

Policy Recommendations
on Public Engagement

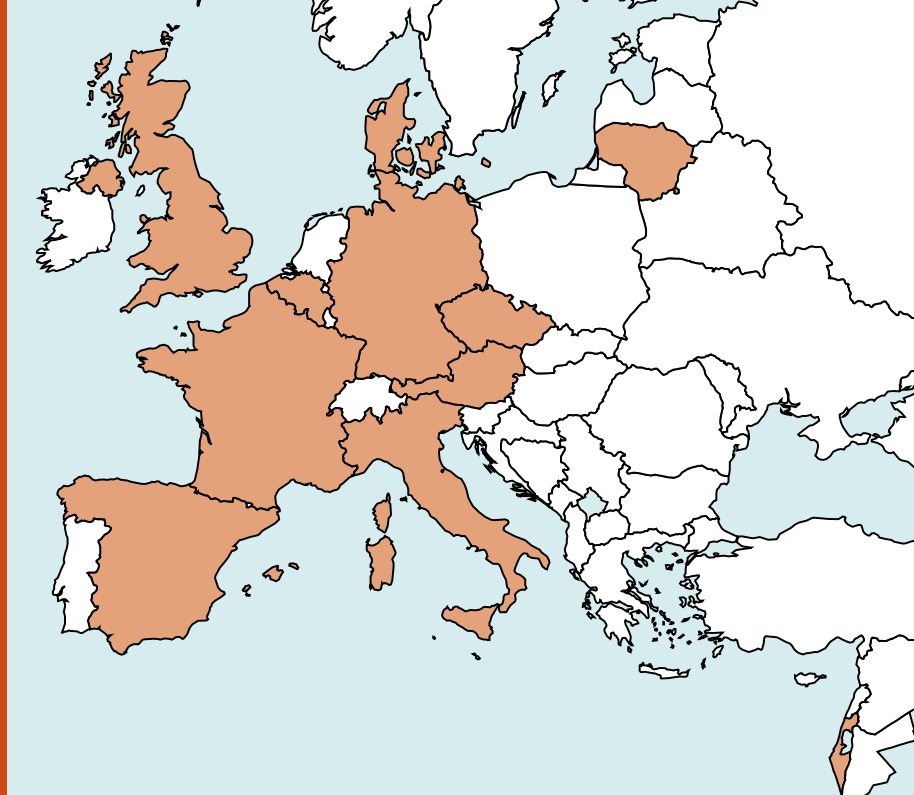
NAN  **PINION**

Nanotechnologies

A Subject for Public Debate



NanOpinion at a Glance



NanOpinion project partners across Europe

Facts and Figures

Face to face activities

- 44** Total events
- 528** Event hours
- 15.000** People engaged in the streets (estimate)
- 44** Locations
- 26** Cities
- 18** Countries
- 1.556** Students engaged in school activities
- 468** National teachers trained

Organisations engaged

science centres, education networks, schools, universities, newspapers and media, cultural institutions, research institutes, science communication agencies.

Project Partners

- Centre for Social Innovation, coordinator
- Ort Israel
- European Schoolnet
- British Council
- European Science Centre Network
- Aarhus University
- Barcelona Science Park
- Centre for STS Studies at Institute of Philosophy, Academy of Sciences
- Federal Institute of Risk Assessment
- Lithuanian Centre of Non-formal Youth Education
- The Guardian
- El Mundo
- Courier International
- TICONUNO SRL
- Il Sole 24 Ore
- Deloitte Brightman Almagor Zohar
- Jon Turney
- Institute for Aids Research IrsiCaixa



NanOpinion monitoring station

Introduction

How can we promote broad social discussion of nanotechnologies? They are extremely diverse, and feature prominently in EU research strategy. Yet few citizens know much about them. The NanOpinion project, delivered new insights and recommendations on this question.

