of technology in our everyday life.[11] Nanotechnology is particularly suited to such explorations as it is 'expected to be a persistent, pervasive and powerful force in reshaping the urban environment'[12] as technologies, cities and societies develop together.[13]

Aims

This activity has as **its dominant aim building capacity (skills, tools and knowledge) for participation in public life** in relation to technological subjects such as emerging technologies. During the activities, there is a deliberate attempt to consider broader social questions such as the desirability and implications of sustainability of nanotechnology and not only the risks and benefits of particular technological applications.[14]

Moreover, in its choice of methods, modes of interaction, and facilitation, an FCT **aims to be truly accessible and inclusive, to cater to those who are less vocal and articulate among the general public** (and who get left out from more traditional approaches to public engagement such as focus group hearings, citizen juries or consensus conferences). In the case of the FCTs, the use of photography opens up new possibilities for reflection and communicating across language and knowledge barriers.

Methodology

The engagement activity consists of **some advance preparation, three sessions, and follow-up**. The recommended group size is of around **15 participants**, although it is possible to carry out the activity with more. Applicants self-select to participate but organisers try to ensure **demographic representation of the city or community** in terms of age, education, income, gender and ethnicity. Other relevant factors are knowledge of nanotechnology, previous experience of community engagement and professional background.

[10] Sarah R. Davies at al, "Citizen engagement and urban change: Three case studies of material deliberation," *Cities* 29, no. 6 (December 2011): 353, https://doi.org/10.1016/j.cities.2011.11.012.
[11] The account of the Futurescape City Tours is based largely on: Cynthia Selin and Jennifer Pillen Banks, 'Futurescape City Tours. A Novel Method for Civic Engagement,' CNS-ASU (2014). http://www.futurescapecitytours.org/brochure-1.
[12] Cynthia Selin and Gretchen Gano, "Seeing Differently: Enticing Reflexivity through Mediate Participation in Place in the Futurescape City Tours," in *Engaging Participatory Visual and Digital Methods*, ed. Gubrium, A. and Harper K. (Left Coast Press, 2015), 88.
2015).https://www.cynthiaselin.com/uploads/4/6/5/7/4657243/fct_selin_gano_digital_methods_july_1.pdf
[13] Davies, "Citizen," 352.
[14] Cynthia Selin et al, "Experiments in engagement: Designing public engagement with science and technology for capacity building," *Public Understanding of Science* 26, no.5 (August 2017): 641, https://doi.org/10.1177/0963662515620970.

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Preparing for the practice: Participants are asked to come prepared to discuss the following question: "What are three examples of technological change that have had big impacts in your lifetime?" as a way to orient the discussion on the nature and role of technologies in society. Participants are also given access to background information suitable for different educational and knowledge levels, so that everyone can explore the topic as lightly or as deeply as they wish.

Source: https://ifis.asu.edu/content/futurescape-city-tours

The first session acts as an orientation. Discussions reveal participant concerns and interests about the topic and the future of their city or community. This initial session is meant to build trust and comfort. Based on its results, the organisers design a walking tour of city or community responding to three to five interests identified.

The second session is a guided walking tour. Participants are asked to write down reflections in a workbook and take photos of where they see the past persisting, the present embodied, and the future emerging. Along the way, they meet experts and stakeholders in different formats: from more traditional expert panels and Q&A sessions to informal conversations. The exchanges are designed with the aim to down the expert/layperson divide and allow participants to bring their own expertise to the discussion on an equal footing. At the end of the tour, participants are given instructions on how to work with the images they have taken: photographs that are most important to them are uploaded and captioned via a shared platform such as Flickr.

The third session consists of guided deliberation: Participants use the photos taken during the tour to discuss aspects of the past that should persist, identify positive and negative characteristics of the present and create a time-collage reflecting imagined futures for their cities. The photographs and timelines can also serve as the basis for exhibitions that are open to the public or around which further engagement activities can be built (e.g. presentations, interactive experiences or maker spaces during which other citizens can add their own impressions).

In practice

The **first pilot Futurescape City Tour took place in Phoenix, Arizona over the course of three months in 2012** and involved 16 participants with the topic of how emerging technologies and nanotechnologies in particular might transform the urban landscape. Participants revealed their initial interests to be solar and alternative energy, public spaces, transportation and water, and this led to the design of a tour that featured a visit to a solar panel installation and meetings with the principal and a student from a local biosciences high school, a photovoltaic researcher from ASU and a representative from the company that makes solar panels.

The pilot helped researchers learn how to support participants in taking photos and generating captions: a small training was added to provide structure and prompts around how to articulate ideas. Researchers also understood that **experts and knowledgeable stakeholders must also be guided to understand that their role was not to educate but to be supportive and responsive to the group's learnings**. This formed part of a broader attempt to bring control to the participants and shift the traditional power balance.

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As a result, small alterations were made to the practice and these changes were incorporated in a **subsequent coordinated implementation of Futurescape City Tours**: in 2013, science centres and museums in six different cities (Edmonton in Canada and Phoenix, Portland, St. Paul, Springfield (Massachusetts), and Washington in the United States) carried out the practice. A **methodological guide, website and video for city planners, researchers and the public were developed to allow the implementation of Futurescape City Tours** in other locations and on other emerging technologies or topics of concern.

Source: https://ifis.asu.edu/content/futurescape-city-tours

Reflections

While a post-event survey taken after the FCTs showed promising signs of capacity building on several aspects necessary for civic participation,[15] evidence on longer-term impact remains only anecdotal: a maker space from one of the implementation sites continued to engage actively with their community after this experience, and FCTs participants continued to attend public talks and events, feeling that they have discovered a new community. In future iterations of the practice, it is recommended that **more attention be given to the longer-term effects of such interventions**, with systematic follow-up three, nine and eighteen months later.

Despite attention to power relationships in the methodological and facilitation choices, organisers noted that the traditional expert/lay person divide persisted to some degree, 'due to personality differences among lay and expert participants, experts' comfort level at communicating specialist information to general audiences, and the expectations of participants themselves.'[16] More **informal moments of shared experience and conversational exchanges where participants can leave behind their traditional roles should be encouraged**.

The FCTs carried out were not intended to inform policy and decision-making. Including experts and stakeholders in FCT activities might nevertheless create expectations of 'further steps taken after the event to connect insights to policy change.'[17] These **expectations of impact on policy making should be managed so as not to create frustrations**. Organisers can support participant interests while also taking several actions themselves: **sharing findings with the stakeholders involved on the tour** other audiences who can benefit, and **building upon the results to start dialogue using other methods**. Moreover, the impact of participating in an FCT should not be underestimated: it is possible that encountering citizens on a thoughtful journey will result in more take-up and integration of societal perspectives among different stakeholders than being the target of traditional dissemination actions.

CNS-ASU showed proof of concept by demonstrating and researching what would be needed to carry out activities such as FCTs but was not in a position to fully operationalise or implement them.[18] Organisers remark that '**capacity building – the development of the skills and habits necessary to successfully participate in**

[15] More precisely, intrapersonal, political, and civil capacities. Consult: Selin et al, "Experiments," 644-645.
[16] Selin and Gato, "Seeing," 93.
[17] Selin and Gato, "Seeing," 95.
[18] Guston, "Anticipatory," 439.

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public life - requires practice and opportunities to engage'[19] which implies the need for additional funding for similar initiatives.

[19] Selin et al, "Experiments," 645.

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