SISSA – International School for Advanced Studies Journal of Science Communication
ISSN 1824 – 2049 http://jcom.sissa.it/

Comment

NANOTECHNOLOGIES AND EMERGING CULTURAL SPACES FOR THE PUBLIC COMMUNICATION OF SCIENCE AND TECHNOLOGIES

Science museums as political places. Representing nanotechnology in European science museums

Brice Laurent

ABSTRACT: Science museums perform representations of science and that of its publics. They have been called to intervene in nanotechnology within global public policy programs expected to develop the field. This paper discusses the case of European science museums. It starts by examining the case of a European project that involved science museums working on nanotechnology. This example illustrates a "democratic imperative" that European science museums face, and which implies a transformation of their public role. It offers a path for the analysis of the current evolution of European science communication perspective – from "public understanding of science" to "scientific understanding of the public" – and of the political construction this evolution enacts.

1. Introduction

The science exhibit is a locus for the display of science as a repository of existing theoretical results and practical applications. Scientific representations are not apolitical: museum scholars have argued that they contribute to solidify citizenship, national pride or power relationships[1,2,3]. In doing so, these works have studied the representations of the social that the (science) exhibit conveys. In cases where social identities are uncertain and fluid, they have described how museums might also work on new ways of representation in order to challenge the position of the visitors by moving him/her to the place of the represented other[4], or include communities in the design of exhibits that directly concern them.[5,6] In the case of science, the current emphasis on controversial and uncertain domains characterized by uncertainty has led a growing number of practitioners and theorists to talk about "public understanding of research", and representations of "science in the making" and "controversy".[7,8]

These perspectives show that the display of science in the museum is neither a given, nor a politically neutral process. Following up on these insights, this paper considers the science museum as a place where the representation of science has political meanings. It discusses examples related to nanotechnology in order to illustrate that the science museum is not exterior to the making of technological programs of development in public and private sectors, and argues that the science museum is a place where the organization of democracy itself is at stake. I am interested in this paper in projects undertaken at the European levels, and supported by the European institutions. I will focus on one particular European project, and the subsequent initiatives of the European Commission, as an illustration of contrasted ways in which democracy (along nanotechnology itself) is problematized in the science museum in Europe.

2. The science museum as a locus for science policy

Nanotechnology has been supported by a series of science policy initiatives initiated in the late 1990s in the United States, and then gradually taking shape in the U.S. and in Europe. The early developments of nanotechnology identified potentially problems that had to be dealt with in order to ensure the full development of the domain. The European approach to nanotechnology communication began with a series of projects announced by the *Nanotechnology Action Plan*, which the Commission released in

2004 in order to present its position on nanotechnology. The objective of the *Action Plan* was to sketch out the steps towards the implementation of "an integrated and responsible approach on nanotechnology at EU level".[9] In this strategy, the "integration of the societal dimension" was a key concern, which was expected to "address expectations and concerns". Under the societal dimension chapter, the action plan called the E.U. to "create the conditions for and pursue a true dialogue with the stakeholders concerning N&N".

The definition of these "societal implications" and the form of policy expertise that was mobilized to deal with them have been discussed in the scholarly literature about nanotechnology. Here, suffice it to consider the call for the examination of the "implications" of nanotechnology as a sign of a concern for the (social) conditions expected to ensure the successful development of nanotechnology. It is in this context that the science museum has a role to play in the development of nanotechnology program, as part of a more general objective of governing the "ethical, legal and social aspects" (ELSA) of nanotechnology.[10]

Nanotechnology has fostered discussions in science communication and scientific arenas about the need for a renewal of the relationships between museums and their publics.[11] These debates are part of wider trends in science communication, which development in two interrelated directions. First, interactivity with the visitor, and, in some cases, direct involvement in the making of exhibits, are becoming increasingly important. Second, the representation of science as a black-boxed product is shifting toward the representation of science in the making, including the various controversies along which science progresses.

In the case of nanotechnology, these trends manifest themselves in the following way. First, the interaction with the visitor appears as part and parcel of any nanotechnology exhibit. This was not only a matter of having the visitor play with devices presented to him or her – as some of the initiatives of the "informal science education" network proposed, but was also connected to a desire to ask the visitor to be directly part of the representation of nanotechnology, either by contributing to the exhibit, or to the making of nanotechnology public programs themselves (I will discuss some examples of this approach below). Second, nanotechnology has already been described as an opportunity to do representation of "science in the making": as the science exhibit used to display pictures of already-made science, the science exhibit is now expected to display pictures of science in the making.[12] This comprises the representation of nanotechnology "ELSA" (in Europe) or its "implications" (in the U.S.). In so doing, they participate in the consolidation of "nanotechnology" as an original entity comprising objects, futures, concerns and publics to engage.[13] The case of the European science museums and their connections with the making of nanotechnology policy is particularly interesting for that matter, since their involvement was called for early in the development of European nanotechnology programs, in ways that linked science communication with the making of European democracy itself, as I will discuss in the following sections of this paper.

