



UNIVERSITY OF THE BASQUE COUNTRY

PHD DISSERTATION:

EUROPEAN SCIENTISTS' PUBLIC COMMUNICATION ATTITUDES: A cross-national quantitative and qualitative empirical study of scientists' views and experiences and the institutional, local and national influences determining their public engagement activities

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DEPARTMENT OF LOGIC AND PHILOSOPHY OF SCIENCE

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To **John Hislop**, my dear husband,
Who has supported me with more than love.

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Introduction

In addition to being a human right (Article 27, Universal Declaration of Human Rights), sharing the development of scientific research and its benefits is one of the essential supports of democratic societies. Nowadays, citizen participation is addressing more and more fields of action and interests, and demands changes in diverse structures and institutions to respond to new social needs. The interest in the impacts and changes that science and technology have made to society and everyday life has grown, as have demands for greater accountability regarding science and technology policies, actions and decision-making. Recent examples of these phenomena include the unexpected change in energy policy in Germany caused by the social demands for nuclear plant closures in this country after the nuclear crisis in the Fukushima Daiichi power plant in Japan following a massive tsunami in 2011; and the prosecution of scientists and government of the region of L'Aquila, Italy, 'for failing to warn people of an earthquake' that killed around 308 people in 2009. They were accused of giving "inexact, incomplete and contradictory information".

The Internet has been a key element in these changes. Today it is one of the main sources of scientific information in many countries, including the United States. Furthermore, compared to more traditional sources of information, the internet is leading the way in terms of right of free access to information and speed of access to almost unlimited forms of relevant information.

Although governments, the media, and various institutions and civil organizations have taken action to respond to these changes, they have been overwhelmed by the needs and expectations of citizens, particularly on efficient access to dialogue with the different agents.

Likewise, the dialogue between science and society, specifically between scientific institutions and citizens, is also being questioned and subjected to the new requirements, such as those asking for a strengthening of the engagement with the general public as part of the scientific work.

Various studies and surveys have revealed a modest increase in the participation of scientists in science communication and public engagement during recent times (Royal Society, 2006; *Survey of Factors affecting science communication by scientists and engineers*). Some of them also examine the practices and attitudes of scientists to the public communication of science across countries (Peters & et al; 2008; *Interactions with the mass media*), aiming to find cultural differences or significant variances that can help to encourage the activity. This evidence indicates that the position does not differ much between countries: for the vast majority of scientists, public science communication is viewed as altruistic and not as an important part of their academic life.

Most of the reports that examine the views and experiences of scientists are quantitative in nature, obtained through surveys by mail or online questionnaires and with intrinsic methodological limitations. Although they have achieved significant results, these studies did not include in their analyses the specific environments and contexts in which the groups of scientists surveyed were connected to national, regional or institutional policies on the public communication of science, which might have had an influence on their participation. A relevant example of this influence is the world celebration “the Year of Physics”, in 2005, which changed positively the stance of several research institutes regarding public communication activities.

The present empirical research work seeks to contribute to the qualitative analysis of scientists’ public communication attitudes and the influences affecting their public engagements. The research for this survey was carried out between May 2008 and May 2009 in 5 European research centres involved in nanotechnology and materials science; Fritz Haber Institute (FHI), Berlin, Germany; Centre d’Elaboration de Matériaux et d’Etudes Structurales (CEMES), Toulouse, France; Istituto per lo Studio dei Materiali Nanostrutturati (ISMN), Bologna, Italy; Centre for Materials Science and Engineering (CSME), Edinburgh, United Kingdom and Donosti International Physics Center (DIPC), Donostia-San Sebastian, Spain. The study included face to face interviews with 112 scientists and 9 national and local Public Relations and Press Officers of the relevant

institutes, as well as observations of the public communication activities and interactions occurring in the centres.

The first chapters of this work (1, 2, 3) present a brief historical review of the public communication of science phenomena and a compilation of the theoretical work and positions that various authors have developed in the subject of models of public communication. They also highlight the findings of some important surveys about activities and attitudes of scientists to the public communication of science, public scientists' engagement with the public, their interaction with the media; and some of the public initiatives in the promotion and integration of science in society.

In particular, the third chapter focuses on analysis of the conflict between journalistic and scientific cultures, and the role in which scientists are currently being placed in the public arena.

The last chapters of this work (4, 5) show the quantitative and qualitative results of this empirical research; information on the public activities in which the research centres studied had been regularly involved; quantitative data obtained from the questionnaires applied to scientists, and the latter's comments emerging from the interviews. They also include interviews with the public relations officers of the institutes. In order that the results of this study could be contrasted with similar others, it followed the same lines of inquiry that the Royal Society applied in its survey of *Factors affecting science communication by scientists and engineers* (2006), which covered 5 categories of information: What public engagement means to scientists; Audiences and activities; Barriers to science communication; Training and demand; and Incentives for science communication. The results are organised and presented first by each country, and secondly summarised and shown as general findings.

Finally, the conclusion tries to elicit a discussion about the influence of external bodies on the scientists' attitudes and the role that public science communicators have in these phenomena, offering some insights into the interaction between scientists and the general public.

Introducción

El compartir el desarrollo de la investigación científica y sus beneficios, además de ser parte de uno de los derechos del ser humano, estipulado en el artículo 27 de la declaración de los derechos humanos, es uno de los elementos esenciales para el mantenimiento de sociedades democráticas. Hoy la participación ciudadana no solo abarca más campos de acción y una diversidad de intereses; también, exige cambios estructurales e institucionales acordes a las nuevas necesidades sociales.

El interés en los cambios e impacto que la ciencia y la tecnología están produciendo en la sociedad y en la vida diaria ha crecido, así como las demandas por una mayor corresponsabilidad en las políticas, acciones y decisiones en materia de ciencia y tecnología. Algunos ejemplos recientes de este fenómeno son el inesperado cambio en la política energética en Alemania provocado por las demandas sociales para el cierre de las plantas nucleares en este país, después de la crisis nuclear acontecida en la planta nuclear Fukushima Daiichi, en Japón, por el tsunami del 2011; así como el juicio en contra de científicos y gobierno de la ciudad de L'Alquila, Italia, por fallar en la alerta a los cuidados en el terremoto que mato a mas de 308 personas en el 2008. Específicamente, ellos fueron acusados de proporcionar "información inexacta, incompleta y contradictoria".

El Internet sin duda alguna ha sido uno de los elementos claves en todos estos cambios. Actualmente, internet es una de las fuentes principales de información científica, en muchos países, como es el caso de los Estados Unidos. Asimismo, comparado con otras fuentes de información tradicional, internet lidera en términos de libre acceso a la información, y rapidez en el acceso a una diversidad de formas de información relevante.

A pesar de que gobiernos, medios de comunicación y diversas instituciones y organizaciones civiles están tomando medidas y acciones para responder a todos estos cambios, están siendo rebasados por las necesidades y expectativas de los ciudadanos, particularmente en establecimiento de dialogo eficaz con los diferentes agentes sociales.

Asimismo, el dialogo entre ciencia y sociedad, específicamente entre instituciones científicas y ciudadanos, está siendo cuestionada y sometida a nuevos requerimientos, como el fortalecer la participación y el compromiso de los ciudadanos como parte del trabajo científico.

Diversos estudios y encuestas muestran que en los últimos años ha habido un modesto aumento en la participación de los científicos en la comunicación pública de la ciencia y el compromiso público ((Royal Society, 2006; *Survey of Factors affecting science communication by scientists and engineers*). Algunos de estos estudios comparan actitudes y prácticas de los científicos para la comunicación pública de la ciencia entre diferentes países (Peters & et al; 2008; *Interactions with the mass media*), con la finalidad de encontrar diferencias culturales o variaciones significativas que sirvan para apoyar la actividad. Sin embargo, la evidencia muestra que la posición de los científicos no difiere mucho entre países, y que para la mayoría de los científicos, la comunicación pública de la ciencia es considerada una actividad altruista y no como parte de la actividad académica.

La mayoría de los reportes que examinan los puntos de vistas y experiencias de los científicos son de naturaleza cuantitativa, cuya información fue obtenida por cuestionarios y correos electrónicos, y por tanto con algunas limitaciones metodológicas. Aunque estos estudios por supuesto ofrecen información relevante, no incluyen asimismo en sus análisis los contextos y ambientes específicos en los cuales los científicos encuestados se encontraban, conectados tal vez con políticas nacionales, regionales, o institucionales, que nosotros suponemos tienen influencia en su participación. Un ejemplo importante en este sentido es la influencia que tuvo la celebración mundial del Año de la Física, en 2005, la cual cambio positivamente el estado de las cosas en varios institutos de investigación en cuanto a su participación en actividades de comunicación pública de la ciencia.

El trabajo experimental que presentamos ahora pretende contribuir en el estudio de los análisis de las actitudes de los científicos y las influencias que

afectan su participación en actividades con el público. La investigación de este estudio fue realizada entre mayo del 2008 y mayo del 2009, en 5 centros de investigación científica relacionados con nanotecnología y el estudio de materiales: Fritz Haber Institute (FHI), Berlin, Alemania; Centre d'Elaboration de Materiaux et d'Etudes Structurales (CEMES), Toulouse, Francia; Instituto per lo Studio dei Materiali Nanostrutturati (ISMN), Bologna, Italia; Centre for Materials Science and Engineering (CSME), Edinburgh, Reino Unido y Donosti International Physics Center (DIPC), Donostia-San Sebastian, España. El estudio incluyó entrevistas cara a cara con 112 científicos y 9 jefes de prensa y relaciones públicas, tanto locales como nacionales de los respectivos institutos de investigación; así como observaciones directas de las actividades e interacciones para la comunicación pública de la ciencia ocurridas en los centros.

Los primeros capítulos de este trabajo (1, 2, 3) presentan un breve recorrido histórico del fenómeno de la comunicación pública de la ciencia y una compilación del trabajo teórico y la posición de diferentes autores respecto a los modelos de la comunicación pública de la ciencia. Se mencionan, los resultados relevantes de algunas de las encuestas sobre actitudes y participación de los científicos para la comunicación pública de la ciencia, y su interacción con los medios de comunicación; así como algunas iniciativas públicas para promoción y la integración de la ciencia en la sociedad.

En particular el tercer capítulo está dedicado al análisis del conflicto entre la cultura científica y la periodística, y el rol que actualmente los científicos están ejerciendo en la arena pública.

Los últimos capítulos (4, 5) presentan los resultados cuantitativos y cualitativos de este estudio experimental; la información de las actividades públicas en las cuales los centros de investigación estuvieron participando regularmente; los datos cuantitativos obtenidos del cuestionario aplicado a los científicos, y los comentarios surgidos en las entrevistas (información cualitativa). Se incluyen las entrevistas de los jefes de relaciones públicas de los respectivos institutos. Con la finalidad de que estos resultados pudieran ser comparados con otros

similares, se utilizaron las líneas de indagación que la *Royal Society* aplicó en su estudio *Factors affecting science communication by scientists and engineers* (2006), el cual cubre 5 categorías de información: Lo que significa para el científico el compromiso con el público; Audiencias y actividades; Barreras para la comunicación pública de la ciencia, Formación y Demanda; e Incentivos para la comunicación pública de la ciencia. Los resultados están organizados y presentados primeramente por país, y posteriormente resumidos y presentados como resultados generales.

Finalmente, las conclusiones se encaminan al debate sobre la influencia de la diversidad de actores externos en las actitudes de los científicos para la comunicación pública de la ciencia y el rol que los comunicadores de la ciencia tienen en este fenómeno, ofreciendo importantes conexiones para la interacción entre científicos y los ciudadanos.

Chapter 1.

The Public Communication of Science

Contents

- 1.1. A brief historical review
- 1.2. The current arguments and models of public communication of science
- 1.3. The debate

1.1. A Brief historical review.

It was in 1992 that the journal *Public Understanding of Science* was founded in response to the extended actions and reflections that took place in the 1980s on the matter of the public communication of science and technology (PCST). Although the theoretical and empirical research on this subject is relatively recent, its practice is documented with the beginning of the systematized creation and production of science. What is more, it has been involved in the development of ideologies of science and its social and economic roles (Bucchi, 2008, Massarini & Moreira 2004, Raichvarg and Jacques, 1991).

In the 17th century, the public communication of science functioned within the formation of the scientific community and the institutionalisation of science. At this time Galileo was communicating his works in astronomy and physics, including spreading the new methods of experimentation and ways of thinking. In the 18th century, the Enlightenment was characterized by the great public interest in science, and its use as a powerful political tool. The public communication of science activities took diverse forms, satisfying the new avid audiences with numerous popular science books and scientific discoveries in the daily press. In addition there were attractive exhibitions and fairs showing the latest marvels of science and technology; the creation of botanic gardens, the formation of natural history societies which sponsored public demonstrations, and popular conferences, and journals dedicated to popularising science. Likewise the Naturalists with their expeditions were playing an important role in communicating the new knowledge acquired from other cultures. Meanwhile in Latin America and Asia, these initiatives were few in number and had poor institutional support, although the local intellectuals strongly held the idea that science would improve the economic situations of their countries.

In the 19th century along with expectations resulting from the development of the emerging industrial economies, a particular worldview of the benefits of scientific and technical advances was taking hold. This time, the public

communication of science and technology (PCST) collaborated in maintaining social order and the legitimisation of the state institutions (Irwin & Wynne, 1996). The Universal Exhibitions, for example, promoted the spirit of a 'Third World' around the globe.

A new discourse appeared around the period of the Second World War. In Britain the 'visible college' of left-wing scientists argued the need for greater citizen awareness of science (Irwin & Wynne, 1996; Werskey, 1988); and after the war, the Association of Scientific Workers, wrote down similar sentiments in their *Science and the Nation* publication (1947), stating that 'democracy needs a greater technical awareness, a rise in the standards of social and technical thinking'. They recommended the use of diverse media as a means of 'broadening' education, through such media as museums, film, the press and radio. They also demanded that scientists become more involved in PCST activities. Meanwhile, new interactive museums appeared in Europe and US; and in some Latin-American countries scientific associations were created in defence of basic research.

The role of the mass media was significant after the Second World War. For example, newspapers return to cover scientific information (Schiele, 2008). The developments made during the war, in medicine, energy, transportation and communication became used for civilian purposes and the media's communication of science helped to re-establish a balance and also to restore the right to speak freely.

During the 1960's the social debate included reflections on the role of science on the productive forces and on its structuring effects on society; discussion arose concerning those involved in the scientific culture spectrum (Schiele, 2008), namely scientists (the creators); the general public (the consumers of culture), and the 'intermediaries' (the media), filling the gap between them.

In 1980's the debate about PCST re-emerge with decisive actions that led to its institutionalisation (Irwin & Wynne, 1996). The UK Royal Society and the American Association for the Advancement of the Science constituted their

Committees for the Public Understanding of Science. Furthermore in 1985 the Royal Society published a report which referred to the absence of substantial progress in the subject, stressing the durability of these issues and endorsing important changes in the educational, political and scientific community. The rhetoric that justified the relevance of the public understanding of science was related to national prosperity; economic performance, public policy and culture.

1.2. The current arguments and models of public communication of science

Nowadays there is a widely held consensus regarding the importance of the public communication of science, but there are also diverse perspectives and visions that legitimize the activity.

Irwin & Wynne (1996) identified that the need for a wider public understanding of science is justified in terms of:

- National Prosperity (e.g. a better-trained workforce),
- Economic performance (e.g. beneficial effect on innovation),
- Public policy (public decisions),
- Personal decisions (e.g. smoking, vaccination, diet),
- Everyday life (e.g. understanding what goes on around us),
- Risk and uncertainty (e.g. concerning nuclear power),
- Contemporary thought and culture (science as a rich area of human inquiry and discovery).

For Stocklmayer & et al. (2002), the relevance of the communication of science to the public can be summarised under five headings:

- Economic (main driving force towards a better scientifically educated public),
- Utilitarian (public should be scientifically aware of the way the community uses science, for example new applications such as the use of the DNA fingerprints in identifying criminals),
- Democratic (public make-decisions)

- Cultural (appreciating science for its own sake, like art),
- Social (science permeates all levels of human activity, and its awareness serve to enhance social cohesion).

These arguments have been forwarded over the past decades by a diversity of bodies involved in the promotion of the PCST activities including governments, scientific institutions, civil associations, and mass media. These bodies have been involved with experiments in different models of public communication of science.

Regarding the models of public science communication currently in action, they can be understood as different groups of orientations or expectations aimed at maintaining communication between science and the public. Trench (2008) adapted an Analytical Framework of Science Communication Models, which shows a grid centred on a triad of models of science communication:

Deficit model: science is transmitted by experts to audiences perceived to be deficient in awareness and understanding (linear model).

Dialogue model: Science is communicated between scientists and their representatives and other groups, sometimes to find out how science could be more effectively disseminated, sometimes for consultation on specific applications (two way model).

Participation model: Communication about science takes place between diverse groups on the basis that all can contribute, and that all have a stake in the outcome of the deliberations and discussions (multidirectional model).

TABLE 1. ANALYTICAL FRAMEWORK OF SCIENCE COMMUNICATION MODELS (TRENCH, 2008)

Base Communication Models	Ideological and Philosophical Associations	Dominant Models in PCST	Variants on Dominant PCST Models	Science's orientation to Public
Dissemination	Scientism Technocracy	Deficit	Defence Marketing	They are hostile They are ignorant They can be persuaded
Dialogue	Pragmatism Constructivism	Dialogue	Context Consultation Engagement	We see their diverse needs We find out their views They talk back They take on the issue
Conversation	Participatory democracy Relativism	Participation	Deliberation Critique	They and we shape the issue They and we set the agenda They and we negotiate meanings

In the column 1 of the table, the core science communication models are related to established and recognized communication models (Dissemination, Dialogue and conversation). Column 2 lists some ideological and philosophical perspectives (Scientism, Technocracy, Pragmatism, Constructivism, Participatory democracy, and Relativism) involved in how the models are applied within the specific contexts of the PCST.

Trench also includes in the framework some of the known variants of the three models of science communication which are based in the analysis of current practices (column 4). They are:

Defence, here the public is envisaged as hostile (anti-science).

Marketing, the purpose is to persuade the public (e.g. increase science and technology student numbers).

Context, contextualized practices consider the diversity of publics and the ways in which they appropriate information.

Consultation, the public's opinions are required to redefine messages or negotiate about applications.

Engagement, here the emphasis is on how the public express concerns, raise questions and become actively involved.

Deliberation, a form of public participation, based on democratic processes; the public contributions help set the agenda for science communication and for science.

Critique, science is held to account through reference to other intellectual disciplines and cultural activities that can offer insights into the public meanings of science.

Finally, in the column 5, the author explains the models in terms of the public's role (hostile, ignorant, persuaded, get their views, talk back, take on the issue, shape the issue, set agenda, negotiate meanings).

1.3. The Debate

During the two past decades numerous empirical and theoretical works have criticized the Deficit or Diffusionist Model, which consists of the notion of communication as a transfer of information or knowledge, without significant alteration from one context to another (Bucchi 2008, 1996; Callon 1999). This model has also addressed different policies on public scientific communication.

The diffusionist conception has long informed studies on public scientific knowledge. First conducted in the USA during the 1950's research on the general public's interest in and awareness of science and scientific information has, since 1980s, become common in numerous countries. The results of this research have frequently been used to decry the public's scant interest in science and its excessively low level of scientific literacy, and to call for quantitative and qualitative improvements in science communication addressed to the public at large. (Bucchi, 2008, p. 59)

Callon summarised the three models of science communication support as, the Public Education Model (Deficit Model), the Public debate Model (Dialogue Model) and the Co-production of Knowledge (Participation Model).

According to this author some of the main premises of the **Deficit Model** are as follow:

- Scientific knowledge is the opposite of popular knowledge (shaped by beliefs and superstitions).

- Not only must scientists teach the public, they even have nothing to learn from it.

- Science is a separate institution governed by its own norms (which guards against all forms of contamination).

- The link between scientists and the public is indirect: the state represents them (as citizens) and their will, and the firms comply with consumers' demands. In other words, science is autonomous but not independent; it is subject to control by the public authorities and adapts to suit the innovation projects of companies. The public does not participate directly in the knowledge production; they delegate their expectations and demands to intermediaries who have direct contact with scientists.

- The existence of trusting relationships between lay people and scientists. As soon as mistrust sets in, the balance and all relationships between them are threatened.

Bucchi (2008) highlighted that in the diffusionist conception, scientific facts need only be transported from specialist context to a popular one, and this supports and legitimises two of the bodies involved in the process: namely the mediators – popularisers, and science journalist-; and scientists, who in this model are authorised to proclaim themselves extraneous to the process of public communication and free to criticise errors and excesses (distortion, sensationalism). Likewise, this vision outlines the public's inability to understand

and appreciate the achievements of science, the misrepresentation by the mass media; and supports mainly the schemes aimed at promoting the public communication of science (e.g. open days, science festivals).

The **Public Debate model**, proposes richer relations between lay people and scientists. The right to discussion comes first because it is recognised that people have knowledge and competencies which enhance and add to those of scientists and specialists. Meanwhile in the **Participation Model o co-production of knowledge**, lay people are actively involved in the creation of knowledge concerning them. Here both specialists and non-specialists work in close collaboration and the notion of the public is replaced by that of the “concerned” group (e.g. associations of patients).

Each model has a key aspect, explained Callon, in the Deficit Model, it is the trust that lay people have in scientists; in the Debate Model it is the issue of the representativeness; in the Participation Model it is the concept of conciliation and the achievement of a common good. Each of these models proposes a form of production and diffusion of scientific knowledge, integrating the nature of knowledge produced the methods of cooperation between scientists and lay people, and the legitimacy of the decisions taken.

The reality shows that most of the communicative situations may move across models, and Deficit and Dialogue models coexist. Communication between public and experts occurs simultaneously at different levels, continuously influencing and reciprocating with one another (Bucchi, 1996, Trench 2008). For example a nanotechnology issue may initially take the form of deficit interaction, and later become the subject of public consultation and mobilisation. Also the bodies may take on variations with respect to their traditional patterns; research and policy institutions (traditionally supporters of the deficit model) may promote dialogue and participatory situations; citizens (involved in a dialogic and participatory forms) may contribute to relegation into the deficit mode in which they have little interest in participating, or in which they prefer to assume the role of spectators of knowledge, for instance for their own cultural benefits, aesthetic appreciation or entertainment. Furthermore, the concern of citizens is normally generated when

problematic and controversial situations occur. In these cases, typified by the NIMBY (not in my back yard) syndrome, dialogic procedures are able to activate participation only in regard to specific and localized issues (Pellegrini, 2008). Meanwhile general themes of national or supranational character do not tend to have the same attention of the civil society.

It is important to recognize that public communication of science is a dynamic and transformative process, a cross-talk model, where public and scientists discourse cohabit and where the core of scientific debate is also affected. In the same way it is essential to **reconsider the role that the mediating institutions** (popularisers, mass media, governments, associations, etc) have in the phenomena, for instance **offering important routes to this interaction.**

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Chapter 2.

Policies in science communication

Contents

- 2.1.** The role of the surveys of public attitudes in science and technology
- 2.2.** Actions in 'Science and Society'
- 2.3.** Promoting science in the media

2.1. The role of the surveys of public attitudes in science and technology.

After the WW II, many countries, especially in North America and Western Europe, experienced unprecedented economic growth, full employment and significant increases in material wealth. At this time the development of science and technology became a powerful metaphor for this transformation. The new movement, 'Science, the Endless Frontier' was named after the Vannevar Bush report to the US president in 1945, and held sway in this country and elsewhere up to the mid-1970's. It valued excellence in basic research and included a clear division of labour. Public research institutes supported missions of societal relevance, and universities began to be funded for basic research (Nowotny; Scott & Gibbons, 2001; Schiele 2008; European Commission, *the MASIS-report*, 2009). By the 1960s, national science policies became more active and this model came under pressure as new policy instruments (strategic research programmes) opened up, and public scrutiny and accountability became important as did links with various public bodies.

