



The NanoDialogue project

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The final conference, to be held at the European Parliament in Brussels on 5 February 2007 (and which will be reported in a following issue of “Nanotechnology Perceptions”) will mark the conclusion of the *NanoDialogue* project,¹ which has involved science museums, associations of researchers and research institutions from all over Europe during the two years that the project has been running.

In this article, we would like to report on the central phase of the project, in which eight exhibition modules devoted to the theme of nanoscience and nanotechnology, and in particular to the debate and social perception surrounding these themes, have been displayed in the following European cities: Barcelona, Gothenburg, Grenoble, Lisbon, Mechelen (Belgium), Munich, Naples and Tartu; the article also discusses the activities conducted as part of these exhibitions.

This is the first time that European citizens from different geographical regions and—within their own countries—from different age groups, professions and cultural backgrounds have had the chance to discuss this theme; a mass of data—still being analysed—has been obtained about the perception or perceptions that they have about this new field of research.

The project

One of the main features of the approach used by the European Commission in drafting the Sixth Framework Programme for Research has been the relationship between science and society; this has been interpreted as involving, first and foremost, the creation of dialogue and the chance to listen to the requests, aspirations and fears of citizens with regard to scientific and technological research (which has an increasingly important impact on everyone’s daily lives), and practical solutions at a European level. This theme, which has an extremely high political significance, takes the form of specially designed measures such as the “Science and Society” programme; it touches on all research programmes that involve specific actions targeted at setting up initiatives and projects in this field.

When—as in the case of nanotechnologies—the field of research is of such a clearly ground-breaking nature and has potential applications that open up disconcerting scenarios (such as those aspects linked to the control of personal liberties or implications with respect to

¹ For further information about the project, visit the web site www.nanodialogue.org.

health and pollution), the creation of forums for social debate would seem to be an priority. As the “dilemma” formulated by the English scholar David Collingridge has reminded us, social attention focused on a new technology normally reaches its peak when—in terms of research, development and applications—it has already become too late to intervene and the only thing that remains is to acknowledge the impact of the technology.

The *NanoDialogue* project represents a model of enormous interest at European level, based on an original combination of the contribution of the most advanced points of scientific research, the dissemination of science to the general public, and the involvement of social institutions through participatory procedures.

NanoDialogue has been funded by the European Commission as part of a specific support action investigating the ethical, social and legal aspects of nanotechnologies. In particular, the objective of the project is to stimulate debate about the various implications, which have not been entirely absorbed by the experts and even less so by the general public, and which may yet have a significant bearing on future research policy.

For some years now, a model of scientific communication based on the public understanding of science has been replaced by a new approach, linked to the need to consider—besides the transmission of knowledge—values, ideas and different points of view. Due to its immediate potential for application, with the incorporation of viewpoints and needs of non-experts, and involving the active presence of researchers in the public arena, contemporary techno-science challenges the traditional distinction between knowledge and power.

This is the reason why today increasing reference is being made to a dialogue model of public engagement in science and technology, since it is becoming clearer that knowledge of phenomena and processes on its own—especially in the field of new applications of contemporary science, from biotechnologies to nanotechnologies—does not necessarily imply that they are unconditionally accepted.

All this forms part of the new horizons of post-academic science, in which the role of other social participants and stakeholders combines with that of researchers, making it essential to find new forms of collective participation in the processes of knowledge production. As Massimiano Bucchi argues, “Despite their diversity, the engagement of non-experts takes the form of increasing cases of public involvement regarding technological and scientific issues. From the second half of the 1990s, in particular, citizens have expressed, in a fairly organized form, their desire to be involved to a greater extent in decisions regarding the development of research and innovation”.²

Similarly, in the new post-academic era of science, the flow of communication between the scientific community and society is becoming increasingly two-directional. It could be argued that the creation and evolution “of science centres is simply the interpretation, at the level of museums, of a change in the role of the public communication of science. The Exploratorium of San Francisco was set up at the end of the 1960s in an attempt to improve the image of science after Hiroshima and Nagasaki, and in the wake of the nuclear arms race”.³ The current evolution

² M. Bucchi, *Scegliere il mondo che vogliamo. Cittadini, politica, tecnoscienza*, Bologna: Il Mulino, 2006, p. 95.

³ P. Greco, *La Città della Scienza. Storia di un sogno a Bagnoli*, Turin: Boringhieri, 2006, pp. 160–161.

of science centres—and the increasing attention they have shown to the public sphere and the discussion in progress—is a logical consequence thereof.

Within this theoretical framework, the *NanoDialogue* project has identified three levels of communication and the related instruments for creating dialogue with the general public: an interactive exhibition, the chief instrument for museum communication in science centres; a set of activities to be carried out as part of the exhibition, targeted at the involvement of participants in the dialogue; and a web site for discussion even in the absence of immediate physical contact, which thus forms a means of prolonging dialogue and discussion in space and time.

The exhibition

The main idea of the exhibition (which originated from a participatory workshop held in Naples in June 2004) was therefore to symbolize the dimension of the *agora* (as an arena of public debate) rather than the unidirectional transmission of knowledge, through the reconstruction of a space open for dialogue and discussion with the public. Considering the general lack of knowledge about nanoscience and nanotechnologies—especially due to their close link to concepts and problems of advanced physics—the exhibition has naturally attempted to deal with the main theoretical concepts and the presentation of some of the practical applications that are already available.