NanOpinion, which began in May 2012, was a 30 month project to investigate how opinion on this new generation of technologies is shaped, and how to inform public debate, especially among hard to reach groups, and enhance education. The results inform recommendations about future discussion and regulation of NT.

Our project included surveys, social media, school activities and public engagement activities built around specially designed street labs and monitoring stations. Our analysis draws on 8,330 questionnaires,

as well as data from workshops attached to the streetlabs, and reports from teachers and monitoring stations.

We also built a web gateway to a repository of carefully vetted materials on risks and benefits of nanotechnologies, along with a blog, online questionnaire, links to media microsites and polls. And other strands of the project developed new materials for use in schools, including online curriculum modules and virtual experiments, and ran teachers' workshops.

This effort yielded a wealth of data to help plan future public engagement on nanotechnologies and manage their regulation. Here we present the main findings and their implications.



People engaged at a NanOpinion monitoring station

Methods

Multi channel approach for public engagement:

- Nano content hub: online webportal for news, information, education, debate, online mini-courses, webinars, social media channels
- Media and channel convergence: newspaper supplements, radio programmes, media microsites, videos, social media, blogs
- Interaction and dialogue: consumer workshops, round table discussions, teacher workshops, school competition, monitoring stations, streetlabs, participatory workshops
- Surveys: questionnaire in 17 languages, opinion polls, monitoring station and streetlab reports, opinion boards, evaluation sheets



Questionnaire



Opinion board



Daily live reference



Results on how strongly persons support the use of NT, published on www.nanopinion.eu/results

The Information Hub

Our website, nanopinion.eu, was created as a lasting resource for nanotechnology information and debate, and as a tool for integrating the different parts of the project.

It presented the nanopinion questionnaire, for online response, along with monthly opinion polls asking specific questions about nanotechnologies.

An extensive repository of carefully assessed multimedia resources compiled materials from dozens of earlier projects that aimed for public engagement on nanotechnologies – a »one-stop shop« for nanotech information. This archived material is searchable, and includes reports, teachers' guides, videos and other materials on all nano topics .

As the project developed, the portal also featured our blog on nanopinion activities, and links to the regular news and discussion updates on our media partners' microsites.

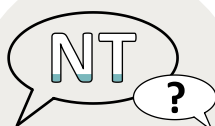
It is also the main point of access for our extensive new education materials, featuring mini-courses, teachers guides to hands-on experiments and other activities, our own virtual experiments and videos on current research.

The nanopinion portal will remain open to access beyond the life of the project, with support currently agreed until 2017.

Results will be published on www.nanopinion.eu/results



Generally,
a European
person...