Finally, in the 1980s, a new model emerged to replace it, labelled 'Strategic Science', which included two new components: strategic research and innovation. Here, strategic research is defined as *basic research carried out with the expectation that it will produce a broad base of knowledge likely to form the background to the solution of recognized current or future practical problems* (Irvine & Martin, 1984). Innovation meanwhile is a lateral model, where innovations and their effects and impacts on wealth creation and quality of life are not limited to a linear chain of innovation, but instead derive from new, lateral combinations, and the social and intellectual mobility of key bodies (European Commission, *the MASIS-report*, 2009).

The first wide ranging study of public knowledge and attitudes in science and technology was conducted in the US in 1957 under the National Association of Science Writers. This national survey was carried out in part to try to connect with their potential readership. However, it was not until 1972 that the National Science Foundation launched the regular biennial *Science & Engineering*

Indicators report, which included science literature analysis. In 1988, the first British survey of the public understanding of science was designed to be comparable to the US surveys. It included a series of questions known as the *Oxford Knowledge Quiz*, which has since been used in surveys in several other countries (Gregory & Miller, 1998).

Surveys of public knowledge of science have had an important role in the development of public policies in science and technology and their results have heavily influenced diverse national programs on science communication. They aim to register changes in public opinion and therefore support or legitimize new political actions. In many countries these regular surveys have been funded and carried out by the national governmental offices of science, technology and education. Regional surveys have also been launched to try to bring different approaches to the collection of knowledge and attitudes.

In 1992 and 2001 the European Commission published their first public opinion surveys, *Europeans, Science and technology*; and by 2005, the Euro barometers were extended to include new members and candidates to the union. They also integrated a new approach, namely: 'Social values, science and technology'.

Another example of regional study is the comparative survey of public attitudes, understanding and knowledge of science and technology (2005-2009) for the Ibero-American region published in 2009 by the Network for Science and Technology Indicators-Ibero-American Inter-American (RICYT), with support of the Ibero-American States Organization (OEI), and through the Science, Technology and Society Observatory and the Spanish Foundation for Science and Technology (FECYT).

2.2. Actions in 'Science and Society'

In many countries diverse initiatives have been launched to try to update the contract between science and society; and varied arguments have been used in support of public policies and the initiation of funding schemes. The MASIS

Expert Group set up by the European Commission (2009) summarised the dimensions on which the role of science in society is currently lying:

The innovation dimension: ensuring economic competitiveness in the global marketplace, providing innovation and contributing to wealth, and economic growth;

The quality of life dimension: contributing to health, education, welfare, and a viable social order;

The political dimension: contributing to relevant debates, especially concerning future developments involving science and technology, as well as giving expert advice to policy makers and the public;

The cultural dimension: respecting cultural diversities, conserving cultural heritage, developing communication skills and intercultural dialogues;

The intellectual dimension: thinking about a 'good society', the future of human nature and sustainable development contributing to the quality of life.

It is a fact that during the last decades and up to the present, the innovation, along with other factors that contributed to the process of democratization, has been the centrepiece of the new contract between science and society, giving spaces for individuals as active agents, (Nowotny; Scott & Gibbons, 2001). The new economy is based on the creation of knowledge for innovation and is considered to be one of the most important factors in improving living standards and in recognising the value of production resources. A relevant example of the implementation of these ideas in concrete actions is in the politics of the European Union.

The Lisbon Treaty (2000) set the goal for the Union in terms of: 'becoming by 2010 the most competitive and dynamic knowledge-based economy in the world'. To have any chance of success, there should, in conjunction with this statement, be an awareness of the necessity of public

support for this vision, as well as the creation of a culture of public interest in science and technology. Therefore, in 2001, the Science and Society Action Plan was adopted as part of the creation of Research European Area (2000) and was included in the corresponding Sixth Framework Programme (FP6). Furthermore, the plan contributed to the implementation of the White Paper on the European Governance (2001), which proposed 'opening up the policy-making process to get more people and organisations involved in shaping and delivering European Union policy'.

The actions included in the Science and Society Plan described three types of initiatives: promoting education and science culture in Europe, bringing science policy closer to the citizens, and responsible science at the central point of policy making.

The Seventh Framework Programme (FP7), 2007-2013, with €330 million budget, was established to build on the actions taken by its predecessor programme. Its new perspective is illustrated by the new title "Science in society", recognising that research activities are a specific type of social activity which are embedded in a wider societal context. Likewise its work programme mentions three action lines: the aim for a more dynamic governance of the science and society relationship; strengthening potential and broadening horizons with respect to issues of gender and science education; and promoting effective two-way communication channels that enable the public to engage with science and vice versa. Regarding the objectives of the third action line 'Science and society communicate', it states that:

"Activities will contribute to addressing the ambiguous feelings expressed by citizens regarding knowledge and the potential benefits from science and technology. They will also help fight the perceived isolation of the world of science from the everyday realities of Europeans by promoting effective two way communication channels: providing a wider public with more scientific information and enabling the public to engage with scientists. A specific focus will be given to the role of the media in this regard, approached in their role as one voice of society's expectations, concerns and interests. A closer dialogue with them will be promoted, including the exchange of the best practices between scientists and media professionals. In addition, some of the

funded activities will be requested to provide the public with tools to express its views on science.” (European Commission, FP7 Capacities Work Programme, p. 29)

In general the actions of the Frame Programmes have focused in 6 specific areas:

- Provision of reliable and timely EU research information to the scientific press (FP6).
- Training actions to bridge the gap between the media and the scientific community (FP6).
- Encouraging an European dimension at science events targeting the public.
- Promotion of science by audio-visual means via European co-productions and the circulation of science programmes, and
- Promotion of excellent trans-national research and science communication by the means of popular prizes.

Furthermore, a special role has been assigned to science museums, science centres as developers of know-how in communicating science to the public and in associating science concepts with citizens’ debates and democracy tools. Some of the actions in the F7P are designed to ‘encourage the co-operation and networking between them and the organisers of national and regional events, by creating synergies to conceive and exchange ambitious and interactive exhibitions on European research topics’ and to engage in particular with citizens and civil society organizations.

2.3. Promoting science in the media

There are different bodies or intermediaries involved in the processes of communication science, including scientists, national academies of science, national and international disciplinary associations, science centres, science-based companies and industries, policy makers, publishers, the media, schools and universities. Also, diverse technologies such as museums, newspapers, magazines, books, television, radio, film, internet, etc. can serve

as the conduit of information flow. However nowadays the mass media have more influence than ever before both in policy and public opinion. Many more resources are used to influence them; politicians and private companies, NGOs (Non Governmental Organisations), among others, hire spin-doctors and communication experts to help in this battle for public attention. Likewise a number of national and institutional programmes dedicate specific funds to promote science in the media.

At the European level, the strategies have been focused on providing European research information efficiently to the scientific press and actions which improved the dialogue between the media and the scientific community.

Some examples of the implementation of these initiatives include the Foundation AlphaGalileo, the world's independent source of research news; and FUTURIS, the television magazine on European Research.

AlphaGalileo was founded by the UK's Particle Physics and Astronomy Research Council in 1998, to promote research and support the communication between the scientists, journalists and the public. Their funds has been provided at various times by the European Commission and the governments of France, Germany and the United Kingdom, with support from research and science promotion bodies in Belgium, Finland, Germany, Greece, Ireland, Netherlands, Poland, Portugal, Spain, Sweden, Switzerland and the UK. Since 2003, the service has operated as an independent not-for-profit company, the AlphaGalileo Foundation, which is funded mainly by subscriptions and supported by commercial sponsorship and grants (www.alphagalileo.org). Research bodies subscribed to AlphaGalileo (over 1,700) use the service to promote their research worldwide, with news posted onto their website reaching immediately more than 7,600 media professionals. Press releases, event or publication announcements, library items and broadcast media posted on AlphaGalileo are published online and disseminated via email alerts and RSS feeds to the journalists from all over the world. They also distribute their news in [Twitter](#) and [Facebook](#).

Feedback from their users expresses clearly the success this press agency has gained over the years:

"The daily news alerts from Alphagalileo offer a very useful opportunity to skim through science and technology headlines and summaries. My specific interest for work is a niche within a niche, but my natural curiosity about all sorts of subjects means I often look up some of the other news stories!" **Steve Barrett, Elsevier Ltd**

"As an ordinary news reporter, I have used AlphaGalileo from its earliest days. It's an invaluable resource because it provides access to information that would never normally reach me. It has given me the edge over competitors time and time again." **Alan Watkins, Kent Messenger Group**

"As an American journalist covering European science, the site is invaluable. There are simply no other resources like it." **Rebecca Roberts, San Francisco**

FUTURIS is a TV magazine on EU research projects on Euronews (24 hours news channel). It is a TV co-production between EuroNews and DG Research, DG Information Society, European Commission. It features a new story on European Research every two weeks (around 8 minutes). FUTURIS has had between 4 and 27 million viewers. It is widely available to European and International audiences and is broadcast in seven languages; 20 times a week on Euronews satellite and cable networks (102 countries worldwide – including Japan).

(http://cordis.europa.eu/fp7/ict/content-knowledge/news_en.html)

Another interesting project is SciDev.Net, Science and Development Network, a source of news, views and information about science, technology and the developing world. It is a not-for-profit organisation that seeks to be a platform to explore how science and technology can reduce poverty, improve health and raise standards of living around the world. It also contributes to building developing countries' capacity for communicating science and technology through their regional networks of committed individuals and organisations, providing practical guidance and specialist workshops. The main office is based in London but they have a worldwide network of registered users, advisors, consultants and freelance journalists, predominantly from developing countries.

www.scidev.net). Currently SciDev.Net receives funding from the UK Department for International Development (DFID), the Swedish International Development Cooperation Agency (SIDA), the Dutch Ministry of Foreign Affairs (DGIS), the Australian Agency for International Development (AusAID), and the International Development Research Centre (IDRC), Ottawa, Canada. In the past it has also been funded by the Swiss Agency for Development and Cooperation, and the Rockefeller Foundation, New York, USA. Some of their partnerships include the scientific journals *Nature* and *Science*, the Guardian Environment Network and Alertnet, which extend SciDen.Net reach beyond those visiting its website. In Latin America, they work closely with the Red Pop, the Latin American and Caribbean Network on Science Popularisation.

Regarding initiatives to improve the dialogue between scientific community and the mass media, in 2005 the European Commission's Directorate-General for Research hosted the second 'Communicating European Research' Conference. It focused on providing a forum and meeting place for scientists, communication professionals and journalists to promote mutual understanding of their respective roles, to share best practices and to define strategies to improve science communication at European level. The event included around 2100 participants -project co-ordinators, journalists and other communication professionals, press officers and representatives from research organisations. Furthermore, the relevant ideas expressed in this meeting were collected in the book: *'Communicating European Research 2005. Proceedings of the Conference, Brussels, 14-15 November 2005'* (Claessens, M, 2007), which has been an important reference for all the professionals involved in public communication of science.

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Chapter 3.

Scientists' participation in public communication of science

Contents

- 3.1.** The studies on the matter
- 3.2** Science journalism culture versus scientific culture
- 3.3.** Scientists in the Public Arena

3.1. The studies on the matter

Today, despite the achievements in the public communication of science such as the development of new theoretical and political approaches, the increment of public interest and participation in scientific and technological issues, and the recognition of this activity within the scientific community; there 'still lacks a genuine communication culture between the scientific community and the public' (Claessens, 2008). In recent decades, as a result of the diverse initiatives launched to encourage scientists to engage with the public and interact with the mass media, public communication of science has become part of the scientists' professional duties. However, diverse studies and surveys reveal a modest increase in the participation of scientists in science communication and public engagement and expose the scale of constraints and obstacles (institutional, cultural, etc) that scientists experience in relation to communicate with the public.

A variety of surveys have been conducted to try to clarify the factors that affect the quality and extent of the public communication of science activities. Some of them have examined the practices and attitudes of scientists as well their interactions with the mass media.

One important study carried out in 2006 in the UK, was the *Survey of Factors affecting science communication by scientists and engineers*; which was jointly funded by the Royal Society, Research Councils UK and the Wellcome Trust. The study involved a web-survey of 1485 research scientists in higher education institutes and contained 41 interviews with a cross section of respondents and other relevant parties. It examined the importance of science communication to researchers; the amount and type of science communication activities undertaken by researchers; and explored the factors that may facilitate or inhibit science communication. Its conclusions included the following; there was a confirmed increase in science communication and public engagement activity since 2000 (18%); there was recognition by funders of scientific research of the importance of such activity; three quarters of scientists surveyed

reported undertaking at least one public engagement activity in the past 12 months. Perhaps most crucially, science communication was viewed as altruistic and not a central part of academic life and many scientists saw as the main reason for engaging with the public the need to 'educate' them rather than to debate, listen and learn as part of a genuine dialogue.

Some authors highlight:

"The survey found that there are still barriers stopping scientists from getting as involved as they'd like in public engagement activities. Scientists on the whole feel that expectations from funders, colleagues and those who judge quality systematically ignore social aspects; so public engagement becomes a hobby rather than part of their everyday work. Almost half of the scientists spoken to would like to spend more engaging with the public. But the system is getting in the way. While the rhetoric asks scientist and members of the public to talk, the system that decides what counts as good science often interrupts the conversation before it can began". (Stilgoe and Wilsdon, 2009, p. 23)

"Scientists report that they are often discouraged by the barriers they face in their efforts to disseminate the results of their work more widely. According to [the] survey, 70% of UK scientists believe that 'funders of scientific research should help scientists to communicate with the non-specialist public' and 46% of them do not 'feel well equipped to engage with the non-specialist public'. The goodwill shown by many is pushed to its limits by difficulties that to some extent stem from lack of professional recognition for those scientists who are successful at communicating their work to the public. In a community that rewards specialists publications and does not emphasise the need for general communication, it is obvious that scientists lack funding to support specific communication measures and lack time to communicate". (Claessens, 2008, p. 33)

Regarding incentives for public science communication, the survey showed that, for scientists (in answer to a close question) 'bring money into their department' was the top incentive to get more involved in public communication (81%). The issue of grants that covered staff time as well other costs was also regarded as important (78%). Meanwhile, the qualitative interviews highlighted both the need of structures for public engagement work, and a support system

such as mentors, technical help and direct support from science communicators.

The regional survey carried out in Argentina, *Popularization by Argentine researchers: The activities and motivations of CONICET scientists* (Kreimer; Levin and Jensen; 2007); in which 1,700 scientists were surveyed by email, with a link to a dedicated Web page, concluded that there was 'not an observed major difference between the popularization practices of Argentine and European (French and British) scientists'. The report showed that Argentine scientists stated altruistic reasons to popularize their work and research while highlighting the lack of institutional support or encouragement as barriers to the process. Likewise the authors pointed to the hypothesis of 'a "universal scientific community" tightly linked and sharing common values that shows an alignment of local scientists with global values'. They also proposed that this "particularity" can be explained by the fact that 'popularization does not need expensive resources or equipment that peripheral countries lack' and that the 'growing perception of "global challenges" has pushed media and scientists all around the world to be more active in the public arena'.

Others surveys have been conducted in order to find cross-cultural differences in scientists' public communication attitudes. One of these, *European Research in the Media: the researcher's point of view* (European Commission, 2007) reported the view of researchers across Europe. This survey involved in-depth telephone interviews with a sample of 100 researchers who had participated in projects funded by the European Commission's Research Framework Programme. The interviews addressed the scientists' experience when communicating their work to wider audiences and in their interactions with the media.

Another important survey across countries, *Interactions with the mass media'* (Peters & et al; 2008a) was based on a mail survey in 2005-06 of 1354 researchers (epidemiology and stem cell research) in the United States, Japan, Germany, United Kingdom and France. This study assumed that:

'one might expect cross cultural differences in the science media interface for several reasons, among them possible differential benefits of public visibility because of variance in competitive research funding environments, difference in the nature of professionalism in science journalism or science public relations, or cultural difference in public acceptance of science and technology across countries'. (p. 204)

However, it concluded that 'the data did illuminate minor country differences'. Likewise the European survey found 'there are no significant differences in the views of scientists by nationality'. Peters & et al; (2008a) also pointed out:

'Despite minor variations in the assessment of the media contacts across the five countries, the basic patterns are surprisingly similar. The functional necessity of public science communication may be global phenomenon in democratic knowledge societies'. (p. 205)

Both these studies reveal that the relation between scientists and the media has increased and improved over time. This interaction has also led to some interesting observations. For example, Peters & et al; (2008a) survey found that scientists most involved with the media tend to be scientifically productive, have leadership roles and perceive the interactions to have more positive than negative outcomes. Regarding the perceptions of risks and benefits of media contacts, the most important benefits mentioned by scientists in the study were: 'increasing the public's appreciation of science'; 'a more positive public attitude toward research' and 'a better educated general public'. Many scientists indicated they felt uncertain and perceived a lack of control in the interactions with the media. They also identified the "risk of incorrect quotation" and "unpredictability of journalists" as problems. In the same way, the survey *European Research in the Media: the researcher's point of view* (European Commission, 2007) revealed that for scientists to feel comfortable with the science-media dialogue 'there is a need for trust between the scientists and the media contact' and suggested that to improve this situation 'there is a need to find a more immediate and feasible mechanism to allow trust to be established'.

Gascoigne and Metcalfe (1997) highlighted in their study *Incentives and impediments to scientists communicating through the media*, involving research

carried out in Australia, that inexperienced media performers generally had a far more negative view of the media than those with experience in the media, and that they were particularly fearful of misrepresentation. This research examined quantitative and qualitative attitudes of 178 scientists, through national focus group (86) and a mail questionnaire (92). They drew two focus groups, one with participants who had little or no experience with the media, while the other used participants with wide media experience. Likewise they found that scientists with media experience and media training were more willing to accept the inherent inaccuracies which can occur in the presentation of scientific stories in the media; and that these scientists were far less likely to be victims of the media but instead attempted to moderate and manipulate the medium and media people in a proactive manner.

There is evident that modest improvements have been achieved regarding scientists' interactions with the Mass Media. Several recommendations and actions have been also addressed in this direction; for example, those that the European Science Foundation published in 2003: basic communication and media training courses for scientists, science courses for journalists; the setting up of communication units providing professional help for communication at research institutes; defining and outlining a communication strategy as part of every research institutions aims and activities. Consequently during recent decades an increasing number of research institutions have employed communication officers and opened press or media offices as a result of the current demands.

3.2. Science journalism culture versus scientific culture

Recent studies show that the relationship between scientists and the media has been improving with more frequent and smooth contacts, although some scientists remain reluctant to get involved in this interaction. Part of the problem lies in the conflict that involves two different professions with different languages, knowledge background, values and interests. Furthermore, that scientists and journalists are immersed in two entirely different institutional structures.

Hans Peter Peters (1995, 2007, and 2008) researched and theorized on the issues of the interdependencies of science and journalism, and the nature of the interactions between scientists and journalists. He distinguished two theoretical approaches to the study of the interface 'science and media', namely **Intercultural communication**, in which the conflict is caused by the differences between professional cultures; and the **Interest Conflicts**, where actual negotiation takes place between them (goals and competing strategies), when trying to reach a common agreement with respect to the benefits of interaction. The author also explained that from the **Social Systems Theory** point of view, scientific meaning is confined to the science system thus precluding a simple 'transfer' or translation of messages from science to the public. Moreover, journalist constructs are the result of journalistic 'observation'; and because of the different 'logics' of science and public communication, scientific and journalistic constructs of the same research necessarily differ. The neglect of scientific detail and accuracy demonstrated in diverse studies is not an indicator of unprofessional journalism. On the contrary, Peters added, 'the consequence of journalistic professionalism is that journalists do not adopt the quality criteria of science, as accuracy, but followed their own criteria'. In another place he and colleagues explained:

“ [...] science journalism is conceptualized as an observation of science according to rules that are different from those of the system being observed. [...] Scientific events selected for news coverage are those that are deemed likely to generate a response in the social context of science, such as those considered to have medical, political, legal, economic or moral implications. One of the consequences of this conceptualization of journalism is that journalist is seen not a transmitter of knowledge but as producer of knowledge. Observation of society results in media constructs, which represent a specific type of knowledge about the world that is influenced by the media logic”.
(Peters & et al; 2008b, p.74, 75)

Furthermore, Peters & et al. (2008b) summarised some of the systematic differences observed in the mutual expectations of scientists and journalists:

Communication norms: scientists tend to apply scientific communication norms to public communication (focusing on knowledge, serious matter-of facts,

etc), and use a cautious and educational style of communication, whereas journalists look for overview knowledge, clear messages, evaluative comments and an entertaining style.

Model of journalism: scientists normatively expect journalists to help them promote scientific goals and interests. Journalists meanwhile, based on their professional norms, insist on keeping distance from the objects they report, on their independence, and on a 'watchdog' perspective.

Control of communication: journalists regard themselves as responsible authors and consider the scientists as their "source", that is as a resource for their task of writing a story. According to journalistic norms, journalists owe sources fair treatment (e.g. correct quotation) but nothing more; and they are very critical of demands from sources which they may be viewed as censorship. Scientists think they are the real authors and should control the communication process because they are the originators of the message to be conveyed to the public. Again they apply a "service model" of journalism, assign journalists a role as disseminators only.

Dominance of diffusionist model

On the other hand, Bucchi (1996) appeals to the dominance of the diffusionist model to explain the basis of the conflict between scientists and journalists:

'Until the 1970's contributions were almost exclusively of a prescriptive tenor: books were written by scientists and major scientific writers which documented the inaccurate coverage of science by the media and offered advice to journalists to help them improve their writing and understanding'

This author said that the position of scientists defining "communicating science to the public" was powerful enough to influence the diverse research work on this subject, which was focused pre-eminently on journalists and the public. Thereby media studies identified the difficulties in reconciling the demands of science with the exigencies of news reporting, promoting 'a blame the messenger perspective', in which the limits of journalistic practice, such as time and education, were identified as responsible for misrepresentations of scientific

ideas and the insufficient appreciation of scientific achievement by the public. He said that terms like **distortion, sensationalization and inaccurate translation** only make sense by **reference to a science-centred paternalist and pedagogic orientation** in the processes of communicating science to the public, and refer to an unidirectional linear communication transfer, from sender to a passive receiver.

Public experts

Recently, a distinction has been made regarding the role that scientists take under the conditions of the 'media society', as **Public Experts**, specifically trying to distinguish this role from other possible roles scientists may take in public. This perspective assumes that scientists are commonly involved in three types on science communication: **communication of scientific expertise**, in which the use of scientific knowledge serves in the public reconstruction of non-scientific 'problems' (such as climate change); **popularisation of research**, public reconstruction of scientific projects, discoveries, achievements and theories, **meta-discourses**, which examines the science-technology and the science-society relationship, including disputes about risks and ethical issues (Peters, 2008).

The distinction that authors established between scientific knowledge *per se* and scientific expertise, is that **scientific knowledge *per se*** is mainly concerned with the understanding of cause-effect relationship; which tend towards general concepts and theories, and abstracts as opposed to specific situations and observations. Scientific expertise - or **Expert knowledge**- in contrast, is scientific knowledge applied to the understanding and solution of practical problems in specific situations and is involved in the provision of concrete advice in specific situations to decision-makers. Here, science is neither the exclusive source nor sufficient source of expertise.

The selection of scientific experts by the media also generates discrepancies. Peters (2008) explained: 'selecting expert sources for journalists is a complex process in which scientific productivity and reputation are not the only factors', The principal criterion that journalists follow in this selection is a source that

makes a **good story** or improves a story. However, what makes a good story is variable between media, sections, programmes and topics. Likewise, journalists justify their indifference to the priorities of the scientific agenda in terms of **public opinion's need** for information (Bucchi, 2008).

Peters listed some of the factors that influence the likelihood of scientists appearing in the media:

Relevance: a scientific source must be able to comment on something that is relevant to the audience. However, this is not a restriction, because **journalists can construct 'relevance'** in several ways. The **'news value'** or **'news factors'** concepts describe some of the criteria journalists use to assess public relevance. Some events are selected on the basis of geographical, political and cultural proximity. For example such criteria may include surprise, relatedness to a topic that has already been introduced, prominence, personalization, conflict; success or damage.