Each exhibition module consists of 5 sections:

1. *Facts or fantasy?* Scenarios from social and psychological studies and science fiction are illustrated and analysed.
2. *Inside the Nanoworld.* Visitors can learn more about the technologies and dimensions of nanoparticles. Models and exhibits are shown together with real applications.
3. *Who's in control?* Ethical, legal and social aspects of the research are provided in the form of comments from scientists, philosophers and experts.
4. *Applications.* Samples of real nano-applications (most of them are already available on the market) are shown in real embodiments and used for events and demonstrations.
5. *The central table.* A space for debate and discussions which gives people the opportunity to “play” with real nano-objects; at the same time, the space can be used for science demonstrations, focus groups and small debates.

In every section, together with the main information, there are comments and opinions (expressed by people from different backgrounds) on the topics, so visitors can compare their ideas and opinions with those expressed by scientists, politicians, philosophers and science fiction writers.

Around the table, some multimedia programmes give visitors the opportunity to write their comments and to read what previous visitors have said, in a similar way to what happens on the internet.

It is a model of museum communication, which did not originate with this project and has various precedents. It is worth recalling here the case of the project entitled *Oser le savoir* at the Cité des Sciences et de l'Industrie in Paris; the “exhibition-magazine” dealt with highly topical scientific themes and provided, by means of the monthly renewal of the contents, interesting material for visitors to reflect upon.

It should also be emphasized that even today there is still not a large number of exhibitions in Europe devoted to nanotechnologies, apart from the example of the London Science Museum

and more recently the Deutsches Museum in Munich. The exhibition produced as part of the *NanoDialogue* project—though limited in terms of the actual display space—represented a novelty and generated great interest. Indeed, after the initial period during which it was held in the eight centres where it was launched, the exhibition module has begun to be displayed in other cities of the various countries involved in the project.

The activities

As already mentioned, the display module represents little more than a pretext for introducing the theme of nanoscience and nanotechnologies from the scientific and applications perspective; it is merely the hardware used to generate the software of the project, namely dialogue with the general public.

In this case, too, it was decided that it was necessary to operate on various levels, taking into account the heterogeneous nature of the museum-going public.

At a basic level, there are the demonstrations and displays of the exhibition space. As is known, one of the characteristics of the new generation of interactive science museums is to make scientific information accessible to the general public. This does not just involve direct interaction with hands-on exhibits, but also science demonstrations and science shows conducted by guides and entertainment organizers who use attention-grabbing communications techniques and are capable of addressing members of the public of all ages and cultural backgrounds.

In the case of the *NanoDialogue* project, these activities are partly aimed at illustrating the behaviour of products made with nanotechnological compounds or ingredients. However, the main function is to inform the public of the fact that nanotechnologies do not belong to the realm of science fiction but are already present in objects and products we use in our everyday lives, such as cosmetics. The objective is to convince visitors that awareness and discussion of problems linked to the use of nanotechnologies represent a problem that needs to be tackled now, not in the future.

Among the various instruments that have been deployed, there have also been sessions devoted to role-play developed for the *Decide* project⁴ funded by the European Union as part of the Sixth Framework Programme (under the “Science and Society” theme); due to its specific nature, it can be classified as a mixture between demonstration and participatory activity related to themes of contemporary science.

The second level of activities directly involved the public by means of two instruments aimed at assessing perceptions and expectations, in particular about what can be considered technologically feasible and socially desirable in the field of nanotechnological applications.

The first instrument consisted of a structured questionnaire, consisting of 10 items (as well as a socio-demographic profile of the interviewees) that had to be filled in partly before the visit and partly after visiting the exhibition. The sample, which consisted of about 100 visitors for each part of the exhibition, was selected in order to take account of the general details of the population of visitors to science museums, according to the statistics that generally characterize them.

⁴ For further information about the project, visit the web site www.playdecide.org.

The second instrument consisted of the organization of focus groups, conducted by expert demonstrators, in each of the cities involved in the project. The focus groups were organized so that various categories of citizens, including experts, could intervene. It should be emphasized that the focus group organized in the science centre in Naples was part of a project funded by the Italian Ministry for Universities and Research and conducted by researchers from the University of Padua; it focused on Italian citizens' perception of nanotechnologies.

As well as these activities—the data for which is being analysed and will be presented in detail at the final conference—considerable attention has been focused on gathering impressions, suggestions and messages via the internet and the multimedia on display in the exhibition.

The results of these three actions (questionnaire, focus groups, web/multimedia) will be the subject of a statistical and qualitative analysis carried out by the Centre for the Study of Democracy of the University of Westminster. They will form the data base for the recommendations which will be put to the European Commission and which will represent the final stage of the project.

Conclusions

Among the various aspects that can be put forward as provisional conclusions at this stage of the project, I would like to emphasize the following:

1. Given the low levels of awareness about nanoscience and nanotechnologies on the part of the general public, people displayed great willingness to be better informed and, in particular, to express their own opinions;
2. Individually, perhaps due to the particular form of presentation developed and the communication of the theme based on uncertainty and dialogue, participation and requests for information, the attitude of the public was not instinctively hostile, and indeed displayed an overriding interest in science and technology;
3. The idea that “experts” possess the decision-making power due to their own knowledge is less entrenched than it used to be. The positive response of visitors to the request to compile the questionnaires or take part in the focus groups shows widespread willingness to participate and express opinions about profound issues (which are not immediately linked to everyday experience) such as those related to nanoscience and nanotechnologies.

This, in brief, is the current situation of the project whose main aim, I would like to repeat, is to provide an original synthesis of scientific and industrial research, communication to the general public and social research; and whose merit is in the recognition—the credit for which should go to the Directorate General for Research of the European Commission—of the role that institutions such as science centres can play in order to stimulate development, based not only on quantity but also on the scientific and social quality of research and its applications.