does not feel
competent to
discuss NT

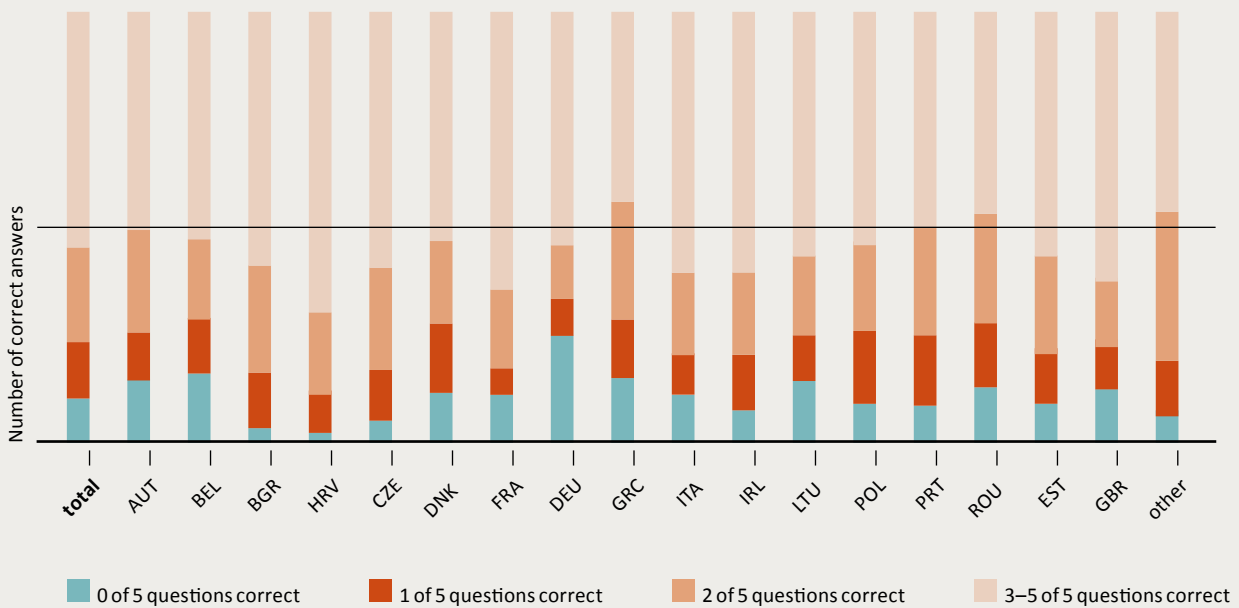


wants popular media,
regularly providing
information



does not feel
sufficiently
informed

Level of knowledge of Nanotechnology Total numbers, N=6779



Less than half of the respondents could answer more than half of 5 questions on NT correctly.

Expectation: Responsible Development

Responses to our questionnaire and workshops indicated that people know little about nanotechnologies, and do not feel secure in their opinions on the subject.

One fifth of consumers in our study had never heard of nanotechnology. Less than half of our respondents could answer more than half of five questions on a NT knowledge quiz correctly.



Lotus effect demonstration

They may see nanotechnologies as an inevitable part of their future. They are broadly optimistic about the effects of new technology, but there is also scepticism that risks are always considered adequately.

The NanOpinion outreach campaign showed that additional information and awareness about new technologies can lead to doubts and reflections but does not necessarily produce negative attitudes. People need not have a detailed knowledge of nanotechnologies to have expectations about how they should be assessed and regulated. Lack of knowledge does not hamper use of everyday reasoning and of analogies with other technologies.



Generally, a European person...