Visibility: scientists become visible to journalists by their involvement in events and debates outside science (e.g. political advisors, authors of expert opinions, etc); and when they publish in journals or talk in conferences that are regularly monitored by journalists. Public relations of scientific organizations, journals, associations and congress promote the visibility, as well as prior media coverage.

Accessibility and media appropriateness: journalists often operate within limited resources and a narrow time frame therefore the anticipated effort required to deal with a scientist is an important criterion. It is a matter of importance whether scientists reply to emails and messages, how quickly they answer and how 'complicated' they are in their interactions. Scientists who are able and willing to speak crisply and concisely, using comparisons and metaphors to explain complicated issues, and who draw bold conclusions are the journalists' favourites. They also prefer scientists with high organisational rank and public reputation.

More and more research organizations are trying to increase their visibility towards policy-makers, industry and business and other funding bodies, as well as to students and young people. Public relations departments manage lists of experts who are available to talk with the media; and institutions have on their websites a directory of researchers who they regard as suitable for interviews. In general many research organizations currently have **formal or informal guidelines** that address the issue of contacts with the media, and the promotion -or defence- of their goals and achievements.

Medialization of science

Peters & et al; (2008b), support the idea that, because politics are medialized, the media presence of science has political effects linked with the **legitimization** of science or science organizations. Thus, media presence is an indicator of social relevance and also offers opportunities to integrate **scientific expertise** with policymaking or indeed to influence politics. They also argue that this **medialization of science** guides the public communication strategies of scientific bodies. They highlighted the important roles that Research Public Relations Offices (PR) play in this scenario. One of these is that its own existence is a strategy for maintaining autonomy, 'in the sense that it decouples the media construct of science organizations from the internal practice of knowledge production'. In other words, PR produces the distinction between the internal scientific organizational self-image and the (desirable) **public image**. The hope is that, for example, the latter meets anticipated expectations of state funding bodies, and is attractive to customers in the markets for education, consulting, health and R&D Services. The authors also state that there exists strong evidence that 'PR is no longer seen as a fulfilment of a generally understood 'obligation of science to actively provide information to the public' – but rather as the consistent pursuit of organizational strategic goals and no longer simply as a way to ensure 'good press', which is analogous to the role of PR in the corporate world'.

3.3. Scientists in the Public Arena.

The production of scientific knowledge has changed. Cooperation, international exchanges, circulation of technologies, and knowledge at the service of innovation are active elements in this reassessment of the role of research. The new policies in science and technology and the subordination of science to economic imperatives have been demonstrated through changes in the **scientific culture**. Diversification of places of knowledge creation, heterogeneity of intervenors, multiplication of exchange networks, and an increased **'contextualization of research'** and **scientists' social responsibility** are some of the results of the new conditions of research work. Funds for research are no longer expected to come mainly from the state and the search for alternative sources of funding has become more important. Also, today researcher's working conditions are no different from those of the workers. For example, there is no guarantee of permanent jobs, and one perspective of the scientists' future career path is as a succession of temporary jobs (Schiele, 2008; Nowotny, Scott & Gibbons, 2001).

The contextualization of research (or knowledge) has demanded a dialogue between scientists and diverse other bodies in society. Here diverse messages, preferences, needs and desires are interpreted, re-interpreted and negotiated, transforming the scientific work. It is in this process where scientific authority and the image of science have changed and are being reconstructed under new rules, including the social knowledge explicitly, for example. However, researchers perceive this involvement in the wider social arena as a threat to their influence on the setting of scientific priorities and standards of research. Some of them are recognizing the importance of participating (through understanding and communicating) in the reconstitution of their authority and trust.

Diverse surveys on the scientist's attitudes show that some of the most important reasons researchers stated for engaging with the non-specialists public relate to the promotion of a positive public attitude towards science and research, and include 'increasing the public appreciation of science';

'highlighting the implications, relevance and value of science' (Royal Society, 2006; Peters & et al; 2008a; Kreimer & et al; 2007). Moreover, although **norms of the scientific community have a strong influence** on researchers, those relating to the **public communication** 'seem to be **playing a more nuanced role today**' and 'seem to be perceived inconsistently' (Peters & et al; 2008a). In their survey *Interactions with the mass media*, only 34% of researchers identified "incompatibility with the scientific culture" as an important concern. Likewise, while 42% of respondents considered "possible critical reactions from peers", a similar proportion found "enhanced personal reputation among peers" to be an important outcome of media contacts.

Although scientists have their reservations about the new demands, **the increment of interactions** between scientific communities and other social bodies seems to **help making public engagement more acceptable to them**. More and more research centres issue press releases and address the needs of journalists and others public bodies. Today, although more interactions are initiated by external bodies (journalists, schools, civil societies, policymakers, etc), numerous research institutions are taking public relations activities –even modest ones- as part of their institutional activities, such as launching press releases, and displaying information and visual material to the general public in their websites, and through open doors events. Also, scientists are increasingly taking their own initiative, participating or creating diverse material to engage with the general public (books, articles, chats, etc).

Lobbying for funds

The **defence of scientists' political causes** (e.g. maintain or increase funding), plays an important role with respect to their openness within the public arena. There are vast examples of scientists' mobilizations, in different historical moments, when they have advocated against state cuts budgets, regulations, or raise public concern with science which has, by itself, contributed to the popularisation of scientific knowledge. Indeed, many of the national scientific societies were funded under these premises. However, what is a new phenomenon is the **lobbying** for funds (Gascoigne, 2008), an activity that has been uncomfortable for scientists because of several reasons: it recognized the

loss of the value that science had previously; it shows that it has to compete with other demands for state funds (against terrorism, roads, social services, etc); it contradicts the 'disinterested' approach that science espouses and 'could be seen as compromising the integrity of their work'.

Deviation functions

Scientists perceived these involvements with the wider social arena as focus of contamination, or **deviation functions** of the traditional model of scientific communication, namely the continuum ideal model which starts with the publication of papers in specialised scientific journals, then in interdisciplinary journals such *Nature* or *Science*, followed by pedagogic spheres, and eventually ending at the popular level (even sometimes they allowed deviation for their convenience).

Bucchi (2008) explained that 'there is a tension within the scientific community between the **institutionalisation of deviations** –its absorption into ordinary expository practice (popularisation) in order to prevent its “uncontrolled abuse”- and its defence as a sort of emergency exit' for certain situations, and as a potential source of scientific change and innovation' (p. 65). This author observed that when scientific problems are pushed into the public arena, they lose some of the status that they enjoyed when published in scientific journals or in the science sections of newspapers. Also, they can be manipulated by bodies, external to the scientific community, which is seen with suspicion by the latter. Therefore, there are growing efforts by scientists to extend their control over communication with the public, such as making use of public relations offices and organising diverse activities including open doors events, courses for scientists to deal with the media, and publishing material to the general public.

Matter of time?

Scientists have explained (Royal Society, 2006) that the need to spend more **time on research** is stopping them getting more engaged with the non-specialist public. Furthermore, the demands of spending valuable research time on both grant applications and engaging with the public are generating anxiety

and anger among some scientists. It is evident that scientific profession, as in other non- scientific professions, is under pressure regarding productivity (publications) and the demands of spending long hours working. This awareness has led some scientists to consider that the process of creativity is based on balancing work and other aspects of life. For example, '*The 24/7 LAB*', one of the two articles published in *Nature* in 2011 on the subject, addresses this issue (Ledford, 2011; Overbaugh, 2011), highlighted that 'research suggest that highly creative scientists tend to have broader interests and more hobbies than their less creative colleagues'.

On the other hand, scientists surveyed in Royal Society study (2006) stated they would be happy to take part in public engagement activity which were organised by others. All these results indicate some of the directions which can be taken to improve engagement between scientists and non- specialist public and the required changes in the scientific community within the new realities at present. One of these is the professional recognition of the science communicator inside this process, an intermediary able to bridge the gap between the different sectors, to facilitate and promote the engagement through knowledge of the different professional cultures (scientific and communication), and able to help and collaborate with research organizations to establish effective strategic public communication policies.

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Chapter 4

Field Research

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4.1 RESEARCH METHOD

GROUP ANALYSIS

The information and data included in this study involved personal interviews with 112 scientists from five European Research Centres involved in nanotechnology and materials science research, including four of the most important European economies: Fritz Haber Institute (FHI), Berlin, **Germany** (n=21); Centre d'Elaboration de Materiaux et d'Etudes Structurales (CEMES), Toulouse, **France** (n=35); Istituto per lo Studio dei Materiali Nanostrutturati (ISMN), Bologna, **Italy** (n=20) and Centre for Materials Science and Engineering (CSME), Edinburgh, **United Kingdom** (n=20); and one from the host country of this research: Donosti International Physics Center (DIPC), Donostia-San Sebastian, **Spain** (n=16).

Nanotechnology and materials science research is a multidisciplinary area, in which different professionals converge; therefore the scientists surveyed were from diverse disciplines: engineering, bioscience, chemistry, physics, mathematics and environmental sciences. This selection was made in order to include researchers with diverse professional backgrounds (condition that follows similar surveys) and, at the same time, within a specified area of research in order to allow comparison of institutional support for public communication across countries.

The number of scientists interviewed in each centre represented fifty per cent of its research staff. The only two criteria for selection were working status (permanent or probationary) and availability. Although not proscribed criteria, each selected group included senior and junior and male and female researchers.

This survey also contains personal interviews with 9 national and local press officers of the relevant research institutes.

INTERVIEWS

The interviews were held in the different research centres between May 2008 and May 2009, most of them in English and the rest in Spanish.

The interviews with scientists were face to face (interviewer-interviewee) lasted about 40 minutes using a formatted questionnaire with 18 closed-answer questions and 2 open answer questions. The respondents were instructed to clarify their responses or add information to their own words at any time during the interview. The answers (quantitative and qualitative) of each personal interview were written down on paper simultaneously, including the transcriptions of the scientists' opinions (qualitative information).

The interviews with local and national press officers were conducted in their respective offices, between May, 2008 and May 2009, and were open conversations recorded simultaneously on paper.

THE QUESTIONNAIRE

This empirical research sought to contribute to the studies of scientists' public communication attitudes so the questionnaire applied (see appendixes, pag.321) is a personal selection of some of the items included in the Royal Society's survey (2006), *Survey of factors affecting science communication by scientists and engineers*. The selected items explored the following five categories of information: I. What public engagement means to scientists and why it is important; II. Audiences and activities; III. Barriers to science communication; IV. Training and demand; and V. Incentives for science communication.

4.2. DESCRIPTION OF THE RESEARCH CENTRES

4.2.1 FRITZ HABER INSTITUTE (BERLIN) OF THE MAX PLANCK SOCIETY. GERMANY

The Max Planck Society operates 80 institutes and research facilities in Germany as well as three institutes and branches abroad. It is a non-profit organization in the form of a registered association and its scientific research is in the interests of the general public and in making knowledge freely accessible. The Max Planck Institutes undertake research in natural sciences, life science, social sciences and the humanities (<http://www.mpg.de/183251/portrait>).

The Max Planck Society's annual budget for 2007 was approximately 1,433 billion euros.¹ Some 82 per cent of Max Planck Society financing is earmarked for the core budget. These funds are provided by the Federal and State Governments, each of which contributes 50 per cent. In addition, project funding from the German States, the Federal Government and the European Union supplies another 173 million euros (14 per cent of the total budget), and remuneration for services rendered, membership fees and donations account for a further 71 million euros (about 4 per cent).

Fritz Haber Institute

The Fritz Haber Institute (FHI) is the successor to the Kaiser Wilhelm Institute for Physical Chemistry and Electrochemistry, which was founded on 28th October, 1911 and was officially incorporated into the Max-Planck Society in 1953 when the Institute was renamed "Fritz-Haber-Institut" (<http://www.fhi-berlin.mpg.de/history/>).

Fritz Haber, first Director of the Kaiser Wilhelm Institute, followed the founding concept of supporting the then leading German chemical industry with basic research. Research in the areas of catalysis, adsorption phenomena, colloid chemistry, atomic and molecular physics, and the kinetics of gas phase processes led to the Institute becoming a Mecca for physical chemists during its heyday in the period 1925 to 1933. FHI has made many scientific contributions

¹ "No more than the budget of two major German universities, and nearly half the budget, for example, of America's Stanford University, one of the best universities in the world".

during its varied history. The lines of research and the working areas pursued at the Institute have frequently changed by following new developments in science, and taken on new perspectives.

Today, the Institute has five departments: Inorganic Chemistry, Chemical Physics, Surface Physics, Physical Chemistry, and Theory. They work on almost all aspects of heterogeneous processes on surfaces. Subjects studied range from ultra-high speed spectroscopy of elementary processes through to the analysis of statistical and dynamical properties of surfaces and adsorbate systems to the theory of surfaces and the investigation of heterogeneous catalytic reactions with numerous microscopic methods providing resolution down to atomic scale.

Currently, the institute has a complement of 47 positions for scientists, and 147 for technical staff including the supports functions. The Institute typically supports between 80 to 100 PhD students, many of them paid through outside funding. Also the institute hosts about 10 apprentices in its various scientific departments and services groups.

Press and Public Relations

Currently the Institute has two people responsible for press and public relations issues -a Press Officer, and a Scientific Press Officer.

The position of Press Officer was created in 2000 in order to answer inquiries concerning public engagement from the Max Planck Society Headquarters. This position was filled first by a researcher, and then in 2002 by an administrative post. Both these positions do not have a formal place in the organisational structure, and lack a documented job description and budget. The Press Officer was dedicating half of her time to public relations activities, and the other half to other different administrative responsibilities. In fact is this latter formal position which funds the post.

In general, the Press Officer produces press releases, latest news, press information, hot articles and research highlights. She also runs open door

events, attends visitors, exhibitions and interfaces with the mass media and headquarters' press office.

Between 2005 -2008, FHI were participating every year in two national open door events: **Girls day**, and **“Lange Nacht der Wissen Schaften”**, (A Long Science Night). The latter is the most important open day event in the country.

Furthermore, the Institute received several groups of visitors throughout the year (students, politicians, researchers, etc) and participated in some exhibitions, television programs and videos. FHI is still a place of historical interest because of its relationship with Einstein and other great physicists.

During my research stay at the Institute (April-June 2008), I was able to participate in some activities, such as both annual open doors events.² The **“Lange Nacht der Wissen Schaften”** event had a friendly and festive atmosphere and included a barbecue and balloons. The conferences, exhibitions and demonstrations, were accompanied by personal chats with scientists. The different events for families, children, students, and the general public were open between 5.00 pm to 1.00 am.

Also, on April 26th I visited **Max Planck, the Reluctant Revolutionary** exhibition at the Technologic Museum of Berlin (Deutsches Technikmuseum Berlin), in which the FHI collaborated. On May 7th a film producer from United States visited the institute and recorded locations and interviewed researcher Professor Bretislav Friedrich (spokesman of the Centennial Project)³ for a documentary: “Einstein and the two eclipses” for the History Channel.

Public Communication Activities

According to the information and documentation available regarding public communication activities in FHI between 2005 and 2008: FHI participated in 7 open door events; 16 groups of guests visited the institute; 7 television

² **Girls Day**, on April 24th, 2008; **Lange Nacht der Wissen Schaften**, on Jun 14th, 2008.

³ The Centennial Project, occasioned by the centenary of the FHI in 2011, has been launched in 2008 to examine the illustrious history of FHI.

producers recorded on location or interviewed researchers for various productions (news, documentary, video clips, etc); 13 press releases were made; 1 article to the general public was published on the Magazine MaxPlanck Research; 1 press conference was held and around 100 journalists were seen in relation to the FHI researcher laureate for the Chemistry Nobel Prize; 1 participation on a radio program; 1 participation in a museum exhibition; 4 training sessions in public communication issues in the Max Planck Society Headquarters led by the press officer(see chart below).

FRITZ HABER INSTITUTE AMOUNT OF PUBLIC COMMUNICATION ACTIVITIES	2005				2006				2007				2008			
	Winter	Spring	Summer	Autumn												
Institutional open day events		1	1			2				1				1	1	
Group of Visitors			5	2	2	1			2		1	1		2		
Television		2				1	1		1			1		1		
Press Releases		3	1	1			1	1	1			1	1	2	1	
Training events				1				1				1				1
Articles aimed at general public									1							
Exhibitions														1		
Radio												1				
Special Celebrations (Nobel Prize)												1				
Press Conferences												1				
Contact with Journalists												100	1			

The results of scientists' interviews showed that their participation in public communication activities during 2007 was the following: 95% had participated in an institutional open day events, 43% had written for the general public, 38% had worked with schools, 29% had been contact with journalists, and 24% had given a public lecture.

FHI Press Officer. Interview

Beatrix Wieczorek, Press Officer of Fritz Haber Institute for more than 10 years, in an interview with me⁴, May, 2008, explained that her greatest achievement is that the press office has managed to survive:

“In all these years I have made very good contacts with the local mass media and the Max Planck headquarters. I can say also that I have a better understanding about how the mass media works”.

She also hopes to satisfy the increased demand for public engagement activities:

“At the moment the Directors do not have plans to support this Office with funds, although they do not have intentions to close it...”

Mrs. Wieczorek said that she would like to launch some projects in which she could show historical and ethical aspects concerning the Fritz Haber Institute. Although she pointed out:

“I have some freedom to propose projects but the scientific community here are reticent about it; some of them argue that these new events could complicate their activities, such as the disposition of rooms, budget and time for research for example”.

The Press Office received important publicity when Professor Gerhard Ertl of the FHI received the Nobel Prize of Chemistry in 2007 for his studies of chemical process on solid surfaces. Wieczorek added:

“It was a big event; this office was in the spotlight, dealing with the press conference and the media. I was helping more than 100 journalists during that period...”

⁴ The interview took place in the Fritz Haber Institute. Faradayweg 4-6. D-14195. Berlin, Germany.

With regards to the media, she explained that sometimes journalists contact the scientists directly, and they do not ask for her assistance. Also sometimes she had had no knowledge of those researcher's public engagement activities.

“Currently the heads of the Institute do not require to view annual reports of public communications activities, so there are no records of some public activities in which scientists are involved”.

Finally, Mrs. Wieczorek also mentioned that every autumn the headquarters' Press Office organises a conference for the Press Officers embedded in the Max Planck Institutes in order to promote training, best practice and exchange of ideas, projects, and experiences.

Max Planck Society, Headquarters of Press and Public Relations.

This office is organized by 8 groups: the Press Office; Online Editorial team; Editorial team Max Planck Research; Editorial team Max Planck Journal; Editor Max-series/Pupils and teachers portal Max-Wissen; Max Planck Forum and Exhibitions; International Press and Public Relations; and Press and Public Relations Berlin.

The funds dedicated to public science communication represent 0.2 per cent of the budget. The Press and Public Relations office is responsible for a range of activities including: The Max Planck Society web portal (www.mpg.de), publishing of press releases (approx. 200 releases per year and broad coverage in the print media for more than 30,000 press clippings per year), production of videos clips, the magazine Max Planck Research⁵, and Max Series (supporting material for teachers).

Other roles include managing the interface with journalists and mass media, participating in exhibitions, and organising “Forum”. The latter is a panel

⁵ MaxPlanckResearch contains a variety of articles about research going on at the institutes of the Max Planck Society: “All articles are written in an informative and easy-to-read manner and are ideal for members of the general public including school students who would like to keep informed about the latest developments in scientific research”. The magazine is published quarterly. 50,000 copies, include 10,000 copies in English.

discussion of 4 public presentations throughout the year - in Berlin and Munich- with around 250 invited guests from politics, business, science and the arts.

Headquarters Press Officer. Interview

The Max Planck Society is structured as a cooperative organisation in order that their research is in the interest of the general public and produces freely accessible knowledge. Communicating their results is one of its most important missions, explained Dr. Bernd Wirsing, Head of the Office of Press and Public Relations, in an interview with me⁶, June, 2008. He added:

“The Max Planck Society is recognised as the third best of the German Institutions over the last 50 years. For the public its name brings to mind leading research, innovation, new ideas, the future, a long tradition and rich history... This Max Planck “legend” is alive and well. It is the jewel in the crown of our press and public Relations work and it should be handled with care”.

Wirsing said that the science communication has to be clear and precise, and should use different communication channels, tailored for different needs.

“The press office shall service the need of the target groups (media, social groups, researchers, pupils, and teachers); and it shall align itself to the information and communication requirements of the media and the public”

Specifically, he stated that the internet will be the core medium, because it is the way to liberate us from the control of the media.

As part of its strategy, to intensify press and public relations, the office included the expansion of the internet information portfolio, Television activities, increased circulation of the magazine MaxPlanckResearch (to 50,000 copies), and the implementation of a more active communication policy in business and industry relations, through talks and discussion forums for example.

⁶ The interview took place in his office: Max Planck Society, Hofgartenstr. 8. 80539 MUNICH, GERMANY.

Dr. Wirsing explained that the different institutes were performing their scientific research freely and independently, and were therefore autonomous. The role of the Press and Public Relation Office (PPR) is to complement and support the Max Planck Institutes (MPIs) advocate a networking of the institutes and PPR Office. It also assists in obtaining finance sources in order to enhance public communication.

“The Administrative Headquarters is not a Corporate Headquarter and the Max Planck Institutes are not business units... Communication is managed according to the individual priorities of each particular Institute”.

He added that not all the MPIs have their own dedicated personnel for Press and Public Relations, but currently nearly all of them have an individual in charge of public relations issues, if only on a part time basis.

Concerning the work inside the research institutes, that could improve their public science communication activities, Wirsing ended saying:

“For us, it is important that research institutes do the best research possible. We do not want that them to become driven by performing public communication issues...”

4.2.2. Centre d'Elaboration de Materiaux et d'Etudes Structurales (CEMES-CNRS). Toulouse-France

The Centre National de la Recherche Scientifique (National Centre for Scientific Research) is a government-funded research organization under the administrative authority of France's Ministry of Research. Founded in 1939 by Governmental decree, CNRS has as its main mission to evaluate and carry out all research capable of advancing knowledge and bringing social, cultural, and economic benefits to society; also to contribute to the application and promotion of research results and to develop scientific information.

(<http://www.cnrs.fr/en/aboutCNRS/overview.htm>).

CNRS carries out research in all areas of science, technology and society through its ten institutes and 1,074 research units. CNRS budget for 2010 was 3,116 billion Euros, and represents a quarter of French public spending on civilian research. This funding comes from various sources: government and public funding; 600 million Euros from industrial and EU research contracts, and royalties on patents, licenses, and services provided.

Centre d'Elaboration de Materiaux et d'Etudes Structurales

The Centre d'Elaboration de Materiaux et d'Etudes Structurales (CEMES) started in 1985 as part of the CNRS research units. Its predecessor "Laboratoire d'Optique electronique" (LOE) founded in 1957 was a pioneer on microscopy electronique, with international recognition. Currently, CEMES has been performing research on the development of materials, new molecular structures, and nanomaterials and nanosciences. Its research areas are composed of three groups: Nanoscience, Nanomaterials, and Crystalline Materials under Stress (<http://www.cemes.fr/>).

CEMES has 184 personnel; 38 are researchers with positions from CNRS, 31 researchers with positions from another institution such as Toulouse University, and 115 are technical staff.

Department of Valorisation and Communication

This department was created in 2005, in agreement with the Scientific Committee of the centre, in order to organise the festivities of the year of physics, and to support business concerning patents and technologic innovation. It is part of the centre's organization chart and it has its own budget (in 2008 was 3,000 euros to communication issues).

In General, this office works on updating the web site, making institutional brochures, participating in institutional open day events, attending to visitors (students mainly) and collaborating with the regional press office on producing press releases and other informative activities.

Since 2005 CEMES had organized an institutional open day event every two years as part of the regional Science Festival "**Fête de la Science**" event.

Public Communication Activities

According to the information and documentation available, the public communication activities in CEMES between 2005 and 2008 were as follows: the Institute participated in 2 open day events; 55 groups of guests visited the institute; 9 television companies filmed in and around the Institute and interviewed researchers for varies productions (news, documentary, video clips, etc); the production of 15 press releases; 31 articles and 2 books published for the general public (include electronic magazines); 17 public lectures; 5 public debates; 8 participations on radio programs, and one participation in a museum exhibition (see chart below).