3. European publics for nanotechnology

One of the first projects devoted to nanotechnology and society and funded by the European Commission was *Nanodialogue*, led by a consortium of European science museums. In line with the action plan, the focus of *Nanodialogue* was to do more than representing nanotechnology. The project was from the start built on a pre requisite: it had to be "democratic". The *Nanodialogue* exhibit was conceived after a couple of meetings involving the participating science centers, a team of sociologists, the program officer from the DG research, and members of an advisory committee made of people proposed by the various partners. The main step in the process was a three-day workshop in Naples in March 2006, during which the "scenarios" of the future exhibit were crafted. The "democratic component" was an object of discussion among the project members, as the minutes of one of the preparatory organizing meetings made clear:

> "We should make people realize that they are taking part in a democratic process, and this could be done through the website, but we should try to have also other instruments into the exhibition module, to enforce the physical interaction. In order to achieve this, the design, the colour, the writings on the module should be such to encourage visitors to stop, read, act and reflect."[14]

"Interactivity" was conceived as a way of realizing the "democratic process" that the science museum was expected to enact through the nanotechnology exhibit. Interactive devices are indeed political, in that they participate in the making of a visitor expected to adopt an active role in the museum and beyond.[15] But interactivity in itself was not enough for the democratic process to take place. It had to be complemented with the making of nanotechnology as a technological domain associated with public concern, and with devices expected to measure the opinion of visitors.

The first objective was eventually taken into account in a way that, for some participants, consisted in "listing the ethical implications for all the scientific domains and industrial applications".[16] Hence the representation of nanotechnology related "ethical issues" was based on the separation between the representation of the facts of nanotechnology, and that of accompanying "ethical implications".

The separation between the representation of nanotechnology and that of its "ethical implications" was completed by the eventual separation between the exhibit itself and the devices expected to measures the expectations of nanotechnology publics. From the beginning of the project, the production of "recommendations" meant to be transferred to the European Commission was an objective of *Nanodialogue*. These recommendations were eventually produced through focus groups, coordinated by a team of sociologists and led by each local science center. The social scientists involved considered the study as a "snapshot" of the European public opinion on nanotechnology, which insisted on the necessary "precaution" to be held while "perceiving more benefits than risks" in nanotechnology.[17]

The European public opinion thereby produced introduced a reflection on the types of publics of nanotechnology. The leader of the team of social scientists, sociologist Simon Joss, thus put the emphasis on the necessity to know the public better in a communication during the final conference of the project:

> "I think it is important to develop notions of the publics, in plural terms, to recognize that *the public comes in different forms and shapes and that therefore developing governance modes needs to recognize there's a plurality of the public*, that is the first point. The second point is that publicity, the process of governing in a way which achieves publicity again has to be conceived of in a pluralistic fashion. So publicity I think has to *include a number of related components, including the construction of understandings, or social imaginations, in our cases, of nanosciences or nanotechnology*."[18]

Hence the *Nanodialogue* conclusions insisted on the need to know about the public, and its diverse nature. The variety of the European publics that *Nanodialogue* had encountered made its promoters sensitive to the different "social imaginations" – a topic that would be of particular importance in the definition of the European strategy about nanotechnology.

4. From public understanding of science to the scientific understanding of the public

The *Nanodialogue* project is of particular interest since, as one of the very first European projects in both nanotechnology communication and nanotechnology "societal implications", it acted as a rehearsal of the European strategy in nanotechnology. Indeed, the *Nanodialogue* experience circulated widely in the communication of the "nanotechnology and converging technology unit" at the DG Research, and in Europe institutions more generally.[19]

By many respects, *Nanodialogue* appears as an experiment in the European nanotechnology communication policy, which, within the Action Plan, was conceived as a part of the European nanotechnology policy.[20] The conclusions of the project were supposed to feed the further construction of the EU policy on nanotechnology. Indeed, the idea that ELSI issues deserved due examination was prevalent after *Nanodialogue*, as was the insistence on the "needs and concerns of the public". The participants in the *Nanodialogue* project were called to contribute to the definition of the "European strategy" towards "nanotechnology communication and outreach". Immediately after the final conference of the project, a workshop was held in Brussels, which gathered participants in *Nanodialogue*, European officials, and experts in science communication. The workshop resulted in a working paper (*Strategy for Communication Outreach in Nanotechnology*, Brussels, February 2007), which was later refined and developed into an official document of the European Commission (*Communicating Nanotechnology*, Brussels, March 2010 – hereafter CN), which presented the "communication roadmap" that was to frame the strategy of the European Commission on the communication of nanotechnology.