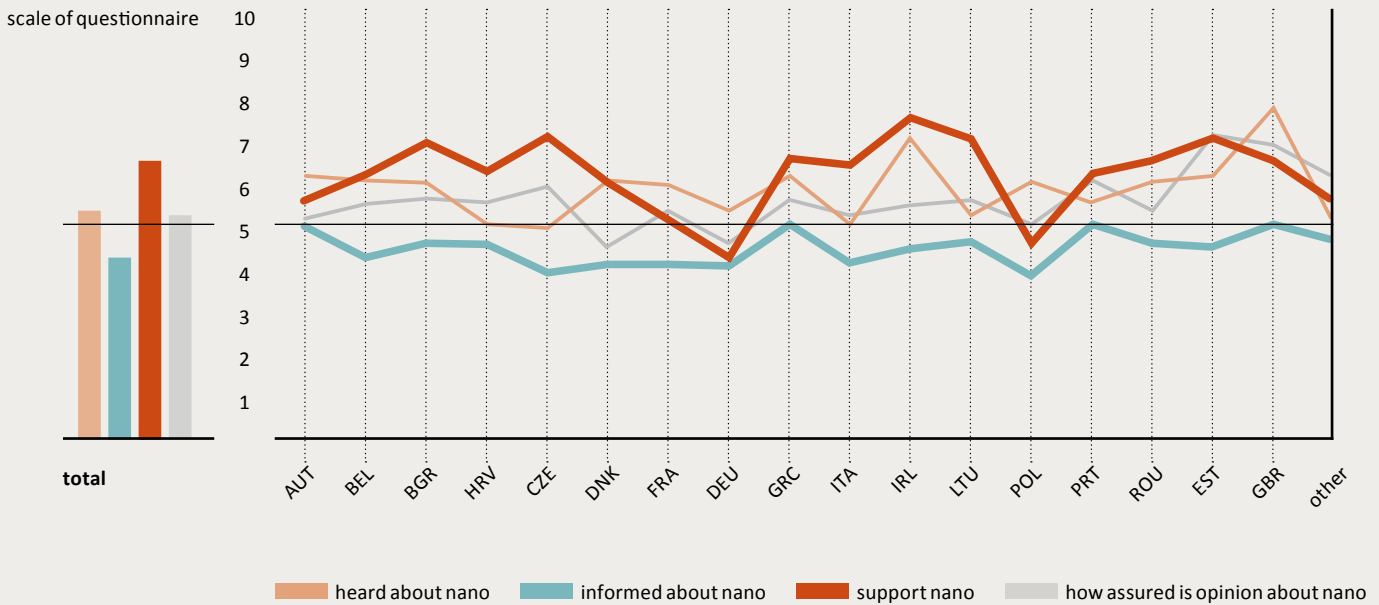


has a positive attitude on NT



does not feel competent to discuss NT

Awareness on Nanotechnologies Means, N=4819



A pattern throughout all countries: Although people are little informed about NT they support them.

Our respondents expect regulation and testing to cover new nanotechnologies, and their health and environmental impacts.

There is broad support for the use of nanotechnologies, but people would like reassurance that there is an »exit strategy« if unexpected risks appear. There is little trust in companies' practices without regulation, although people support the freedom to do basic research.

Regulatory authorities are expected to monitor new products, ensure testing before market release, and to take account of international developments. Maintaining the credibility of regulators is crucial for future use of nanotechnologies.

Recommendations in brief:

- Promote labelling of NT products, along with detailed, accessible information.
- Collaborate with independent institutions for certification.

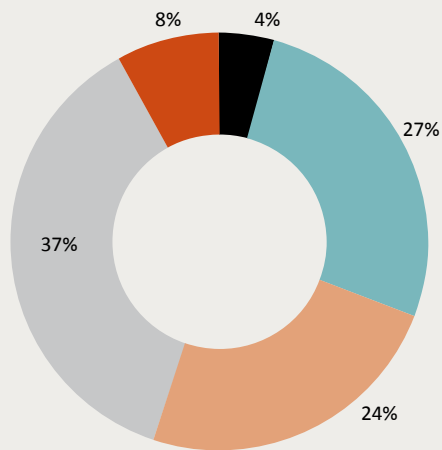


Tablet computers at monitoring station



Opinion towards labelling nanoproducts

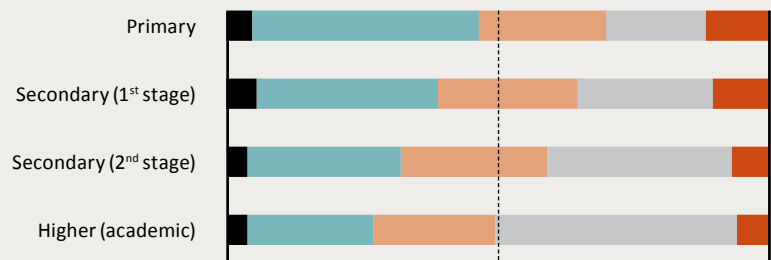
Percentages, N=6779



no necessity to label
 should be labelled
 labelled and links
 labelled, links, quality control, official seal
 no opinion

Opinion towards labelling nanoproducts by education

Percentages, N=6671



Europeans are in favour of product labelling.

Labelling: Strongly Supported

A large majority of Europeans favour labelling of products using nanotechnologies. It should extend to sources of further information, and specify quality control standards.

They are generally willing to buy the products although there are concerns about the price. But people wish to be informed that nanotechnologies were involved in manufacture of particular products, and to know about the properties of nanomaterials or processes used. The most sensitive product category is food, whether nanotechnology is directly involved in a product or used in processing or packaging.