CEMES				
AMOUNT OF PUBLIC COMMUNICATION ACTIVITIES				

ACTIVITIES/YEAR	2005	2006	2007	2008
Group of visitors	24	10	12	8
Press releases	6	3	2	4
Articles aimed at general public	8	10	6	7
Public lectures	11	2	2	2
Public debate	1	2	1	2
Institutional open day	1	2	1	1
TV, movie, video shoots	4	2	2	1
Activities in schools	1	1	1	1
Books for general public	1	1	1	1
Radio	1	1	1	6
Exhibitions	1	1	1	1

The results of scientist's interviews indicate participation in public engagement activities during 2007 as follows: 54% had participated in an institutional open day; 54% had been in contact with policy makers; 49% had worked with schools; 43% had written for the general public; 37% had given public lectures; 37% had participated in public debates and 34% had had contact with journalists.

CEMES Communication Officer. Interview

Evelyne Philippot, who is in charge of the Department of Valorisation and Communication, in an interview with me⁷, October 2008, explained that the year of physics (2005) was a great year for public engagement:

“That year, the mass media’s cover was exceptional...they were so open to all the festivities. As a result we had on average 900 visitors...”

After this celebration CEMES had been more visible to the public and the politicians, Philippot highlighted.

The Regional Press Office is mainly in contact with the media, and with the Headquarters Press Office. They both decide what kind of information (press releases, news, etc) to communicate with the media, locally or nationally. Philippot stated that her relationship with the regional office is very good:

⁷ The interview took place in her office. CEMES. 29 Rue Jeanne Marvig, 31055, Toulouse, FRANCE.

“The regional press office is doing excellent work in the matter of public engagement. It is a shame I do not have time to collaborate more of their activities”.

With regard to the work with the scientists she said:

“My work is to deal with researchers in this centre and serves as a link with the Press Offices. But it is difficult because for example the researchers want exact precision on the documents, and they do not understand how the mass media operate; therefore it is difficult to agree a final document...”

She mentioned that in the past she tried to organise public conferences at the centre, but the scientific community was not very receptive to the idea. Also, that efforts to improve the web site is problematic because of debates over editorial decisions with some scientists. She added:

“I try to encourage scientists in public science communication activities because I would like they were more interested in improve our current events...”

Attending to visitors and students groups is one of the regular activities at the centre, and there usually had been 25 researchers involved in these activities, which included: giving talks, demonstrating experiments, and conducting visitors through the laboratories. Philippot said:

“The scientists who participated are always the same scientists. Some of them enjoy engage with the public; others doing it because their research is successful and they feel have interesting findings to show...”

Phillippot finally explained that her position was hampered, as a result of the low budget, overwork and conflicting demands arising from her other responsibilities, and the lack of recognition. She ended:

“It is not encouraging that some scientists said that this Department is not professional; or that others do not come to ask for any support or try to collaborate...”

Regional Press Officer, CNRS- Midi-Pyrinees. Interview

This office is in charge of the public communication of the regional area Midi-Pyrinees that includes 60 research units. It has a team of 4 people, responsible for interacting with the media and other organizations such as Regional Council and universities, organising several public events and exhibitions, and also the production of press releases and articles to the general public (around 50 notes per year, approximately 2 per week). This office is acting as the link between research units of the region and the CNRS Headquarters Press Office.

In an interview with me,⁸ October 2008, Carine Desaulty, in charge of communication of the Regional Press Office, explained that this office is working on different programs in order to promote science among young people and society in general. She indicated:

“We are working very closely with the Ministry of Education in several programs for young people; as a result the contact with the schools is very good”

Some of these regular programs include the *Clubs Jeunes “Sciences et Citoyens”* (Young’s Clubs “Science and Citizens”), *“Fete de la science”* (Science Festival), *“La nuit des chercheurs”* (Researcher’s night). Desaulty added:

“Mainly our budget is directed towards activities that promote science and the scientific careers among young people...”

With regard to the media, she stated that it is difficult to gain coverage and have their support when they organise public events.

⁸ The interview took place in Toulouse, FRANCE.

“The media are not particularly interested in scientific information, so it is difficult to gain their attention...”

She said that her work is gratifying because of the variety of themes and issues that are involved in science, and also the contact with young people; however she was frustrated about the fact that when they organised events for the general public sometimes they were unable to support an appropriate publicity campaign and then subsequently the public participation was low.

“Sometimes, a low audience in an event is a consequence of a lack of funds to support a publicity campaign through the media; and sadly they do not show any proactive interest...”

CNRS- Headquarters Press Officer. Interview

The CNRS allocates to communication affairs around 0.3% of its budget. Their activities include public communication, publications, production of films and videos, public relations, amongst others.

The magazine **CNRS**, with 50,000 copies, is one of their most important publications. It is written in French and it is mainly for internal communication and for the research and academic community, universities, teachers and students.

Julien Guillaume, Press Officer, in an interview with me⁹, November 2008, explained that this office produced around 250 press releases through the year (approximately 20 per month). Also, it is the scientific departments of the headquarters, which decide what information or scientific findings are promoted in the media.

Concerning the media coverage, Guillaume said that sometimes 80% of their press releases are published; however at other times, nothing is considered. He remarked:

⁹ The interview took place in his office. CNRS. 3, Rue Michel-Ange 75794 Paris. FRANCE.

“There is not any consistency in our media presence. Nowadays in France, it is a fact that there is less space for science information than before...”

According to Guillaume, in 2005, the CNRS had an agreement with the newspaper “*Le Monde*” to publish 2 pages daily of science notes in the newspaper; then it was reduced to one daily; and more recently, in 2008, it was only one per week. He said:

“Fortunately, the CNRS is still allocated space in the medium of radio, with the program “La tête au carré”, transmitting on France Inter channel. This program is aimed at the general public, being broadcast for one hour per week, at 2 pm.”

He pointed out that currently, the relationship with the media could be improved although the directors of the CNRS do not have intentions to work on this situation at the moment. Nevertheless the Office tries to maintain regular informative meetings with the media and close contact with almost 10 key journalists. Finally, he explained:

“At the moment, the directors of the CNRS are not particularly interested in issues about public science communication and on the relationship with the media, because they have been focused on working on the changes as a result of new government policies; and their consequences”.

4.2.3. DONOSTI INTERNATIONAL PHYSICS CENTER (DIPC). SAN SEBASTIAN, PAIS VASCO, SPAIN.

The Donostia International Physics Center Foundation (DIPC) was created in 1999, with the collaboration of the Departments of Education and Industry of the Basque Government, the University of the Basque Country, and others such as the local council and the private sector. Its aim is to promote the development of basic research, and basic research oriented towards material science (http://dipc.ehu.es/01historia_y_objetivos.php).

Since its creation, the DIPC has been linked to the University of the Basque Country, and it has become an international point of reference in basic research in the field of the Physics of Materials, working in two research lines: the Condensed Matter Physics group, currently focused on the structural, electronic and optical properties of solids, surfaces and low-dimensional systems (particular attention is paid to systems of nanometer size); and the Polymers and non-crystalline materials group, focused on molecular motions and relaxation processes in polymer materials and glass forming systems.

The DIPC carries out four essential programs: the visiting researchers' project; the international conference program; the Guipúzcoa Fellows program¹⁰; and the program for Popularising science, which tries to *"bring society in general closer to the world of current science and technology"*.

Around 64 members made up the DIPC, between administrative staff (8) and directors (3); contracted researchers (16); fellows (17) and research visitors (20); and research visitors with short permanence, about 24.

¹⁰ The Programs of DIPC: Visiting researchers' project aims to establish a platform for interaction between researchers of recognised prestige from other countries, in the field of the basic science of materials, and local researchers; International conference program creates platforms for debate and discussion with experts in different fields; Guipúzcoa Fellows program is recovering young researchers who are working abroad and want to return and carry out their scientific work in the Basque Country.

Press and Public Relations

The DIPC does not have a Public Relations office. Nevertheless, the Director of the Institute, who is a very important figure in the country with influence in the media and society, has been directing DIPC public relations activities, hiring the private public relations office for certain public events, and keeping contact with the Press Office of the University of the Basque Country.

Some of the activities for the general public carried out at the DIPC are aimed at promoting the social awareness of scientific activity and included the lectures: **Twentieth Century's scientific legacy** (November 22, 23; 2000); **Climate Change** (October 25, 26; 2001); and **Science and its frontiers** (November 13, 14; 2003).

Although the Congress **Albert Einstein Annus Mirabilis 2005** (September 5-8, 2005), was aimed at an educated but non specialist audience¹¹, it attracted the general public of all ages, social and professional groups. The organizing committee mentioned that with it was *“dispelling any doubts over the interest of citizens for the intellectual adventure of science, and its repercussions in modern life”*.

The DIPC web site (<http://dipc.ehu.es/index.php>) has been a relevant way to engage with the specialist and general public. All press clippings about the researchers and their activities in the centre are available on the site, and through the link 'DIPC TV' videos online of some of their public lectures and highlight events.

Public Communication Activities

According to the information and documentation available regarding the public communication activities in DIPC between 2005 and 2008, 121 notes were published in newspapers and reported on the DIPC web site, In addition, one

¹¹ The Congress hosted over 750 attendants from the world over, and some 2000 following the event online. Moreover, Six Nobel laureates, and thirteen other leading experts on the figure of Einstein and the impact of his work on modern Physics and philosophy were taking part on this event.

press conference was held to provide and promote information about the Einstein Commemoration Congress “*Annus Mirabilis*” (2005).

Most of the press notes published in the local and national newspapers related both to the special scientific events that the DIPC had organized and to their publications in prestigious scientific journals. The details are as follows: in 2005 the Einstein Commemoration Congress “*Annus Mirabilis*”, with 6 Nobel Prize winners as special guests; in 2007 “Trends in Nanotechnology”, with more than 60 international experts involved; in 2008 “*Ultrafast*”, International Symposium; 3 publications and 2 papers in the journal Nature in 2007 and 1 paper in the journal Science in 2008. In addition, there was special grants related news (2006 and 2008), important visitors (a novel prize winner in 2008) and several interviews of the Director of the centre and its researchers. (See chart below).

DIPC AMOUNT OF PUBLIC COMMUNICATION ACTIVITIES																
	2005				2006				2007				2008			
ACTIVITY	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autum
Newspaper notes	15	4	5	5	2		1	9	5	22	15	2	4	16	4	12
Special scientific events			1								1	2		2		2
Press conferences			1													

The results of the scientist’s interviews showed that during 2007: 51% of scientists had engaged with policy makers, 31% had worked with schools, 25% had contact with journalist; and 25% had participated in the local university open day events.

Interview with the Director of DIPC

The Director of the DIPC, Pedro Miguel Etxenike, in an interview with me¹², December 2008, pointed out that it is important that the people know about science in order to support good policies in this area, he marked:

“If society does not respect and care about science, the activity would become difficult”

He explained that many scientists do not have a clear idea about the public communication of science or the knowledge to participate in this activity, because their work is doing good research, although there are very good scientists who are good communicators. He added:

“When you love your scientific profession, and know very well your area, it is natural being a good communicator and share clearly about this passion.”

With regard to press and public relation offices (PR), Etxenike indicated that to have or not to have one depends of the size of your institution. Also, that it is important these offices are being run by communicators who understand the scientists, and do not impose agendas. He asserted:

“It is relevant to find the equilibrium between the communicators’ work and what scientists want to communicate”

He believes that personal contact is the best way to have good relations with the media, in comparison to the work that PR are doing now, reduced to sending press releases and the rare invitation to journalists to press conferences. Finally, he concluded:

¹² The interview took place in his office. DIPC. Paseo Manuel de Lardizabal 4. 20018. Donostia-San Sebastián (Guipúzcoa). SPAIN.

“I prefer to contract the service of external press and public relation offices to support the organization of specific events. They already have the contacts to promote my event and we do not waste time.”

4.2.4. ISTITUTO PER LO STUDIO DEI MATERIALI NANOSTRUTTURATI (ISMN-CNR), BOLOGNA-ITALY.

The National Research Council (*Consiglio Nazionale delle Ricerche*, CNR) is a public organization in Italy, in charge of promoting, spreading, transferring and improving research activities in the main fields of knowledge; furthermore, the results of its research encourage the scientific, technological, economic and social development of the Country.

CNR is distributed all over Italy with a network of almost 100 institutes and 4,000 researchers dedicated to several research sectors: biotechnology, medicine, materials, environment and land, information and communications, advanced systems of production, judicial and socio-economic sciences, classical studies and arts (<http://www.cnr.it/sitocnr/Englishversion/CNR/AboutCNR/AboutCNR.html>).

Its main resources come from the State, but also from the market. Thirty percent of its balance sheet comes from external job orders for studies and technical advice as well as from agreements with firms and contracts with the European Union and with the other international organizations. The overall available resources total about a thousand million euros.

Institute of Nanostructured Materials

The Institute of Nanostructured Materials (ISMN) in Bologna, one of the CNR institutes, is the leading Italian centre for the growth, fabrication, and characterization (chemical-physical) of molecular thin films and nanostructures, and devices based on these. Also, since 2004, it has generated some patents which have led to three spin-off companies: Organic Spintronics; Scriba Nanotecnologie; and Nano4bio (<http://www.bo.ismn.cnr.it/about.php>).

ISMN has been involved in several EU Research Projects, with several industrial research centres and has had collaborations with universities and research centre worldwide.

In 2009, the Institute had 45 researchers working in three different research areas: advanced multifunctional devices based on organic and hybrid nanostructures and non-conventional optical nanoprobe; hybrid organic-inorganic spintronic devices; and nanotechnologies of Multifunctional Materials. However, the ISMN had only 10 researchers in permanent positions, 10 researchers working towards permanent positions and the rest, 25, were under temporary contracts within the specific projects.

Press and Public Relations

The ISMN does not have a public relations office. However, the Director of the Institute, the Heads of the Research Departments and the scientists themselves managed public engagement initiatives and worked with the headquarters press office at special occasions.

Concerning their public activities, the main institutional activity involved keeping the web site up to date with news and notes about their current research activities, the publishing of articles in prestigious science magazines, and information on special scientific awards. These activities occasionally led to journalists contacting the scientists involved and publishing articles in newspapers and magazines aimed at the general public.

Some scientists expressed that they had participated at least once a year in the Institutional open day event by invitation from the specific organized team from CNR headquarters press office.

Public Communication Activities

According to the information and documentation available, the public communication activities in ISMN between 2006 and first term of 2009 were as follows: some scientists participated at least once in the institutional (CNR) open day events; 9 notes were published on the ISMN web site; 12 notes were published in newspapers and magazines; and 1 press release was launched by the headquarters press office relating to an important scientific innovation made by scientists of ISMN (see chart below).

ISMN				
AMOUNT OF PUBLIC COMMUNICATION ACTIVITIES				
ACTIVITIES/YEAR	2006	2007	2008	2009
Institutional open day	1	1	1	1
Notes in an institutional web site	1	2	4	2
Newspaper articles		6	5	1
Press Releases	1			

The results of scientists' interviews indicate that their participation in public engagement activities during 2008 was the following: 50% had written for the general public, 50% had participated in public debates, 45% had participated in institutional open day events, 45% had engaged with policy makers, 45% had interviews with journalists, and 45% had worked with schools.

CNR, Headquarters of Press and Public Relations.

This Office is dedicated to: maintaining communication with the mass media and the general public; outlining activities that provide access to institutional services and to relevant scientific knowledge, and the promotion of the CNR image.

The Press office includes 12 people, and its budget approaches 140,000 euros. The activities of this office includes: the website, press review and press releases, monitoring agency, front office, provider of communication expertise, press conferences, and publishing of the fortnightly online magazine "*Almanacco della scienza*" (<http://www.almanacco.rm.cnr.it/reader/>). The office also gives support to the president of the CNR, and CNR's summits.

Headquarters' Press Officer. Interview

Press Officer Marco Ferrazzoli, in an interview with me¹³, in February 2009, explained that in recent years their production of press releases had been decreasing; 172 press releases in 2005, 158 in 2006 and 129 in 2008; because in his view:

¹³ The interview took place in his office: Ufficio Stampa. Consiglio Nazionale delle Ricerche. Piazzale. Aldo Moro, 7-00185 ROMA, ITALY.

“Nowadays the media are saturated with scientific notes and it is difficult for them to select; whereby our work is focused on direct contact with journalists, being more selective, phoning them and giving exclusive notes...”

Ferrazzoli also noted that some newspapers prefer their output to be based on exclusivity. Nevertheless the press office works with all the media in Italy, and has good relations, specifically with the local media, through regular meetings. Moreover, recently this office is beginning to work with international agencies. He added:

“We do not have any agreement with Radio or Television, but we have a good relationship with them; however it is difficult to work with the big Television channels; they usually only contact us for our image stock...”

The scientific notes that CNR Press Officer produces are ready for publishing in the media, asserted Ferrazzoli, because they manage the journalist languages and their notes are tailored to the needs of the journalist and interests of the public. He also remarked:

“I think that one of our achievements it is just to deal with the immediacy, typical of the journalists work...”

Health, Environment and Technology are examples of themes which are interesting for the journalists while basic research is less discussed in newspapers. However, some magazines are publishing articles on basic science issues. They even contact the scientists and institutes directly requesting interviews and collecting information, indicated Ferrazzoli. He explained:

“This Office does not have any policy about the control of information; the CNR’s scientists are free to speak directly with the media...In fact, some scientists have their own direct contacts with journalists”.

CNR never had any problems regarding this freedom, even though the media in Italy are very alarmist, and scientists have to be very careful about giving contextual information with social sensibility, explained the Press Officer.

The Press Office aims to encourage scientists to achieve a greater understanding of public science communication. For example in 2006, the Office asked all the institutes to identify one representative who helps with contact with the media, but only 20 institutes answered this request. Nevertheless, it is in contact with around 300 researchers. Ferrazzoli added:

“Of course, if each institute had one communicator agent, it would make easier communication with the media and the public, but this is related to the degree of freedom of each institute has...”

He pointed out that the media is a complicated business, where it is difficult to introduce information or maintain a position. It is a very controlled area with diverse interests –including political and economic. Hence following the criteria of the media, this Office is trying to place scientific notes as if they were another commercial product. He expressed also that:

“In the media, scientific issues are treated the same as other themes; it does not matter what the reality is, but what the journalist’s ideas have about that reality...so we are living in a crisis of credibility”.

Young people in particular are looking for alternative ways to get information, for example using the internet; therefore the CNR Press Office is working on making interesting informative science sources for them.

Ferrazzoli explained other serious problems in which the media is playing a negative role:

“In Italy, for example, the funds for science research represent 1% of the general national budget and the country does not have a high technology industry. This is a problem because it shows the low interest that science

has in our country and therefore its value in our culture. Moreover the media does not help this situation; on the contrary their influence does not change anything. Therefore, I think the internet is the future.”

When my interview with Ferrozalli ended I asked him about the good and bad things about his job. He answered:

“The good side of this job it is the variety of themes and activities in which we are working; every day gives us something new and different...the downside is the low interest of journalists”.

4.2.5. CENTRE FOR MATERIALS SCIENCE AND ENGINEERING (CMSE- UNIVERSITY OF EDINBURGH). EDINBURGH, SCOTLAND, UNITED KINGDOM.

The Centre for Materials Science and Engineering (CMSE) was a research centre of the College of Science and Engineering at the University of Edinburgh¹⁴; its role was to promote high quality work in materials, emphasising a multi-disciplinary approach (<http://www.cmse.ed.ac.uk/>).

The College of Science and Engineering consists of seven academic schools: Biological Sciences, Chemistry, Engineering and Electronics, Geosciences, Informatics, Mathematics and Physics and Astronomy. There were also 11 Research centres, include CMSE, which was a virtual research centre that encompasses all the schools within the College. (2004-2009; College of Science & Engineering; University of Edinburgh).

Some 41 scientists of the College academic staff were members of CMSE; 16 researchers work at the School of Engineering and Electronics, 10 at the School of Physics and Astronomy, 9 at the School of Chemistry, 3 at the School of Geosciences, 2 at the School of Biology, and 1 researcher at the School of Mathematics.

The College of Science and Engineering states that these large groupings offer many opportunities for collaboration between the disciplines they cover and also stimulate interdisciplinary collaborations between Schools and Colleges within the University.

The College has a solid track record of commercialising its research, and has strong links with industry. Over the five years to 2009, it has helped to expand 11 companies and started 45 more, issued 104 licences and taken out 221 patents. It has 16 Business Development Executives embedded in the Schools

¹⁴ Today integrated at the Institute for Materials and Processes (<http://www.see.ed.ac.uk/IMP/>).

and also 41 staff dedicated to engaging with secondary schools and the public¹⁵.

Public Engagement with Science Development

Relating to actions on the public communication of science, the “College of Science and Engineering, Strategy and Delivery Plan 2009–2014” outlines specific activities on the subject. As part of its strategic goals on Excellence in commercialization and knowledge exchange¹⁶, the College is considering:

- Maintaining and developing a programme of public engagement, focusing on schools and the wider public.
- Establishing sustainable programmes and activities that promote and encourage engagement with companies and other users of research.
- Ensuring that the University’s Communications and Marketing team is informed of developments in the College.
- Training all researchers in public engagement and provide media training to all researchers who would benefit from it.
- Crediting public engagement and knowledge exchange activities alongside research and teaching in consideration of promotion and reward.

The College’s Plan (2009-2014) marks its responsibility to engage with the wider community to discuss the science that they undertake, to inform the public about scientific and engineering advances, and also to listen to public concerns. It highlights a strategy to exchange knowledge with the local community and national bodies¹⁷ in which by encouraging public engagement activities they will:

¹⁵ The College of Science and Engineering, Strategy and Delivery Plan 2009–2014. http://www.ed.ac.uk/polopoly_fs/1.49875!fileManager/SDPlan.pdf

¹⁶ The College of Science and Engineering, Strategy and Delivery Plan 2009–2014. Page 19.

¹⁷ The College of Science and Engineering, Strategy and Delivery Plan 2009–2014. Page 31.

- Create a culture within the College that public engagement is important – and ensure that success in this area is properly recognised, for example, in promotion procedures.
- Increase and embed public engagement work undertaken by staff through activities of the Edinburgh Beltane Project.
- Identify staff with appropriate skills and a positive attitude to public engagement and provide training.
- Identify major generic issues on which there should be thought or action, and promote public debate.
- Provide expert contributions to public debate, and brief MSPs, ministers, officials and the media on policy issues.
- Plan a significant and positive participation in Open Doors Days and other local opportunities for public engagement.
- Ensure that public engagement activities are properly funded through internal and external funding streams.

Furthermore, to raise public awareness of what the College does, the Plan includes:

- Maximise the University's exposure in the media, with attention to the quality of information provided.
- Ensure co-ordination with others in the University, research funders, and other stakeholders by issuing press releases or other announcements of research outcomes.
- Continue the University's policy of encouraging newspaper articles on research developments and other 'good news stories'.

- Ensure appropriate co-ordination of activity within the College and the University to avoid duplication, unhelpful internal competition and external perceptions of incoherence, without inhibiting initiative or excellence of individual projects.
- Develop the University's database of experts who may be contacted with information on available expertise, provided through a user-friendly web interface which achieves good web visibility.

Public Engagement with Science Development Office. Interview

The Public Engagement with Science Development Office seeks to support communications and external relations, knowledge transfer and undergraduate education strategies and policies of the College of Science and Engineering, explained Dr. Patricia Erskine in an interview with me on March, 2009.¹⁸

Patricia Erskine started this office in 2007, running several activities and strategies on the promotion of public engagement, she asserted:

“Since that time I have been working with diverse schools and institutions, such as the National Museum of Scotland, Edinburgh Zoo, Edinburgh Beltane, etc; and encouraging the students of the College to collaborate in public engagement activities and supporting our researchers around these subjects”.