In the working paper, Renzo Tommelini, who was at that time the head of the nanotechnology and converging technology unit at the DG Research, and, as such, in charge of European funding for nanotechnology research explained:

> Clearly, a new mood of communication is required, based on dialogue: instead of the one way, top down process of seeking to increase peoples' understanding of science, a two way iterating dialogue must be addressed, where those seeking to communicate the wonders of their science, also listen to the perceptions, concerns and expectations of society. (…) This should enable to settle a sound basis to reaching consensus, achieving sustainable governance and social acceptance for nanotechnologies and nanosciences. (Strategy: 10)

This excerpt made it clear: "people's understanding of science" was now longer to be sought after if one was to "achieve sustainable governance and social acceptance for nanotechnologies and nanosciences". The shift was later clarified in CN, which made it explicit that the role of science museums needed to evolve "from public understanding of science to scientific understanding of the public".

In this formulation, the representation of nanotechnology is not considered as the the main issue, and can be limited to simple messages:

> Nano is:
> - not magic;
>
> Nano is:
> - a new phase of technology exploiting nanoscale effects;
>
> It deals with new:
> - beneficial applications and markets, impacting on health, safety, privacy, ethics and the socioeconomics divide;
>
> It:
> - must and can be controlled and driven conscientiously (CN: 106, emphasis in the original).

Nothing more is to be said, since the state is that of no "existing controversy" (at which case a "formal consultation" would be needed). Yet what is important is to "monitor public opinion" in a "scientific" way, the claimed objective being that nanotechnology communication could be integrated "at the core of scientific research". For the head of the Nanotechnology and Converging Technologies Unit at the D.G. Research, what is to be constructed through the "scientific understanding of the public" is nothing less than "technical democracy", in which "public opinion *will be monitored on a continuous basis*". Ultimately, this is expected to allow the European institutions to know "what people really think about nanotechnologies and promote evidence-based dialogue" (CN: 152).

Here, the "evidence-based dialogue" is not problematic because of the representation of nanotechnology but because of that of "the public". A "continuous monitoring" of the European public can thus appear as a way to solve the "problem of representation" (an expression used in an interview) that EU officials have regarding the civil society organizations they are in contact with:

> "That's an issue here, it's always the same kind of people, over and over again. We do a meeting open to civil society, we request comments… And we can guess in advance who's gonna show up. Always the same, Friends of the Earth, maybe Greenpeace,… And what we want is talking to the European public, to the real European public."[21]

This quote clearly shows that the definition of the legitimate European public is at stake within communication strategies. Communicating nanotechnology can thus appear as a way of linking the European science policy with "the real European public", which would, somewhat paradoxically, not be engaged in nanotechnology before the communication process (as opposed to NGOs, too much engaged to qualify as the "real European public"). The political role of science communication is here made explicit, through the technologies expected to produce the "real European public". They are complemented by an "ongoing process", intended to provide "continuous feedback of what the public thinks of nanotechnology". This has several objectives. Through such representations the DG Research hopes to be able to correct the misrepresentations of the public, but also to develop certain areas of nanotechnology rather than others. Talking about a call for project he was crafting at the time, a EU official at the DG research explained during an interview:

> If we are not able to give the possibility to the public that is participating into the dialogue to really see that what they are dialoging on is put into concrete policy action, there's no need. (…) So the condition I'm putting in this call is the following one: that the successful projects (…) will provide evidence that there is a link between what is being discussed and what is going into the changing, or re-addressing, or reinforcement of the current EU policy. That means on current funding lines for nanotechnology. (…) It's something quite new that engages not only the public but also ourselves, the regulators. (…) So, for sure, the main input of this will be on funding research. So if the public, or those publics, or different member states, say to us "please don't do research on nanofood", we will not spend any single euro on nanofood.[22]

In this account, the scientific understanding of the public is expected to impact the very making of nanotechnology programs at the European level. This does not alter the fact that the "scientific representation of the public" is built on the exact same theoretical basis as public understanding of science: the issue is the faithful, at-a-distance representation of an object the existence of which is not problematized ("science" in a case, the "public" in the other). Thus, the initial interrogations in the *Nanodialogue* about the representation of nanotechnology and the democratic roles of science museum project appear to be solved in CN: the "scientific understanding of the public" is expected to connect the European nanotechnology policy with its publics, and the whole process implies shifting from the representation of nanotechnology to that of the European public.

5. Conclusion

Nanotechnology forced the European institutions to refine the representation of nanotechnology, from a science policy program defined by the amount of funding granted to it to a topic of potential public sensitivity. The issue with the representation of nanotechnology is then less that of the representation of science than that of the correct representation of the opinion of "the European public", and it is in that sense that, for the European officials encountered in this paper, nanotechnology is an opportunity to construct a "technical democracy".