Older people and the better educated are most likely to favour provision of more detailed information on product labels.

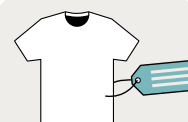
It is important to involve the public in the debate on regulation and labelling. There is strong support for approval of product safety to be certified by independent institutions. Along with this, people still wish to have information about the attributes of products that use nanotechnologies, along with their price, availability and potential impact.



In terms of regulation a European...



appreciates regular monitoring of new NT developments



asks for detailed product information

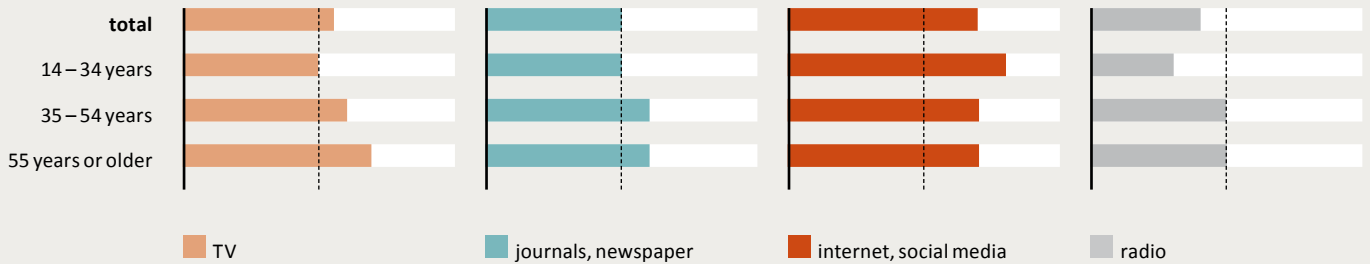


believes in independent regulatory bodies

Preferred sources of information Medians, N=6779



Usage Patterns: Media by age groups Means, N=6679



Science news are preferred sources of information. Internet and social media are preferred media, older groups still prefer TV.

Broader Public Information

Outreach is essential for effective engagement but, especially when the topic is so novel, needs to work in conjunction with communication via a mix of other channels. Diverse target groups prefer different communication channels although face-to-face, interactive communication is generally most effective. However, a range of media and social media channels have to be used as well to ensure broad coverage of target groups.

Science magazines are seen as the most trustworthy channel, but unfortunately are not widely read. The internet is an important source. Social media differ widely in their usefulness, depending on age, professional status and nationality. Knowledge of social media infrastructures and users in particular

countries is essential for these channels to be incorporated in an engagement effort. Citizens in general do not see social media and blogs as reliable sources. They are more likely to use institutional websites. Official sites need to convey basic information, at different levels, and more reliable and easily accessible information on TV and in newspapers is also needed.