Patricia Erskine indicated that part of their strategy on Communication and External Relations includes actions to improve external communication and promotion of the College and its achievements in collaboration with the University's Communications and Public Affairs office, such as improving

¹⁸ The interview took place in the University of Edinburgh. The King's Buildings. Mayfield Road. Edinburgh. EH93JZ. Scotland, UK.

accessibility to neighbouring communities, promotion through the use of web-based, printed publications and seeking opportunities to raise the Collage's profile with MSP's and other decision-makers.

Within the area of Knowledge Transfer they support the Scottish Science Information Service for MSPs, in collaboration with the Royal Society of Edinburgh, Scottish Parliament Information Centre, Royal Society of Chemistry and others. They also promote staff involvement in national and international advisory and consultative bodies and ensure that the College as a whole contributes appropriate expertise to policy debates.

Patricia Erskine said that her work also includes seeking funds to support public engagement activities, she explained:

“The majority of funds for the promotion of public engagement come from the Scottish and British governments; but it is necessary to explore other sources of support...”

Patricia remarked that the public relations activities are her most important work because, she asserted:

“It is relevant to change the perception that society and the scientific community have around public engagement activities, and it is necessary to promote the dialogue between them.”

Therefore, connected to this objective, her office is working together with Edinburgh Beltane, a beacon for public engagement funded in 2007 by UK funding councils, Research Councils UK and the Wellcome Trust. Together they organize activities for the general public and for researchers aiming to establish a bridge between them.

Concerning public science communication activities, Erskine indicated that every year the University takes part in the Edinburgh Science Festival during

Easter and in a couple of Edinburgh festivals during the summer term. Also, their open doors day takes place in autumn.

During my research stay at the CMSE (March-May 2009), I was able to participate in the launching of a pilot programme DEEPER, Developing Engineering Expertise for Public Engagement and Rapport, in March 2009, which was a development project funded by The Royal Academy of Engineering's Ingenious grants programme. Patricia Erskine, in charge of this programme at the University of Edinburgh, explained that:

“With this project the Royal Academy of Engineering aims to include an opportunity for engineers to take part in a public engagement activity and to develop and deliver bespoke public engagement training courses, seminars and workshops for engineers.”

Finally, she explained that each school of the College usually has one “person”, who collaborates with her office and helps in the coordination of these activities, also linking with the Communications and Marketing Press and Public Relations office of the University of Edinburgh.

Public Communication Activities

According to the information available concerning public communication activities in the College of Science and Engineering, between 2008 and 2009, the college participated in around 180 different projects among its 7 schools, including conferences, exhibitions, science shops, and actions in schools, workshops, training, television programmes and other projects. Furthermore, between 2000 and 2009 some 155 press releases were issued by the Communications and Marketing Press and Public Relations office about the College's research (see chart below).

CENTRE FOR MATERIALS SCIENCE AND ENGINEERING

TABLE. PROJECTS ON PUBLIC ENGAGEMENT ACTIVITY BY SCHOOLS (2008 -2009)

Action/Schools	Biology	Chemistry	Engineering and Electronics	Geosciences	Informatics	Mathematics	Physics	TOTAL
Conference	5	7	7	3	2	1	5	30
Exhibitions	4	8	1	5	2	3	5	28
Open doors events	1	1	1	2	1			6
Actions aimed at associations	1	-	-	-	-	1	1	3
Actions in schools	4	4	2	8	3	5	2	28
Science shops	7	5	7	8	8	2	4	41
TV	1	1	1	-	-	-	-	3
Movies	1	1	1	-	-	-	-	3
Workshops	3	-	1	1	1	2	2	10
Festival	1	2	1	1	1	-	-	6
Training	1	-	1	-	3	-	-	5
Other projects	-	-	-	-	7	3	7	17
TOTAL	29	29	23	28	28	17	26	180

Press releases (2000-2009)	52	21	15	17	25	9	16	155
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Moreover the results of CMSE scientists' interviews showed that their participation in public science activities during 2008 was the following: 90% had participated in institutional open door events, 70% had been in contact with policy makers, 45% had been interviewed by journalists, 35% had written for the general public, 35% had given a public lecture, 35% had worked with science centres, 35% had participated in a radio program, 25% had worked with schools, 19% had taken part in public debates.

Overall, considering all the information available, the participation of members of CMSE accounted for around 25% of the total of public engagement activities in which the College was involved in 2008.

Media and Communications Unit, of the University of Edinburgh.

The Communications and Marketing, Press and Public Relations Office, of the University of Edinburgh is in charge of communicating the activities and priorities of the University to a wide national and international audience. Also this office works on the flow of internal information, from one part of the university to another.

Its team offers a wide range of services and produces a variety of publications and resources for the media, the general public, current and prospective students, partner organizations, the public and private sectors, and University colleagues. The Office is organized into 5 departments: Marketing; Press and Public Relations; Publications; Web publishing and Video Production Unit. Its budget, in 2009, was £500,000 which included expenses for publications.

The Media and Communication Unit at the Press and Public Relations Department is the University's main contact for media strategy, media training, community relations and internal communications. Rob Tomlinson, head of this unit since 2006, in an interview with me on May 2009¹⁹, explained:

“In the last three years the university has invested more money in this area in order to encourage and improve the relationship with the media in general, promote the image of the university and its research and also provide support to researchers to engage with the media”

The Press and Public relations Department produces several press releases on different subjects but health and natural science are the topics on which they mostly work and which they send to press agencies. Tomlinson said that they have around 40 special media contacts such as journalists, editors, societies

¹⁹ The interview took place at his office at the University of Edinburgh; C Floor, Forrest Hill Building; 5 Forrest Hill, Edinburgh EH1 2QL, Scotland, UK.

and the office usually contacts them only for exclusive information such as scoops, for example. Tomlinson pointed out:

“We consider that the best way to distribute information is through the press agencies or press associations because they work very efficiently and that is sufficient...”

Furthermore, this office receives direct calls from different communication media (magazines, for example) interested in information additional to the press notes launched by the agencies.

Tomlinson indicated that the Press Office assigns journalists to each school of the University (one journalist for the College of Science and Engineering, one for the College of Humanities and Social Science and two for the College of Medicine and Veterinary Medicine). These press officers work closely with members of the schools, manage information about researchers and research projects and select relevant or useful information to develop press releases. Tomlinson added:

“The criteria to select information to communicate are basically that it is interesting for the media and society, and that it was published in leading scientific journals”

Concerning the relationship between his office and the different schools of the University, he said that some schools are more supportive than others and for example, the Schools of Chemistry and Biology are more enthusiastic about communication. Relating to researchers, Tomlinson said:

“There are still misunderstandings between the media and the researchers, because they both do not understand their respective priorities and timings, and it is a limitation. Sometimes they have a successful direct contact, but this Office prefers to be the facilitator between them...”

One of the strategies of the Media and Communication Unit is to send press releases to press agencies usually 2 times a week. Tomlinson asserted:

“My view is that if you want to be successful with the media’s cover, it is important to select the information you send and not send too much.”

This Office does not organize press conferences because Tomlinson and his team are of the opinion also that:

“Nowadays press conferences are not very useful; there are other efficient ways to interact with journalists.”

Tomlinson indicated that one of their important achievements is they are able to manage critical situations, he explained:

“We are able to answer urgent media enquiries because most of the people of this office are journalists and know how the media works; also, thanks to our public relations work, we have made close links with the community and the councils which is essential in these situations.”

What is more they developed a brief *“Guide to Working with the Media”* that outlines the key factors to consider before doing any media work, and offers tips for preparing for newspaper, TV and radio interviews.

Regarding the media’s science coverage in the United Kingdom, Tomlinson noted that nowadays it is becoming worse because of the pressure inside the media and the economic climate, he explained:

“Currently there is not enough money to pay good journalists and scientific journalists. So it means that there is not coverage for stories (only for brief and limited science notes)”.

However the internet is an excellent way to communicate, he remarked, and as an example he mentioned that a large amount of information about the University of Edinburgh is available on YouTube. Finally, Tomlinson highlighted the need to offer to the general public full scientific stories and researcher’s

opinions, as well as encouraging the understanding of the mass media and the teaching of it.

The Edinburgh Beltane, at the University of Edinburgh. Interview

The Edinburgh Beltane is one of six Beacons for public engagement funded in 2007 by the UK funding councils, Research Councils UK and the Wellcome Trust. The Edinburgh Beltane is a four year project delivered by a partnership led by the University of Edinburgh; and its budget was £1.2 million over four years.

Edinburgh Beltane aims to bridge the gap between researchers and the general public and encourage citizen participation and understanding of research that is relevant to public policy, such as health and life sciences and energy and the environment. It also aims to promote a culture of public engagement in the higher Education Institutions and encourage, support and help researchers to engage with society and policy making and facilitate public policy debate.

Heather Rea, Project Manager of Edinburgh Beltane, in an interview with me on April 2009, explained that they are working with researchers, policymakers, the public, interest groups, academic institutions and public engagement experts. She said:

“Our work with the researchers involves providing training opportunities to improve communication skills and opportunities to engage with the public through the events that we run, for example”

Concerning policymakers, they try to improve links with experts and the public, and organise public debates to guide policy and public participation. She added:

“We work in special focus areas which require improvement. Sometimes the Royal Society of Edinburgh, which is link the Scottish Parliament, suggesting which areas or subjects are relevant to work on”

Rea indicated that Edinburgh Beltane supports interactive events with the public which present and debate research in public policy areas, giving opportunities

to participate in governance and policymaking using evidence based approaches to decision making. Finally, it offers more relevant and accessible events with special interest groups and the opportunity to contribute and influence research. She added:

“With academic institutions we are working to provide training for their staff giving them the necessary skills to engage with the public and policymakers. Furthermore we are aiming for public scientific engagement as a properly rewarded and recognized activity.”

Regarding public engagement experts, Rea said that their strategy is to set up a Web site, have an awareness-raising campaign across all the partners, share best practise, have a larger pool of effective speakers available for different audiences, develop increased capacity to respond to public concerns, and extend partner network.

Finally, Heather Rea added that sadly, the response has been small and they are only working with small groups of researchers, students and public engagement experts.

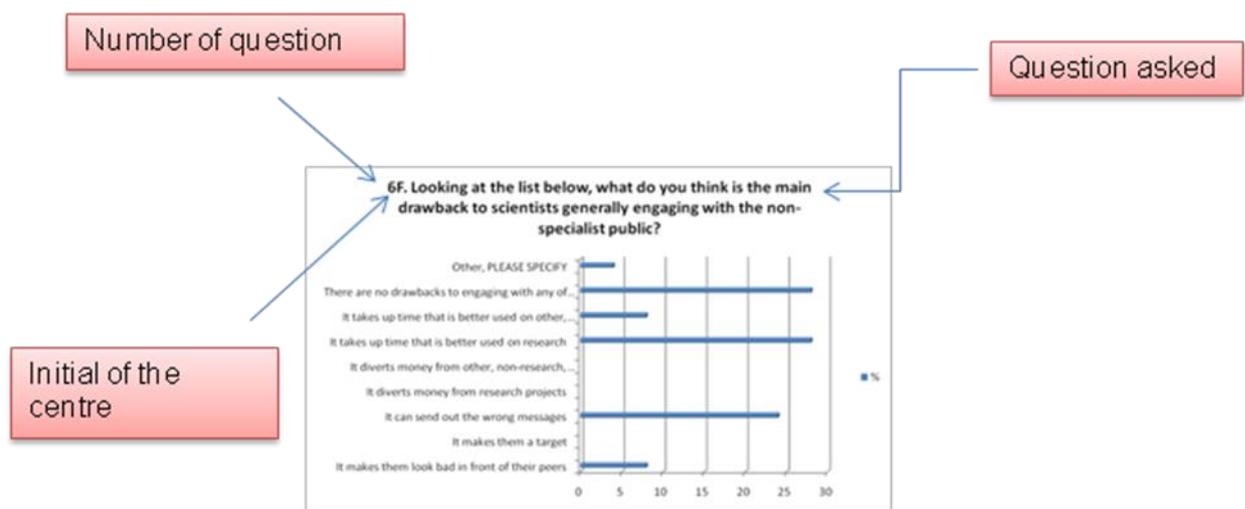
4.3. RESULTS: SCIENTISTS' PUBLIC COMMUNICATION ATTITUDES AND ACTIVITIES BY CENTRE.

This section summarises the responses, as percentages, to the questionnaire applied and the comments that emerged in each item as part of the qualitative investigation.

The results were organised into the five categories of information established before in the methodology, as follow:

- I. What public engagement means to scientists and why it is important
- II. Audiences and Activity
- III. Barriers to science communication
- IV. Training and demand
- V. Incentives for science communication.

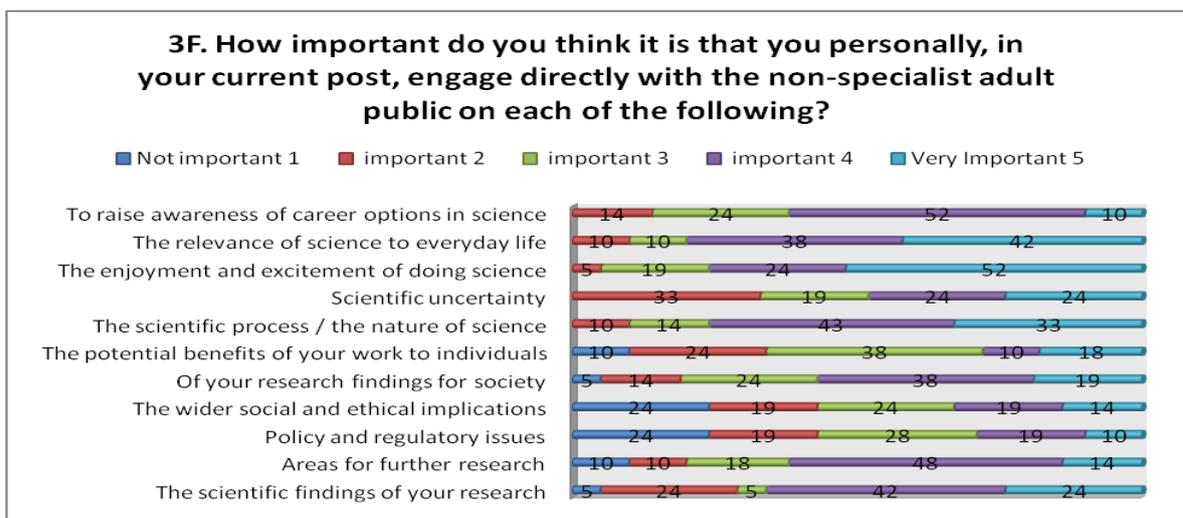
It includes charts which illustrate the diverse levels of responses obtained. An example is given below:



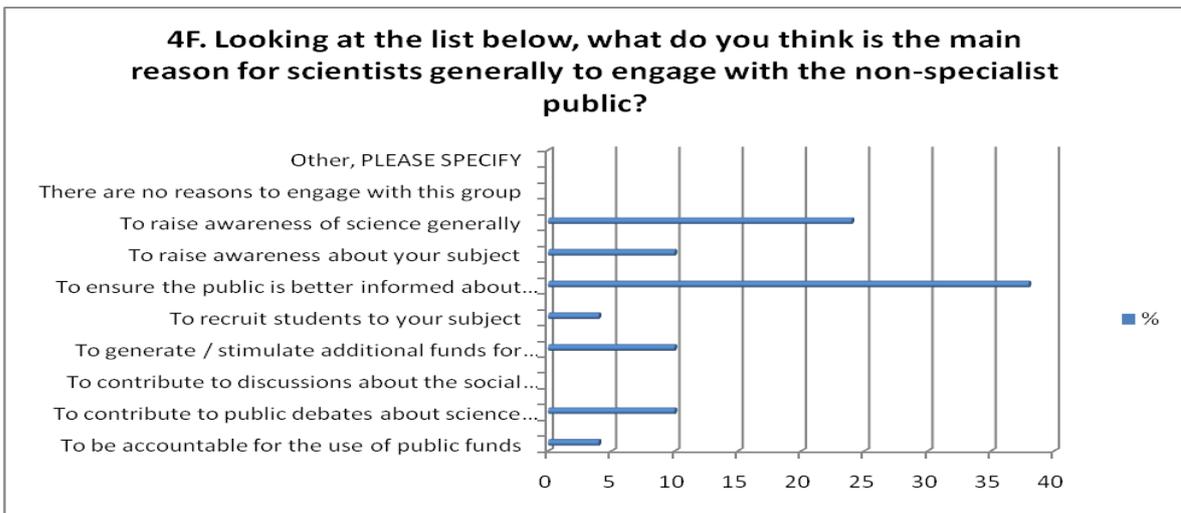
4.3.1 RESULTS OF THE FRITZ HABER INSTITUTE

I. WHAT DOES PUBLIC ENGAGEMENT MEAN TO SCIENTISTS AND WHY IS IT IMPORTANT?

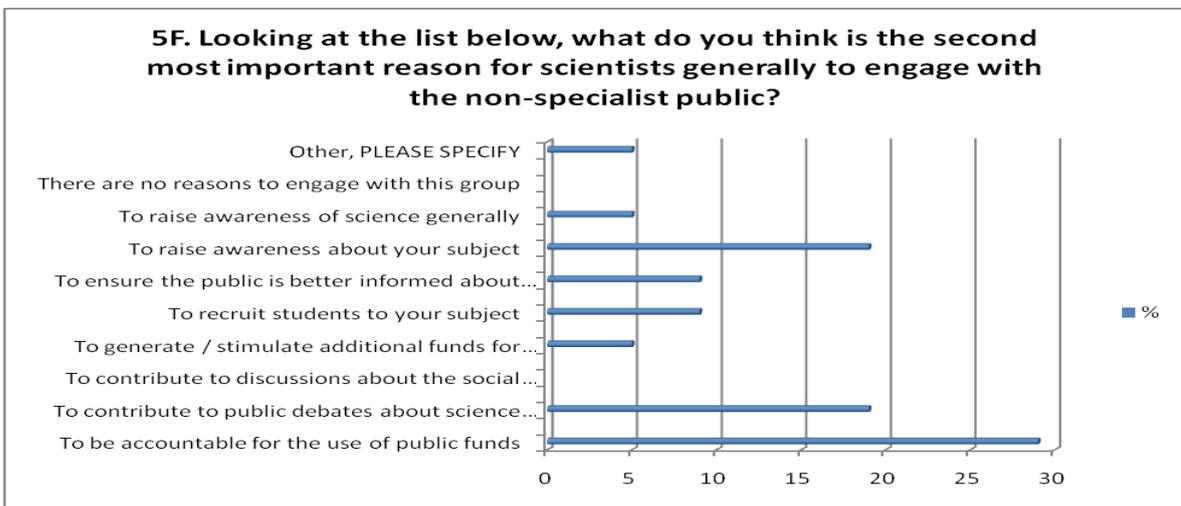
When scientists considered their own research, the most important issues with regard to engaging the non-specialist public were: the enjoyment and excitement of doing science (52%), the relevance of science to everyday life (42%) and the scientific process/the nature of science (33%). Next in priority were the scientific findings of your research (24%) and scientific uncertainty (24%), of your research findings for society (19%) and the potential benefits of your work to individuals (18%).



The most important reason for scientists to engage with the non-specialist public was to ensure the public is better informed about science and technology (38%); followed by to raise awareness of science generally (24%). The least important reason was to contribute to ethical discussions about science (0%).



Also, the second most important reason for scientists to engage with the non-specialist public was to be accountable for the use of public funds (29%). Close were to contribute to public debates about science (19%) and to raise awareness about your subject (19%).

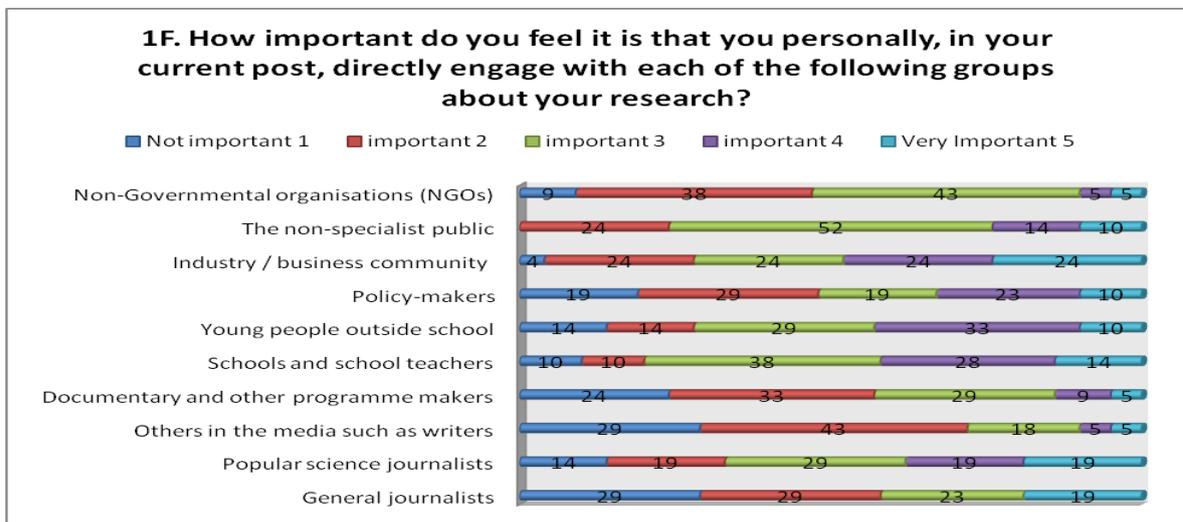


One comment related to why the scientists participate in these kind of activities was:

“Some scientists could benefit from the personal publicity”.

II. AUDIENCES AND ACTIVITY.

The most important audiences identified by scientists to directly engage with their research (ranked 4 and 5 on scale of 1-5) were: industry/business community (48%), young people outside school (43%) and schools and school teachers (42%), popular science journalists (38%) and policy-makers (33%). The least important audience was non-governmental organisations (10%).

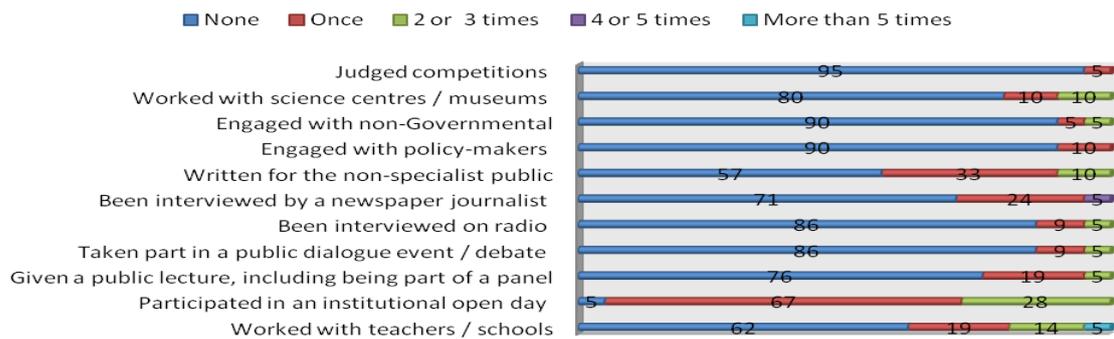


Some Scientists said that:

“The press office has to orientate the interaction with these groups”,
“The relationship with politicians is part of the directors business”.

When scientists were asked about their public engagement activities in the past 12 months 95% of scientists said they had participated in an institutional open day; 43% had written for the non-specialist public; 38% had worked with teachers or schools; 29% had been interviewed by a newspaper journalist and 24% had given a public lecture. The activities with low engagement were judging competitions (5%), and engagement with NGO’s (10%) and politicians (10%).

2F. Thinking about public engagement with, and communication about, science, roughly how many times in the past 12 months have you done each of the following?