In this process, the science museum appears as a place where the organization of democracy is at stake. This has particular resonance in Europe, where the sources of democratic legitimacy are not pre-given, and many of the political constructions undertaken by the European institutions are experimental. The insistence on "dialogue", on the need to speak to the "European public", and eventually on the scientific understanding of the (European) public, is a clear sign of the important role of the science museum in the making of the European political space. The science museum, and, more generally, science communication strategies, are vehicles for the making of European publics and issues, and, thereby, for the enactment of acceptable relationships between science and democracy in Europe. These examples illustrate attempts made at grounding the European political legitimacy on dialogue, the identification of ELSA issues, and the representation of a "real European public" in order to impact science policy choices. Considering this arrangement as the outcomes of local processes – such as the making of a science exhibit or the definition of a communication strategy – is a way of locating the sites where it acquires its strength, and, concurrently, where it could be transformed in order to accommodate alternative problematizations of the relationships between science and democracy.

Notes and references

[1] C. Duncan (1995), *Civilizing Rituals: Inside Public Art Museums*, Routledge, London, U.K.
[2] E. Gable (1996), *Maintaining boundaries, or 'mainstreaming' black history in a white museum*, in Macdonald and Fyfe eds.(1996), pg. 177-202, see note 3.
[3] S. Macdonald and G. Fyfe eds. (1996), *Theorizing Museums*, Blackwell, Oxford, U.K.
[4] H. Riegel (1996), *Into the heart of irony: ethnographic exhibitions and the politics of difference*, in Macdonald and Fyfe eds. (1996), pg. 83-104, see note 3.
[5] S. Macdonald (2003), *Museums, national, postnational and transcultural identities*, *Museum and Society* **1**(1): 1-16.
[6] J. Clifford (1997), *Museums as Contact Zones*, in *Routes: Travel and Translation in the Late Twentieth Century*, Harvard University Press, Harvard, U.S.A., pg. 186-219.

[7] A. Yaneva, T.M. Rabesandratana and B. Greiner (2009), *Staging scientific controversies: a gallery test on science museums' interactivity*, *Public Understanding of Science* **18**(1): 79–90.
[8] For an overview of this trend, see M. Meyer (2009), *From cold science to hot research. The texture of controversy*, CSI Working Paper, Mines ParisTech, Paris, France.
[9] *Nanotechnology Action Plan*, 2004, http://ec.europa.eu/nanotechnology/pdf/action_plan_brochure_en.pdf.
[10] See for European examples: A. Hullmann (2008), *European activities in the field of ethical, legal and social aspects (ELSA) and governance of nanotechnology*, European Commission, DG Research.
[11] See a call for a "new role" of (American) science museums based on dialogue (L. Bell (2008), *Engaging the Public in Technology Policy: A New Role for Science Museums*, *Science Communication* **29**(3): 386-398.). The examples discussed in this paper will provide other illustrations.
[12] M. Meyer (2011), *Researchers on display: moving the laboratory into the museums*, *Museum management and curatorship*, **26**(3): 261-272.
[13] B. Laurent (2011), *Democracies on Trial. Assembling nanotechnology and its problems*, Ph.D. dissertation, Mines ParisTech.
[14] I am using here archival materials that the Grenoble science center (which was a member of *Nanodialogue*) made available to me.
[15] A. Barry (2001), *Political machines. Governing a technological society*, Continuum, London, U.K. and New York, U.S.A.
[16] Interview, September 2009.
[17] These expressions were used in the final report of *Nanodialogue*.
[18] Final conference report, p.34, emphasis added.
[19] *Nanodialogue* was repeatedly presented at international conferences on science communication. Various European initiatives made use of *Nanodialogue*. Hence the CIPAST project, which is conceived as a training program in participatory instruments, had the participants work on *Nanodialogue*, under the supervision of Simon Joss. Later one, the coordinators of the *Nanodialogue* project were mobilized by the DG Research as evaluators for the 7th Framework Program.
[20] The fact that the management of "nanotechnology & society" projects was done by the nanotechnology unit at the DG Research rather than the "Science & Society" unit of the same directorate is telling for that matter.
[21] Interview with a EC civil servant, nano unit, DG entreprises, January 2009.
[22] Phone interview, DG Research, May 2010.

Author

Brice Laurent is a researcher at the Center for the Sociology of Innovation (Mines ParisTech, Paris, France). His work focuses on the connections between science and democracy, using a perspective based on Science and Technology Studies. He recently published *Les politiques des nanotechnologies* (C.L. Mayer ed. (2010), Paris, France). E-mail: brice.laurent@mines-paristech.fr.

HOW TO CITE: B. Laurent, *Science museums as political places. Representing nanotechnology in European science museums*, *Jcom* **11**(04) (2012) C02