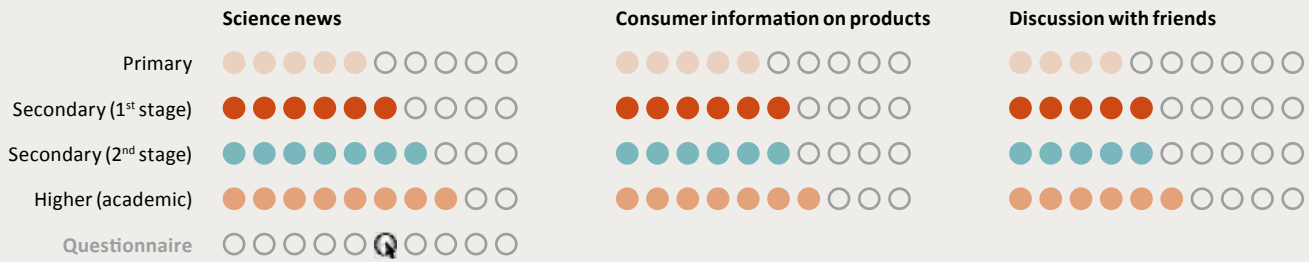
NanOpinion workshop discussion on media

does not (yet) have a secured opinion

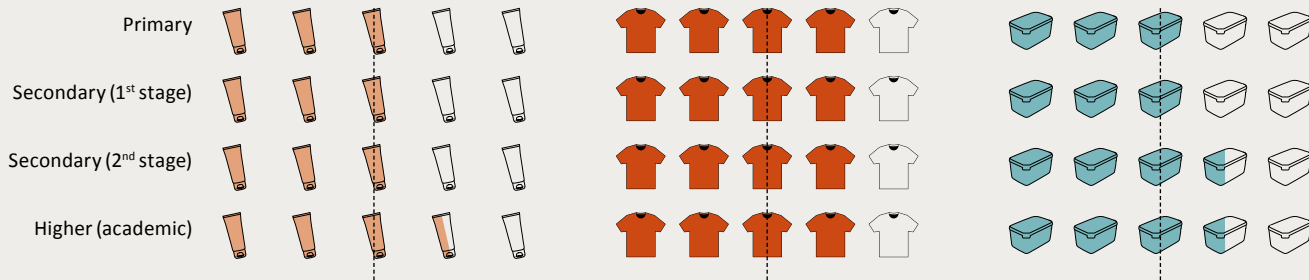
expects to receive honest and balanced information

is interested in ethical legal social aspects

Sources of information by education Medians, N=6671



Willingness to buy by education Medians, N=6670



There is an above average willingness to buy NT products throughout all education levels.

Education: A Key to Foster Dialogue

Education is key to participation in decision-making on nanotechnology, as well as important for inspiring interest in science in general and in careers in nanotechnology industries or research.

Nanotechnology is inherently multi-disciplinary, and special efforts are needed to reconcile this with the single discipline approach that shapes most teachers' lessons. Nanotechnology education can be an excellent way to introduce the modern methodology of STEM (Science, Technology, Engineering and Mathematics) across the EU educational system.

Schools' work on nanotechnologies should involve parents and the wider community, where possible, to extend its impact.

Teachers need training and support to get to grips with nanotechnologies, including money for hand-on activities and equipment, and opportunities to update their knowledge. Flexibility in the science curriculum is important to accommodate these new technologies and creative approaches to teaching about them. Updating teachers' knowledge and skills in nanotechnology is a pan-EU challenge that calls for collaboration between secondary education, universities and industry.

Existing teacher networks at European, national and regional levels will amplify efforts here.



Teacher Workshop



Teacher workshops and briefings

Schools will benefit from access to state-of-the-art nanotechnology work in academia and industry. Funding for collaboration here is important. Useful routes include open laboratories for students and encouraging university experts to make time to engage with schools.

Inquiry-based learning, which the NanOpinion teaching materials used, is good for motivating students and developing critical thinking skills about the topic.

Recommendations in brief:

- **Support STEM teachers to integrate NT into their lessons.**
- **Invest in teacher training and support at local, national and European level.**
- **Encourage development of more flexible and interdisciplinary STEM curricula.**
- **Create a European online hub for e-courses and related materials.**



Street theatre



Children's programme



Impressions of monitoring stations

Practical Lessons Learnt

An eye-catching stand – in our case, what we came to call the »orange mushroom« – helps to draw people in. It needs to be the focus of a space that allows dialogue, demonstrations, and display, and activities such as filling in a questionnaire.

The setting must encourage people to linger – time for effective interaction is crucial, and successful encounters take at least 20 minutes. The opportunity to return to an outreach site, perhaps another day, is also helpful.

Electronic media have not yet displaced traditional formats, and some people still prefer paper and pen questionnaires and face-to-face discussions.

Facilitators must be seen as neutral, and selected and trained to achieve this. They need to be supported by materials written at different levels adapted to different audiences. They must consider the preferences of each target group.