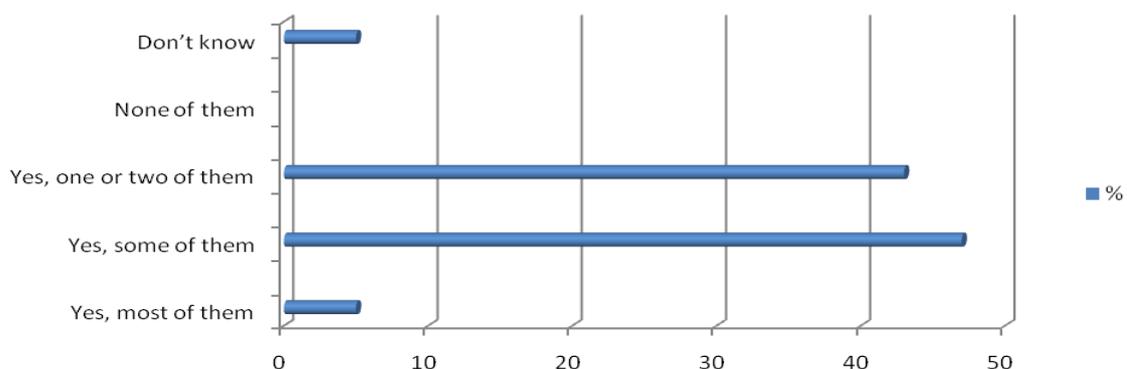


One of the scientists had collaborated for 10 years in a kindergarten science programme (<http://www.haus-der-kleinen-forscher.de/de/home>), and he emphasised:

“I am convinced how important it is for young people to have contact with science”.

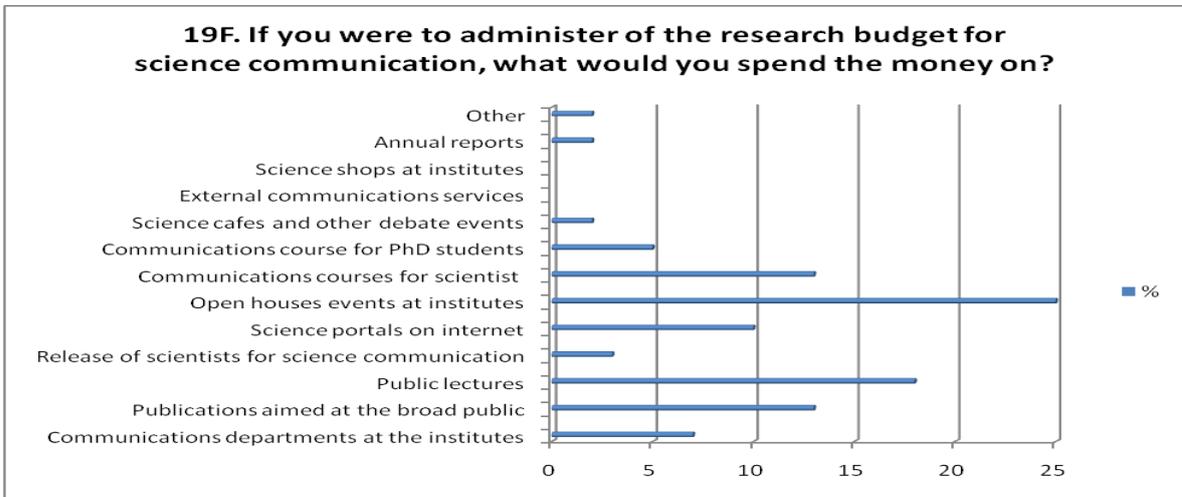
Focus on the appreciation of scientists’ participation, forty seven percent of the participants respond that some of the members of their department take part in activities that engage the non-specialist public in science; and 43% said that one or two of them.

16. Do other members of your department take part in activities that engage the non-specialist public in science?



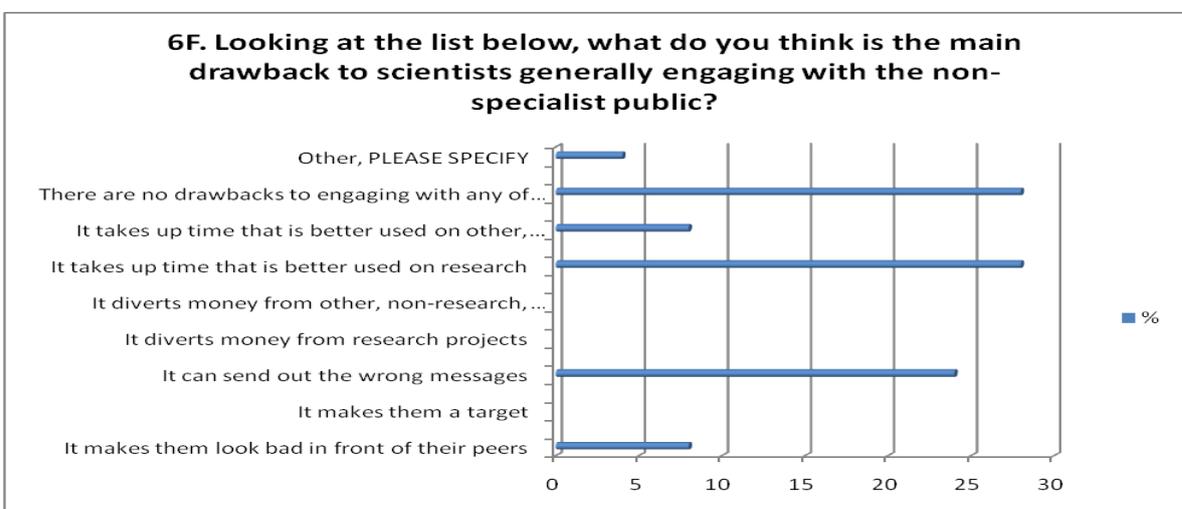
Regarding which activities for science communication the scientists would spend money on, 25% of participants agreed on open house events at institutes, 18% public lectures and 13% publications aimed at the broad public

and communication courses for scientists, 10% science portals on the internet and 7% communication departments at institutes . Others activities mentioned not included in the format were paid free access to magazines such as Nature, or Science for example, and money to support projects in schools.



III. BARRIERS TO SCIENCE COMMUNICATION

The main drawback for scientists engaging with the non-specialist public was it takes up time that is better used on research (28%); followed by there are no drawbacks to engaging with any of these groups (28%) and it can send out the wrong messages (24%).

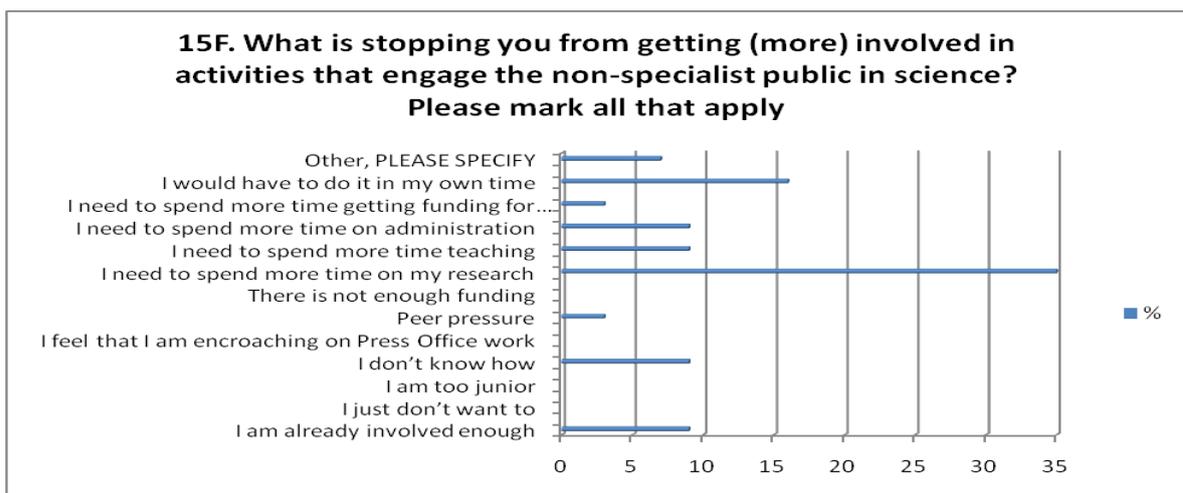


A few scientists pointed out they experienced obstacles engaging with the public because their subject matter was difficult to explain and they had had previous bad contacts with the media.

“The specific details of my research are not important to the public and it is difficult for them to understand, however nuclear physics itself is a relevant subject...”

“The scientists’ relationship with journalists isn’t always a good one; they alter information or present it in a superficial way. So if you have a bad experience it discourages you from working with them again...The truth is we don’t have any training in dealing with them”.

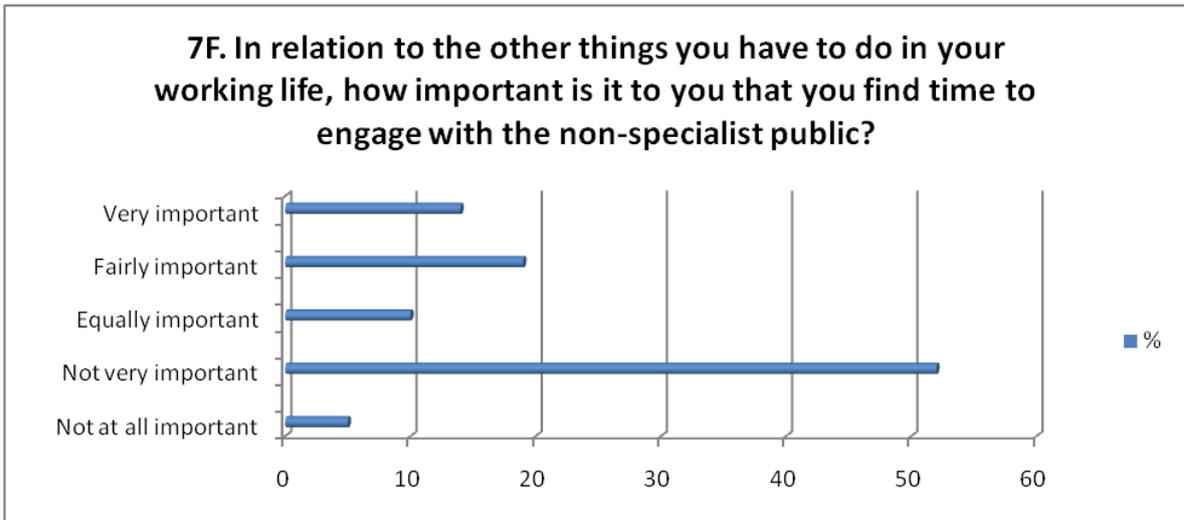
When scientists were asked about what stopped them taking part in public engagement activities; thirty five percent of scientists stated that their need to spend more time on research and 16% stated that they would have to do it in their own time.



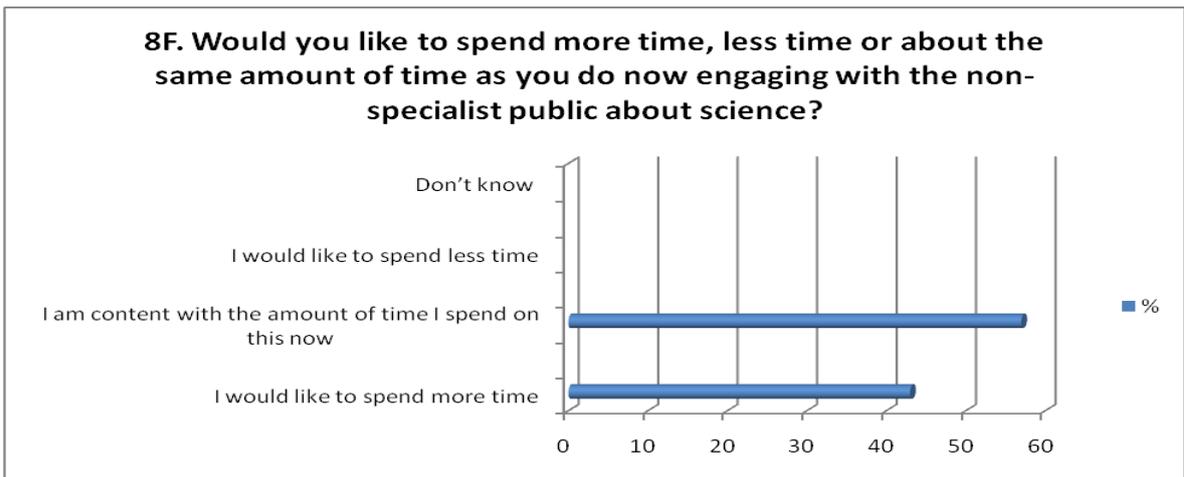
IV. TRAINING AND DEMAND.

Regarding the importance to find time for public engagement, forty three percent of scientists gave at least some importance to find time to engage with the non-specialist public, whereas 52% per cent of scientists said that it is not

very important; and 5% of scientists said it is not at all important to find time for public engagement in their daily working duties.

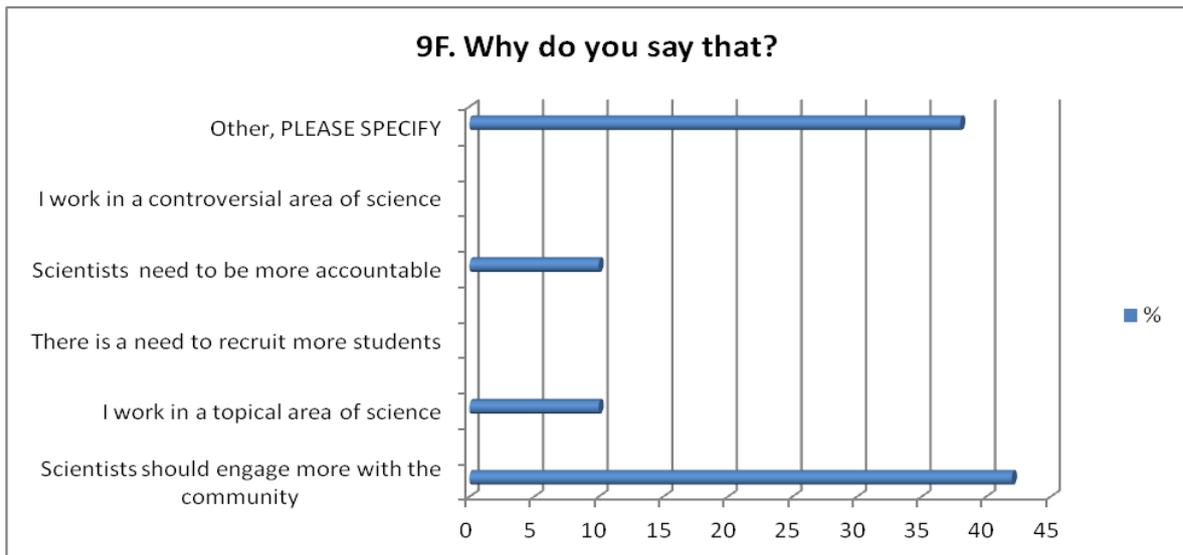


Fifty seven per cent of scientists said they were content with the amount of time that they spent engaging with the non-specialist public meanwhile 43% would like to spend more time.



Forty two per cent of participants agreed that scientists should engage more with the community, and 38% of them explained in their own terms two different situations, one group of respondents said that it is important to explain what the scientists work means and what they are doing with the public money, likewise that they and their institute are working well to engage with the public and the media at the moment (19%). However other scientists (19%) highlighted the

difficulties around this activity as it takes up time; also the difficulty in talking with the general public and these activities are not recognised.



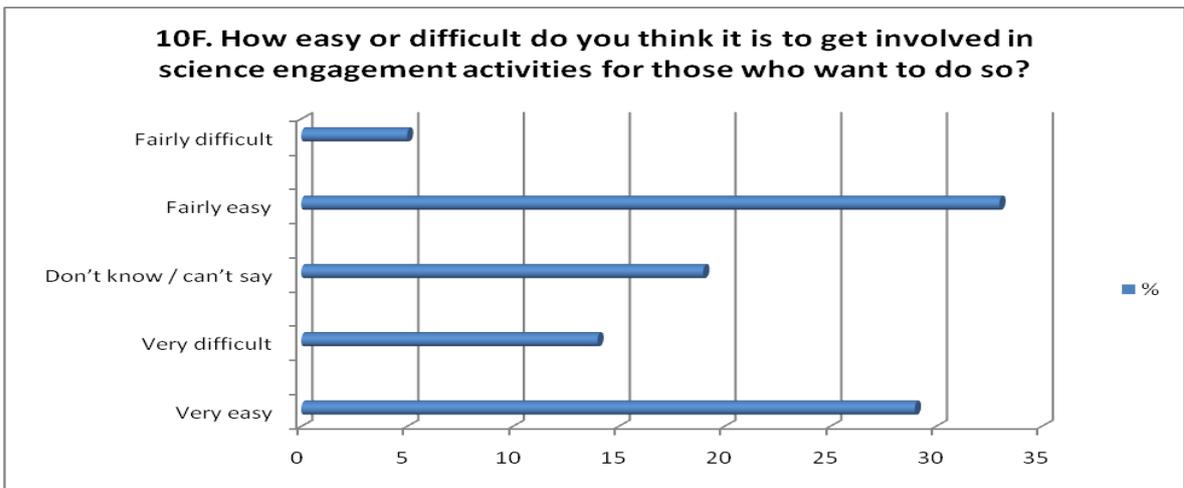
Some of the comments emerged in this point were:

“The research is hard work, it takes a lot of time and we are often under high pressure. Engaging with the public takes time and sometimes people find it hard to understand us.”

“Explaining physics to the public is difficult”.

“It is more important to find funds for research than attempting to explain our research to the public”.

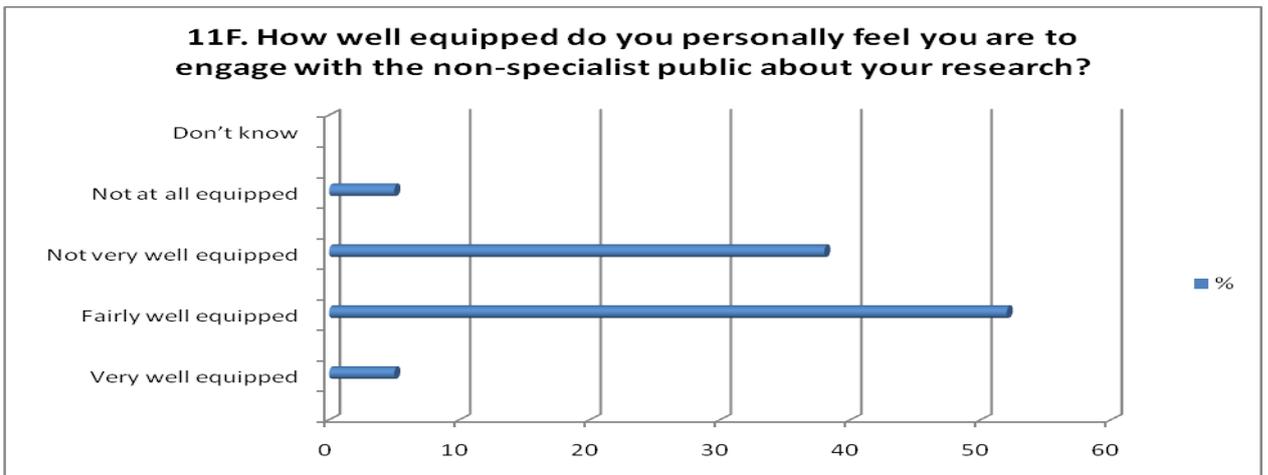
Most of the scientists (62%) agreed that it is easy to get involved in science engagement activities and 19% reckon it is difficult.



“Engagement activities are complicated and it is necessary to have professionals to deal with them”.

“It is important to indentify which objectives we need to reach because it is not about education, it is about communicating science”.

Furthermore, around half of participants (52%) felt they are fairly well equipped to engage with the non-specialist public about their research, whereas 38% said they are not very well equipped.

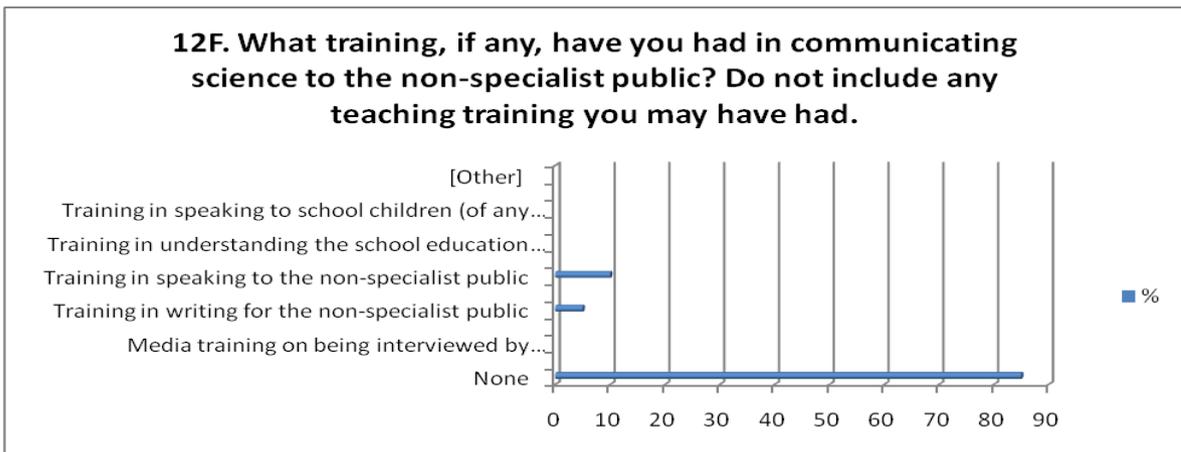


Some scientists mentioned that even though they don't have any training they can engage with the general public.

“There is not any training during our scientific career, so it is difficult to explain science with simple words. But we learn a few rules”.

“I feel I can communicate because I can talk with my family or friends about my research for example...”

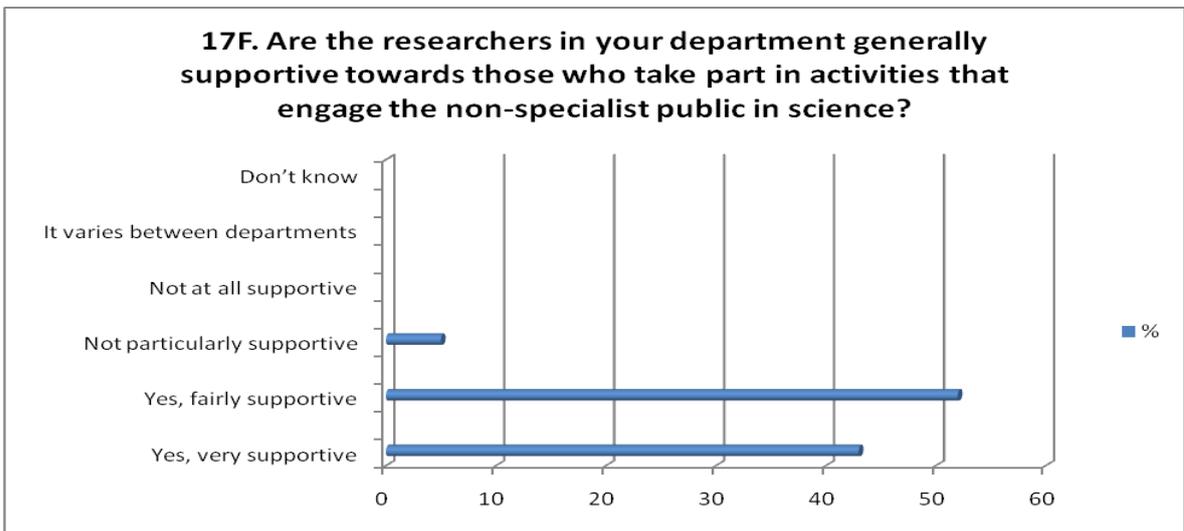
Most of scientists surveyed have had no training in communicating science to the non-specialist public (85%) and only 15% had had training in speaking and writing with the general public.



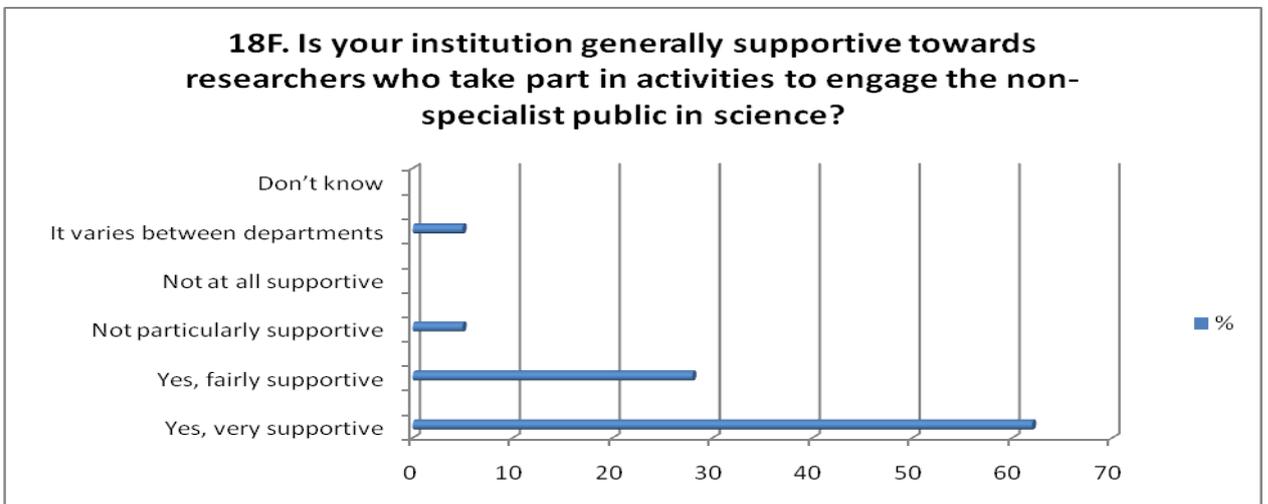
One of the scientists mentioned his training was part of his postgraduate course while another participant commented that:

“The experience of teaching helps us to communicate with the non-specialists public as well”.

Focus on colleague’s support, 52% of the researchers said that their fellow scientists are fairly supportive towards those who take part in activities that engage the non-specialist public or very supportive (43%).



Concerning the support of institutions towards researchers who take part in activities to engage the non-specialist public, 62% of scientists said it is very supportive and 28% fairly supportive.

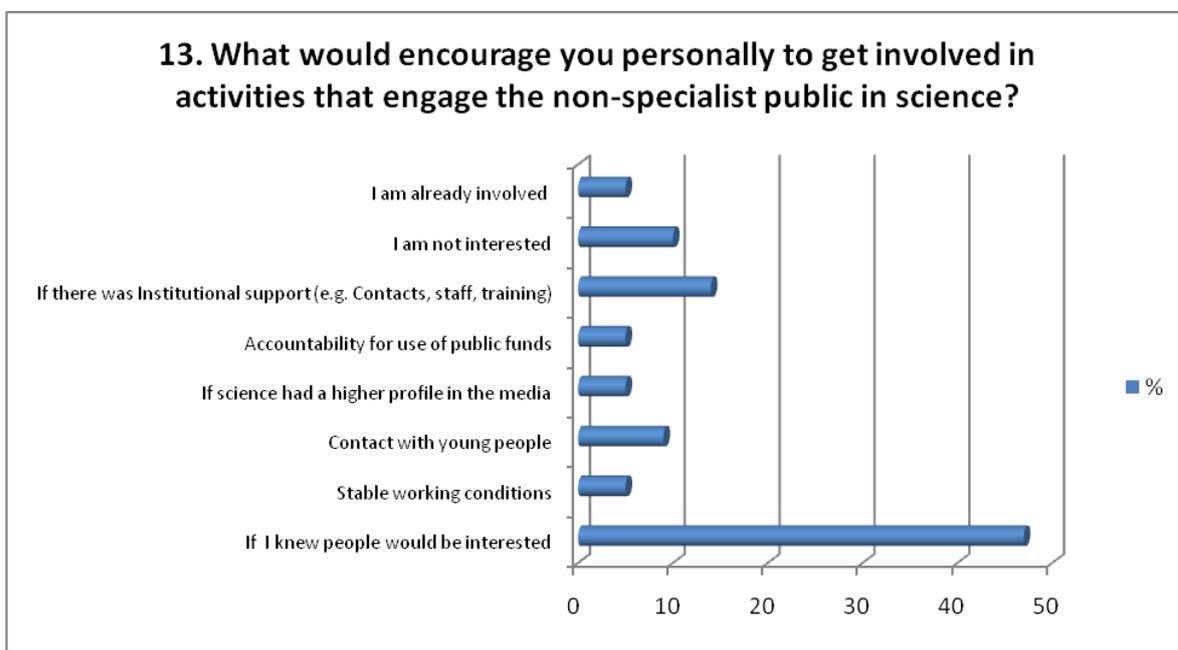


Whatever the positive opinions about the institutional support, one of the scientists commented:

“When I wanted to participate in the production of a book for the non-specialist public, the institution asked if I was trying to leave my scientific career”.

V. INCENTIVES FOR SCIENCE COMMUNICATION

When scientists were asked to define in their own terms what would encourage them to get involved in activities that engage the non-specialist public in science, the dominant answer was if they knew people would be interested (47%). Some of the views about were:



“I am willing to participate and give interviews to journalists but I won’t initiate contact with them. These activities are important but a lot of the time people are not really interested and it is really discouraging”.

“If people show an interest this is encouraging and interaction becomes easier. It is just what we want”.

“I like to see people interested and would be happy if science communicators invited me to participate”.

“If the journalists show interest it makes the task easier.”

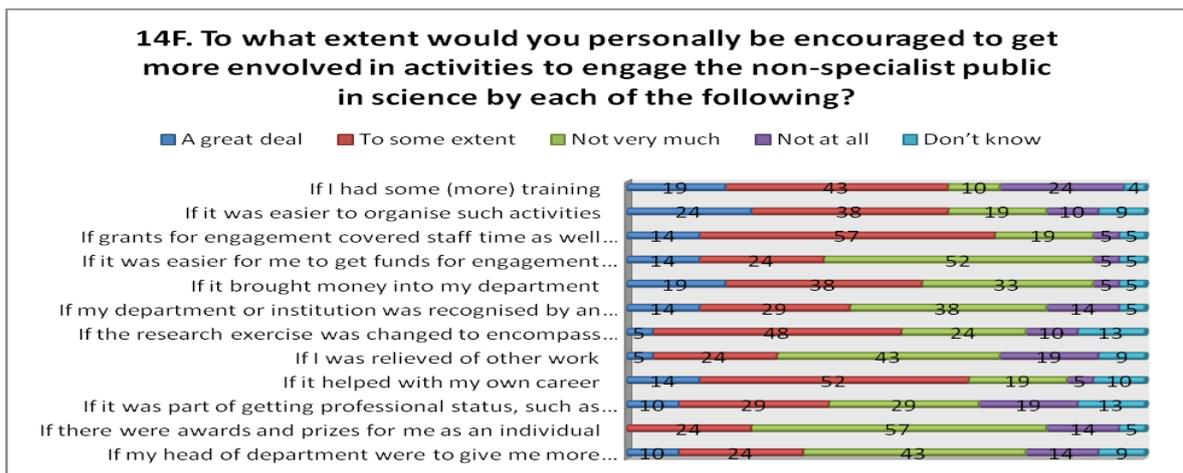
Because it is difficult to engage with the non-specialist public we need support from our institutions, with staff and training...

“Barriers can exist between scientists and our target audience and some of us need assistance in understanding who the audience are and the best way to communicate with them”

“More space for science in magazines and newspapers would encourage interest.”

“Stable work conditions because we are under big work pressures and no permanent positions”

In the closed-answer questions on the subject of, to what extent scientists would be encouraged to get more involved in activities to engage the non-specialist public in science, grants for engagement covered staff time as well as other costs was the top incentive (73%). It was also important it helped with their own career (66%), had some training (62%) and it was easier to organise such activities (62%).



For some of the respondents the public communication of science is considered a secondary activity, the same can also be said about awards and prizes in this area.

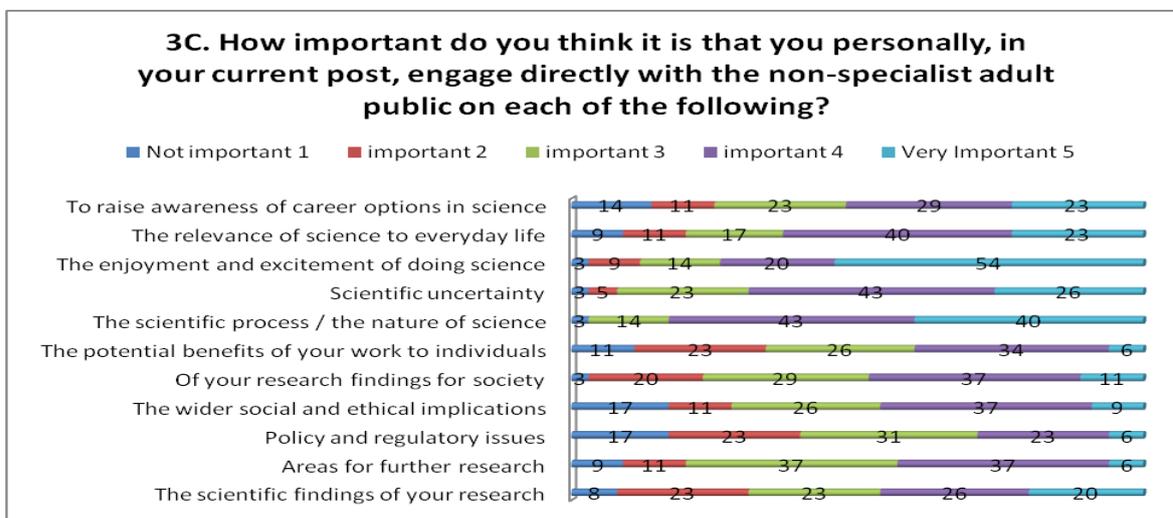
“My main concern is scientific research”

“These awards are not relevant for the scientific community”.

4.3.2 CENTRE FOR MATERIALS ELABORATION AND STRUCTURAL STUDIES – TOULOUSE

I. WHAT DOES PUBLIC ENGAGEMENT MEAN TO SCIENTISTS AND WHY IS IT IMPORTANT?

When scientists considered their own research the most important issues with regard to engaging with the non-specialist public were the enjoyment and excitement of doing science (54%); the scientific process (40%) and the scientific uncertainty (26%). Next in priority were the relevance of science to everyday life (23%); to raise awareness of career options in science (23%); the scientific findings of your research (20%) and of your research findings for society (11%).



Some participants outlined why they considered it is not important to talk about their research:

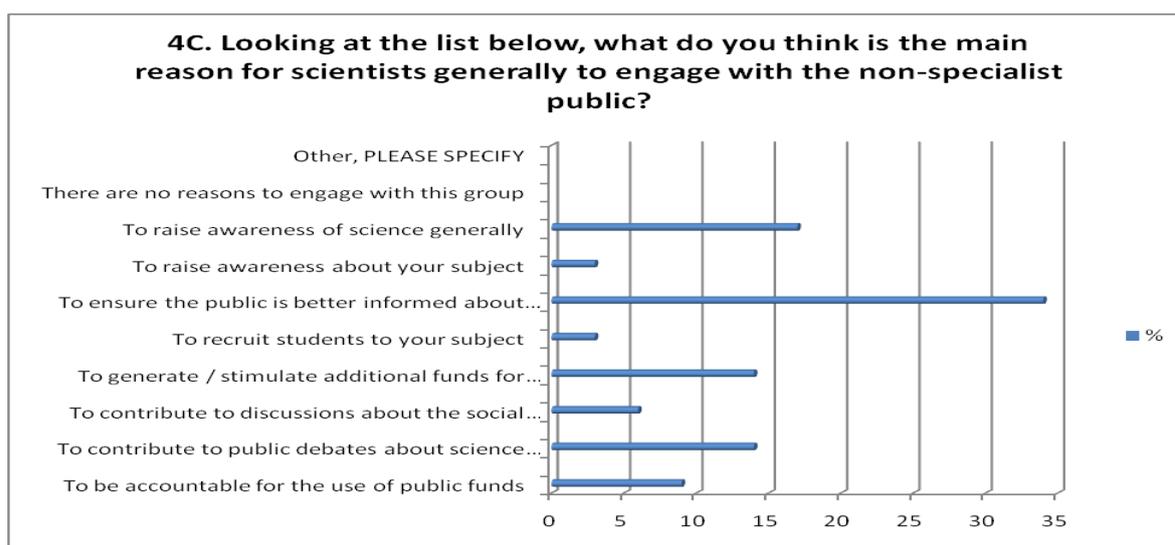
“It is very difficult to explain to the non-specialist public what I am doing in my research”.

“I think the results of my research are of no interest to the public...”

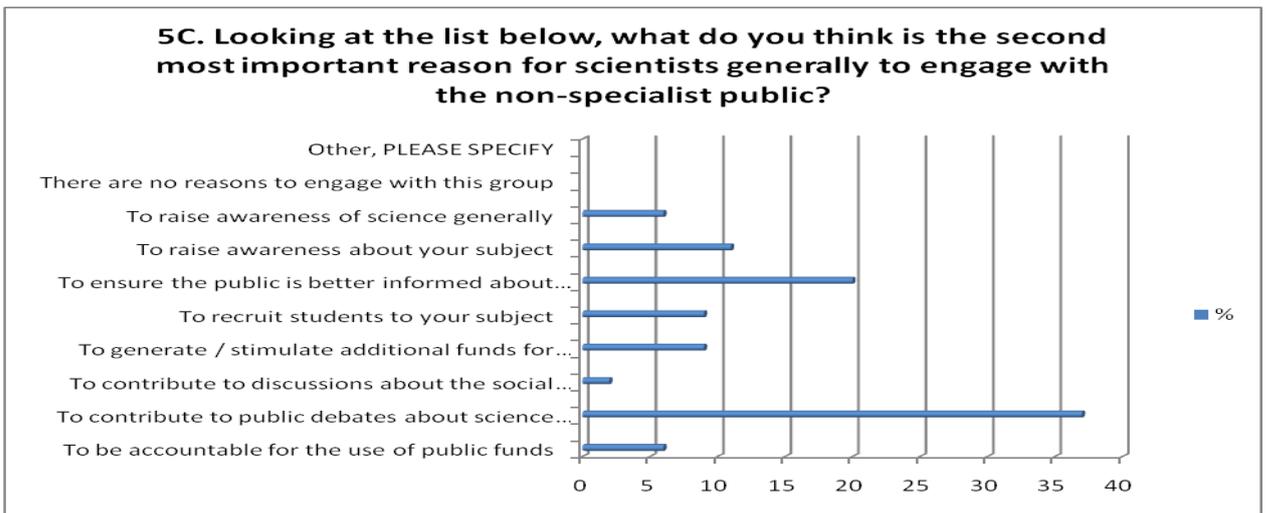
“You can only place your research in the public domain when you have got results.”

“To the mass media, public science communication is just about application and I don’t think this is right...”

Concerning the most important reason for scientists to engage with the non-specialist public it was to ensure the public is better informed about science and technology (34%).



Furthermore, the second most important reason for scientists to engage with the non-specialist public was to contribute to public debates about science and scientific issues (37%).



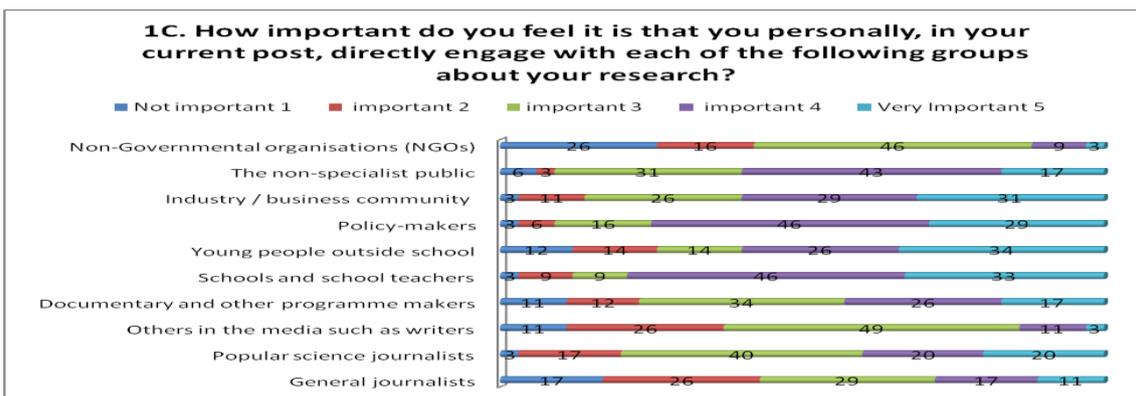
Also a couple of comments with reference relevance to nanotechnology emerge in this point:

“It is important to explain what we are doing in the laboratory, because people think that nanotechnology is harmful”.

“The success of allaying the doubts of the non-scientific public can be reflected in funding issues for future project”.

II. AUDIENCES AND ACTIVITY.

The most important audiences identified by scientists to directly engage with about their research (ranked 4 and 5 on scale of 1-5) were schools and school teachers (79%), policy-makers (75%) and industry, the non-specialist public and young people outside school (60%). The least important audience was non-governmental organizations (12%).



Some of the comments of scientists added were:

“I think the most important thing is to work with schools and young people because they are the future, we can guide them...The general public should have the right to know what scientific research their taxes are spent on. As for NGO’s, as a rule they do not seek advice”.

“It is necessary to include a successful communicator who is aware of public perception, and act as a link between these groups.

“I think it is the institution (the director) who must to be in contact with the public, not me...”

“It is possible that direct contact with public groups is important for one’s ego but not necessarily for your career. It is good that your research is in the public domain, although I would never go to the lengths of contacting a journalist or any other public groups to try and arouse interest in my work”.

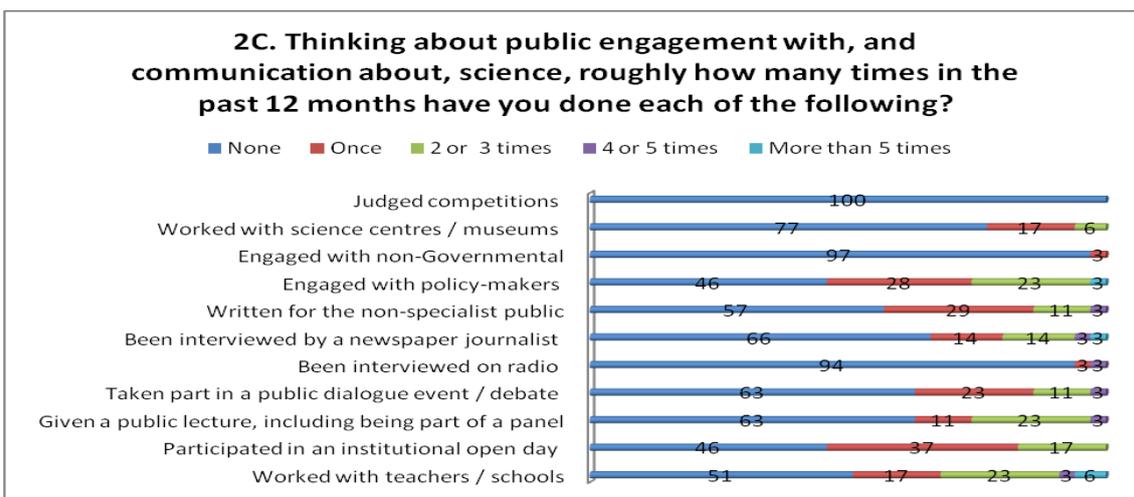
“I have no interest in developing a relationship with journalists; I am not famous and therefore they are not interested in me or my work.”

“The journalists are not interested in science as the daily routine of science is not headline material”.

“I prefer to communicate directly with the public rather than with journalists, that way I know that information is correct”.

When scientists were asked about their public engagement activities in the past 12 months 54% of scientists had participated (once or more than 5 times) in an institutional open day; 54% had been engaged with policy-makers; 49% worked with teachers or schools; 43% written for the non-specialist public; 37% given a public lecture, taken part in a public dialogue event and 34% been interviewed

by a newspaper journalist. The activities with low engagement were judging competitions (0%), engagement with NGO's (3%), and taking part in radio interviews (6%).



Some of the opinions regarding non-scientific participations were:

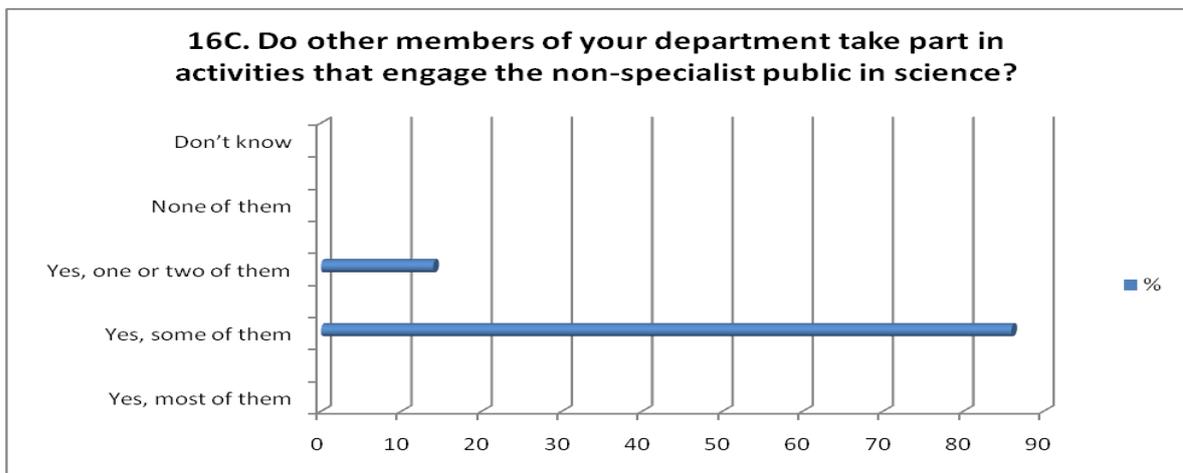
“I didn’t participate in the Institutional open day because there was no funding”.

“I don’t have time for these kinds of activities; I am under a lot of pressure to write articles and publish papers...”

“This is a critical period for the French scientific community which is under extreme pressure. Productivity between scientific groups is extremely competitive. There is much more to do and constant difficulty finding more funds for our research, publishing papers...If this current situation perpetuates future research will be in danger”.

Some of the scientists said they were currently involved in these kind of activities because of they are members of science or civil societies which promote the engagement with the public, such as the Society of Physics.

Focus on the appreciation of scientists' participation, most of the participants responded that some of the members of their department take part in activities that engage the non-specialist public in science (86%).



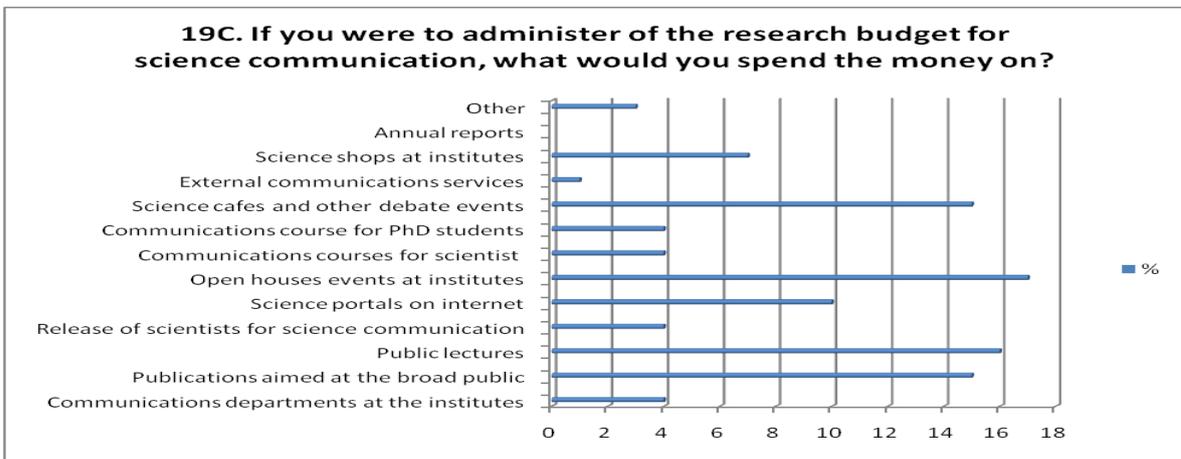
A couple of comments pointed out:

“Many of our colleagues don't have time to participate”,

“We are under too much pressure at work”.