The reputation of the host is also crucial. Real NT products, and hands-on activities are the most effective introductions to the topic. These can be supplemented by reflective activities such as discussion games, role-play exercises, and consultation through questionnaires. A focus on topics that relate to daily life, like sports or food, is often the best way to engage interest. The word »nanotechnology« does not have to be the first thing people hear, even if that is where the discussion is headed.

Our approach to engaging hard to reach groups such as the elderly and less well-educated can be extended. It calls for introductory dialogues in everyday venues – shopping malls, parks, libraries, hospital waiting areas, transport lounges – or in workplaces.

Public engagement efforts like this benefit from being run in parallel with social media campaigns and online discussion.



NanOpinion workshop

Effective Outreach and Public Engagement

We were able to trial novel methods for engaging with publics directly at diverse sites in many different countries. Most of the general public do not go looking for scientific information, but they can be drawn in to discussion of new technologies if public engagement activities are well planned. In the context of the efforts to ensure Responsible Research and Innovation, our experience indicates fruitful ways to take forward citizen engagement in governance of new technologies.

Public engagement activities for new technologies like these, that aim to make a lasting impact on awareness, need to begin with relatively simple information, then prompt curiosity to seek to become better informed.

All stakeholders in the research and innovation system – policy-makers, researchers in natural and social science, science educators, industry, and citizens

themselves – should ideally collaborate in developing outreach and public engagement programmes. Face to face events, with appealing activities and trained facilitators, should be organised whenever possible. They can be complemented by online dialogues.

Recommendations in brief:

- **Invest in a network of stakeholders engaging citizens in live dialogue and reflection.**
- **Emphasise debate and collaborative learning to help develop opinions.**
- **Organise activities in venues people use day-to-day.**



The NanOpinion candy



The NanOpinion team visiting a monitoring station

Future Options

Our experience suggests there are many opportunities for improving stakeholder involvement in discussion of nanotechnologies in future.

The public and consumers have to be engaged in the Research and Innovation process, and in the debates on regulation, social implications and labelling. We need regular monitoring of people's opinion as NT develops. Public concerns include wishing for assurance that there can be an NT exit strategy.

We know that reflective and consultation methodologies help citizens form their opinion, and can inform policy makers and help design future programmes. They facilitate real participation in the Research and Innovation system. Public engagement activities prompt reflection and seeking more information, and thus are a good start

to public discussions. They need time and money to organize. Participants also need time to focus on the topic.

Hard to reach citizens respond to introductory dialogues in venues where they normally spend time (malls, parks, libraries, waiting areas in hospitals, airports, or at work). An eye-catching stand helps draw people in, but give-aways and additional information are also essential. Facilitators are important. Their number, background, attitude, performance and understanding of the target group are decisive.

Education policies must support a more flexible STEM curriculum, and support teachers with training, and with access to NT science researchers. Teachers need a minimum background and training in NT. Rewards, certificates, and money for consumables can all help. Formal education



Nanotechnologies »in action«
at literature festival Cheltenham

serves well to launch public engagement if materials are adapted to curriculum needs.

Opportunities to build on these findings could include:

- Involving third sector organisations, such as consumer organisations and environmental NGOs at the outset.
- Promoting collaboration among policy-makers, industry and research organisations to find channels of genuine participation, where citizens can help shape research and innovation agendas.
- Promoting citizen involvement in reflective activities that are embedded in industry and research organisations throughout the innovation process.
- Promoting flexible curricula that allow adoption of up to date teaching methods, demonstrations and virtual experiments.

Recommendations in brief:

- **Investigate a wider range of innovative methods for communication and engagement around nanotechnologies**
- **Explore ways of sharing responsibility for shaping the research and innovation agenda in NT.**
- **Consider how to co-ordinate multi-channel campaigns of science communication and engagement, including targeted use of social media.**
- **Discover the effective incentives for industry and academia to contribute to science communication and education in NT.**
- **Establish a continuing and sustainable information and dialogue hub.**

www.nanopinion.eu



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