“Scientific researchers are in a better position to actively participate with outside groups than those in academic positions due to the different structures and commitments between these two positions”.

Regarding which activities for science communication the scientists would spend money on they were most likely to spend money on: 17% open house events at institutes, 16% public lectures and 15% publications aimed at the broad public and science cafes and other debate events.



Some opinions emerged were:

“It is more important to train researchers than students because they already have experience. Students are sometimes confused and lack focus”.

“Open day events demonstrate the reality of applied science...the science cafes for example, only provide a stage for vainglorious chats”.

“The public relations office of internal departments in research institutes are not run by professionals. It is more efficient to contact the services of dedicated external public relations experts to carry out public scientific communication”.

“I know we need profesionals in communication because I am not going to do their work but I would prefer that the money was spent on research...”

III. BARRIERS TO SCIENCE COMMUNICATION

The main drawback for scientists engaging with the non-specialist public was it takes up time that is better used on research (40%); followed by it can send out the wrong messages (20%) and there are no drawbacks to engaging with any of these groups (17%) .



Some of the opinions were:

“We don’t have the tools to communicate with the people”

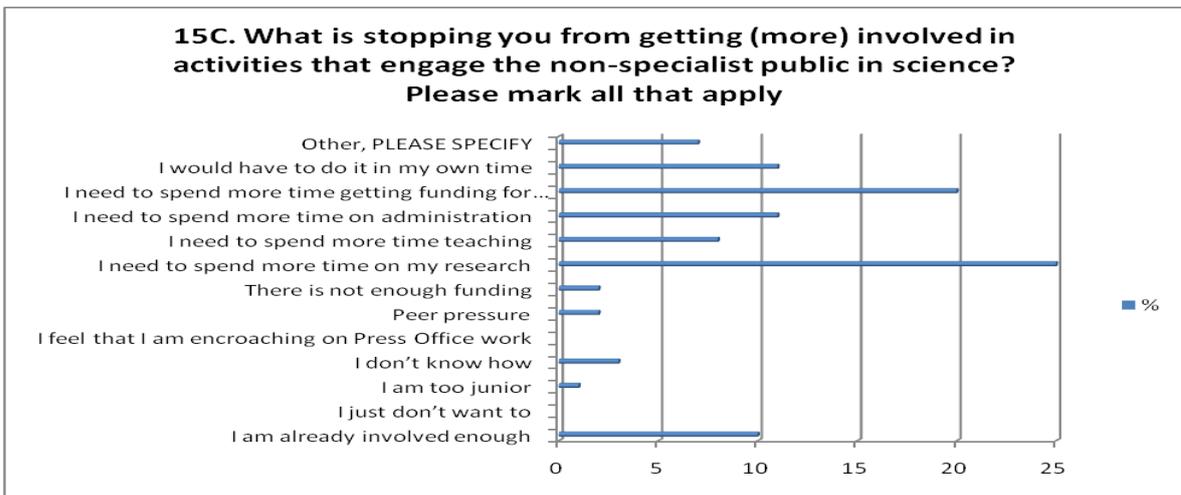
“Institutions encourage participation in public engagement but do not recognise these as beneficial, attributing more importance to the production of research papers and research findings”

“The current climate for the scientific community in France is difficult. There is great pressure to secure funding and publish research findings; this is what takes up all the time at the moment”.

“The CNRS work’s contract includes the obligation to participate in public science communication activities...”

“It is not about wasting money on engagement activities [diverts money from research]. However, if the research project is not outstanding, what will we communicate?”

When scientists were asked about what stopped them taking part in public engagement activities, twenty five per cent of scientists stated that their need to spend more time on research was stopping them engaging with the non-specialist public; 20% stated that they need to spend more time finding funding for their research project.



Other answers were:

“I have got other priorities...”

“I participated when I was younger but now I am don't have time, maybe in the future I will do it again”

“I don't have any training to do it”

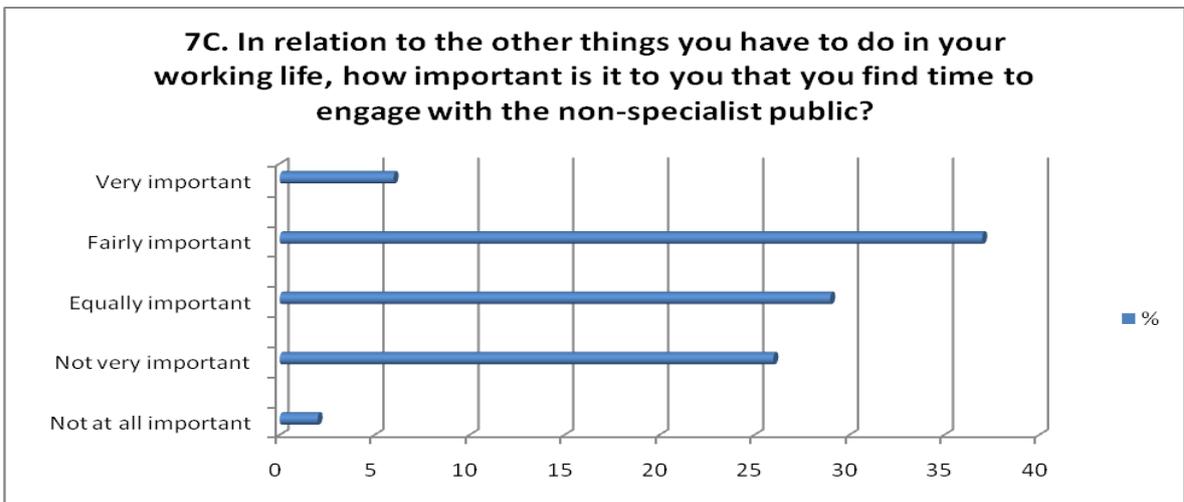
“I am under high pressure at the moment, I am a head of a team, and have got students too...”

“I don't want to risk being manipulated by journalists or being ridiculed.”

“If I did not have so much administrative work to do then maybe I could find the time.”

IV. TRAINING AND DEMAND FOR PUBLIC ENGAGEMENT WITH THE NON-SPECIALIST PUBLIC.

Regarding the importance to find time to public engagement, thirty seven percent of scientists said it is fairly important to find time to engage with the non-specialist public, 29% that it is equally important whereas 26% said it is not very important to find time for public engagement in their daily working duties.

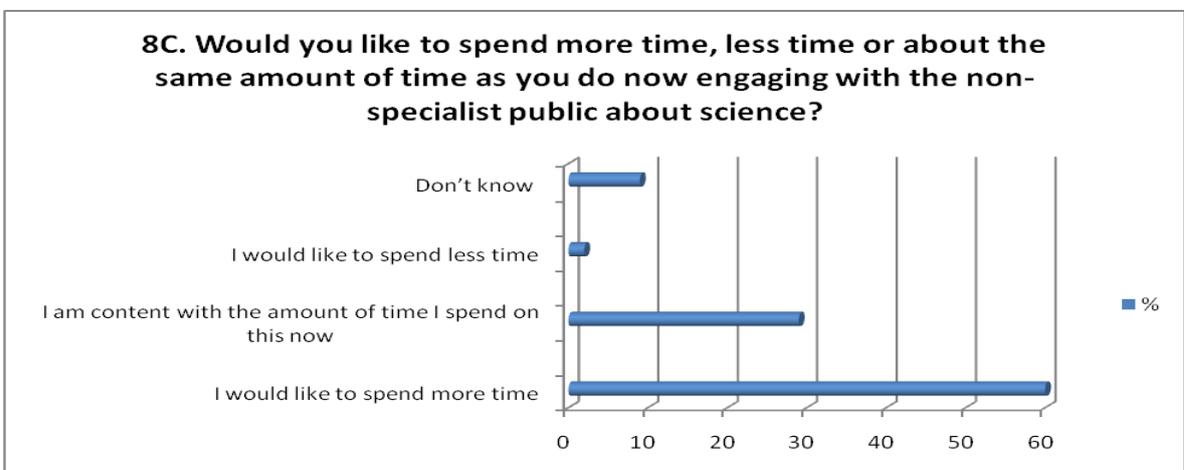


Scientists stressed that:

“Nowadays these activities are more and more important, the people want to know more, become more aware and become more involved in the decisions. So it is necessary to explain the nature of science”

“Although I consider this activity to be equally important with my research, to be honest it is not a priority”

Sixty per cent of scientists said they would like to spend more time engaging with the non-specialist public; while 29% said they were content with amount of time that they spent on this, 9% did not know.

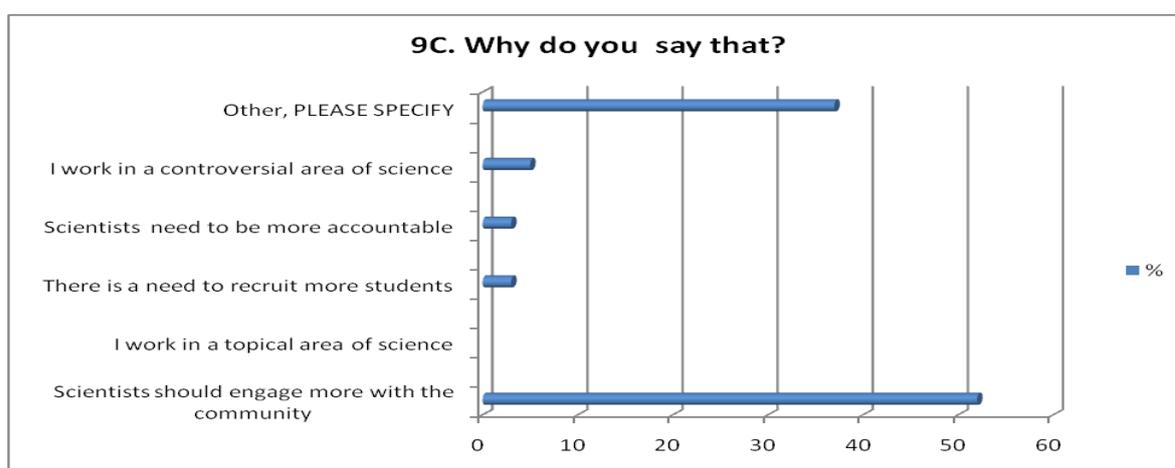


Some scientists added:

“Yes, I would like to spend more time...but I would have to limit other important activities”

“I would like to do it, but I am a junior researcher so I have got other priorities at the moment. Maybe in the future I will find time to become more involved”.

The participants agreed that scientists should engage more with the community (52%) however priorities emphasised that although they considered the activity important, there were constraints due to other priorities (25%). While other scientists considered they liked to engage with the non-specialist public (9%).



Some opinions emerged were:

“It is important to give the right messages regarding scientific work, as in why it is fundamental to do basic research. This is vital especially when dealing with politicians...”

“Communicating science is part of my work and my mission. We can avoid misunderstandings, in nanotechnology for example, if we answer public queries”.

“After all the alarming information regarding genetically modified organisms, nuclear energy and risks associated with nanotechnology, I

feel a lot of responsibility to give clear explanations concerning these topics...”

“We need to allay public fears and encourage young people and women to be interested in scientific careers”.

“This activity is important, scientific awareness is part of the culture and society, so we should engage with the public, but in reality we do not have time to do so”.

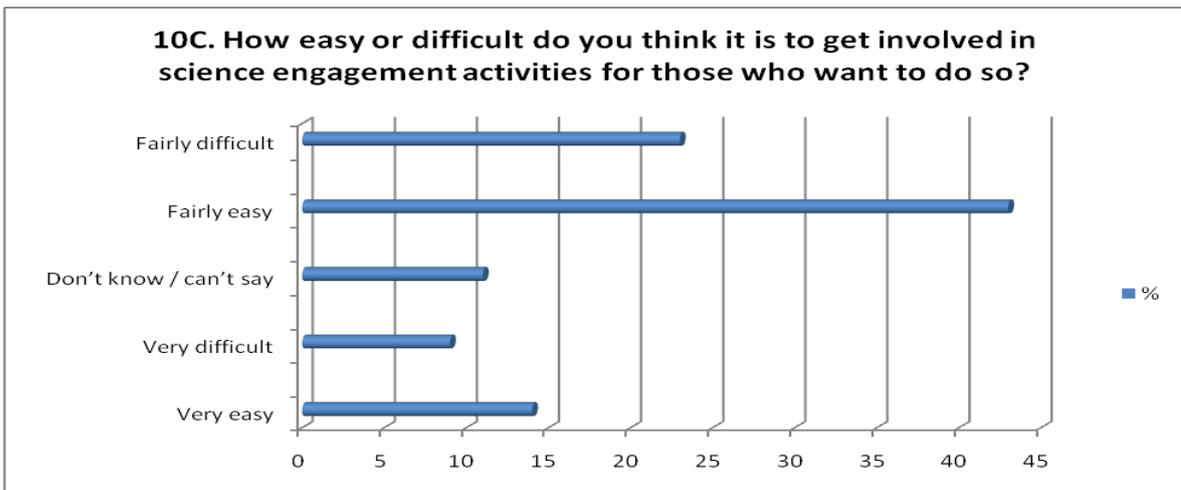
“My priorities are to get more students and funding for my research. I would love to get more involved with the public, but my research comes first and therefore I do not have time”.

“If I give part of my time to this activity then I spend less time doing research and my promotion will be at risk. I would like to engage with the public but the problem is finding time to do it”

“I have been writing articles for the general public and have been involved with young people since I started my career; it is something which I really like”.

“I participate in scientific public debates for reasons of philanthropy”.

Most of the scientists (57%) agreed that it is easy to become involved in science engagement activities while 32% think it is difficult. Some of the difficulties emphasised in being involved in these activities were time and lack of training.



Some of the comments were:

“It is easy if you want to do it”

“It is not difficult to do, what it is difficult is finding the time to do it...”

“It is easy, because I am teaching and talking to students all the time”.

“It is difficult to find time to do it because it is not part of scientific work, it is an extra activity”

“You need time, to find out about the audience...The research is complex and difficult to communicate and I don't have the tools to do it”

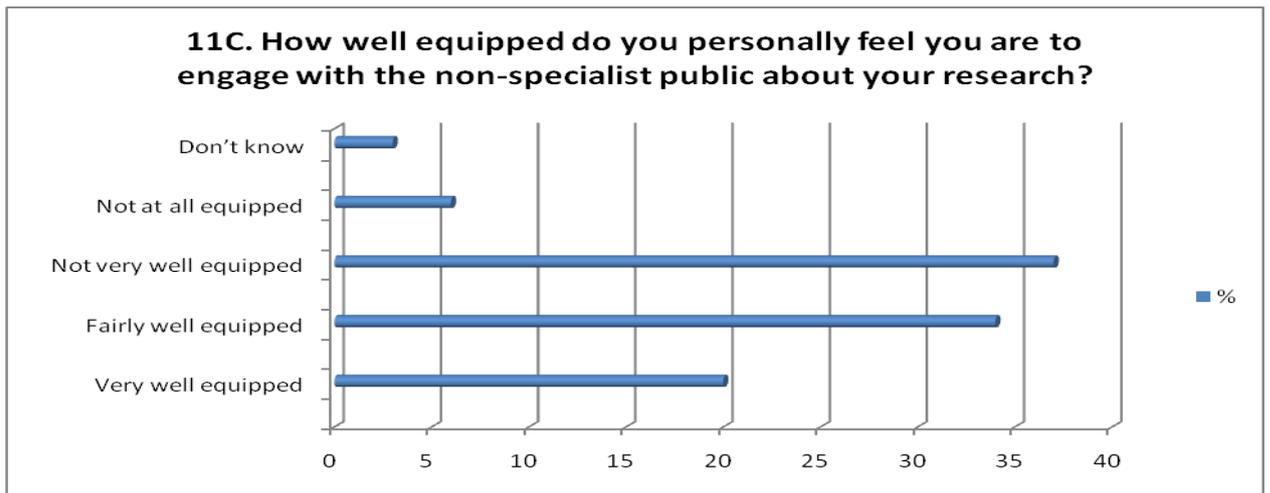
“There are a lot of concepts difficult to explain and understand; you need to find the right words and images to help you”

“To talk to people you need to find the right language. It is sometimes difficult to simplify scientific language in order to make the subject understandable and right...it is also important not to be boring...”

“It would be easier if you have assistance”

“I like to talk in detail about my research but the public do not need to know about it. You can often send out the wrong message. I think it is easier and more relevant to talk about science in general and some important processes... Actually, we need a bridge between the scientific community and society...”

Likewise, 54% of participants felt they are well equipped to engage with the non-specialist public about their research whereas 43% stated that they were not well equipped.



“My research it is close to people, it is part of their daily live so it is easier to talk about it”

“I can talk with the general public, they listen. Journalists on the other hand question me as if they already know everything but they do not”.

“Sometimes it is easy to give simple explanations; however, finding an interested public is more difficult”.

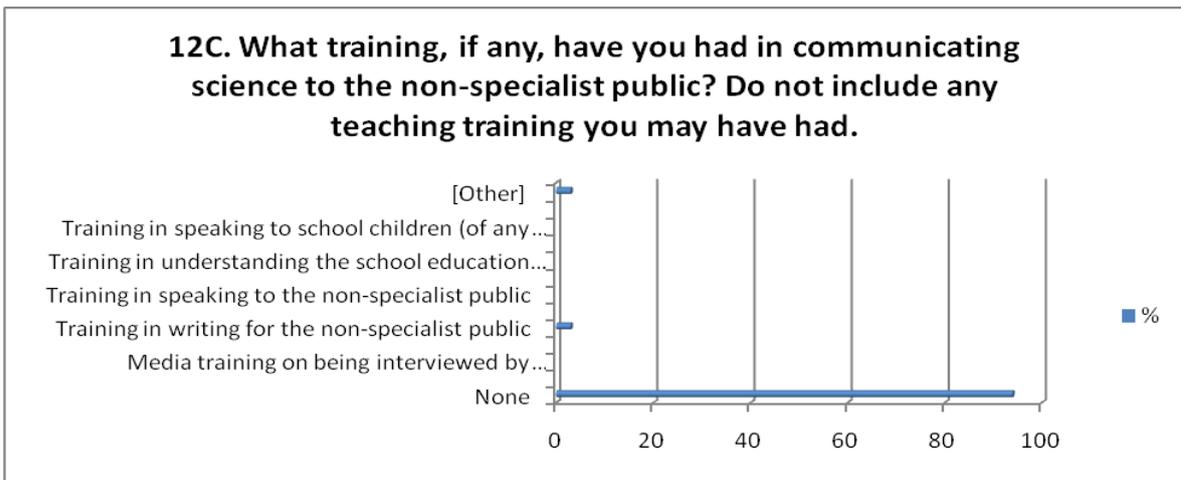
“Public communication is different work; it doesn't use the same methods which we use in the education system...And in some areas it is difficult to present interesting topics”.

“I have never tried to do it before, so I do not know how I would do it”

“I do not have the tools to give simple messages”

“I have never received any training before; the Institution has not provided any”.

Nevertheless, 94% per cent of scientists surveyed have had no training in communicating science to the non-specialist public.



Also they stressed that the practical experience has given them the tools to do it,

“My training is empirical; I have had contacts with journalists, and given chats and worked with kids”

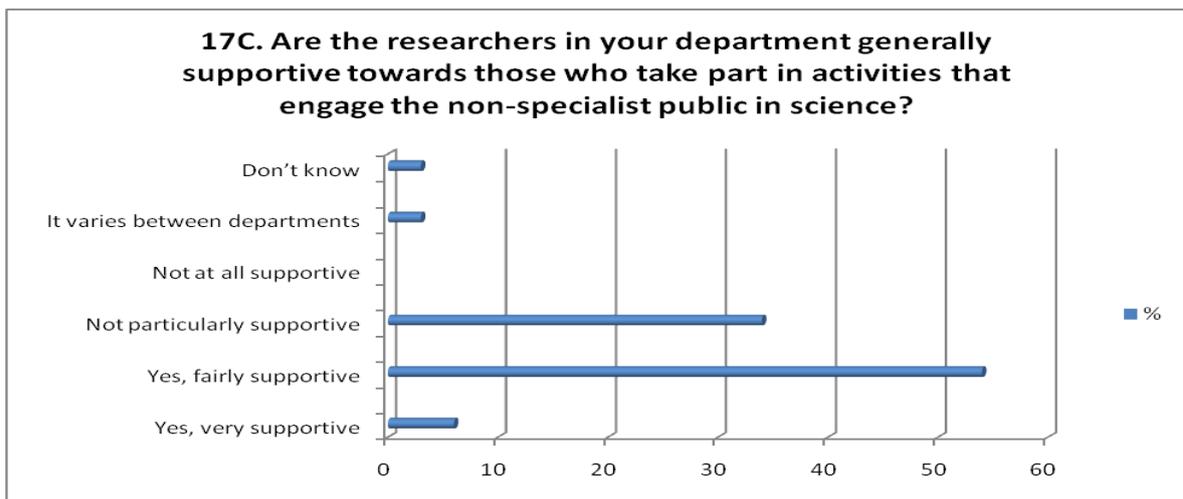
“I do not have any training but I have the tools with which to communicate and have done so, I really like this activity”.

“I have not had any training but I am working on a new collection of books for the general public at the moment”

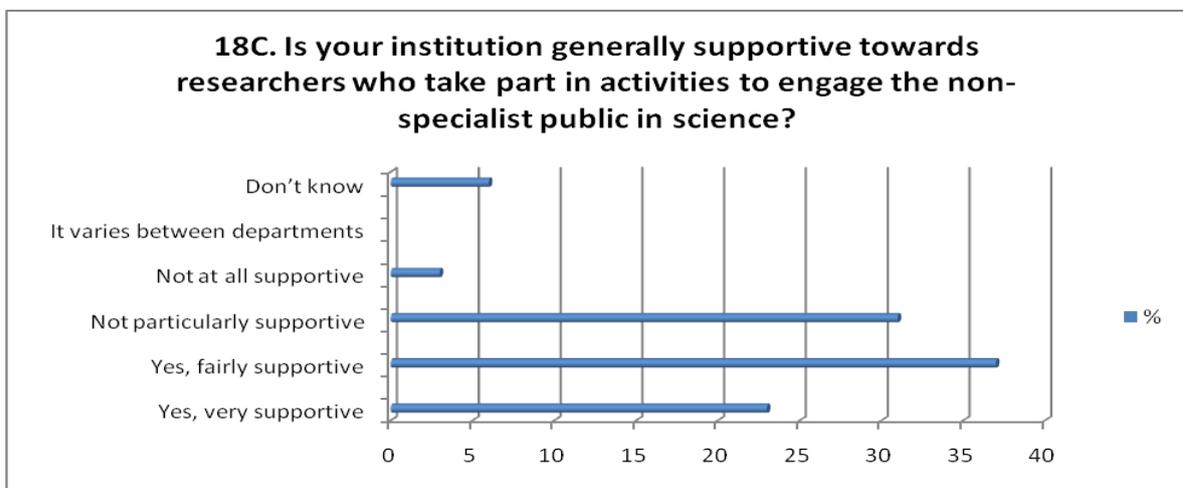
“I have got experience working with kids and I am part of the team of a crystallography exhibition at the museum”

“It is not necessary to have any training; it is possible to do it. In truth I believe that the specialists are not so good because they simplify too much and this can be dangerous...”

Focusing on colleague’s support, 54% of the researchers said that their fellow scientists are fairly supportive towards those who take part in activities that engage the non-specialist public, while 34% said they are not particularly supportive.



Concerning the support of institutions towards researchers who take part in activities to engage the non-specialist public, 37% of scientists said it is fairly supportive and 23% very supportive, whereas 31% said it is not particularly supportive.



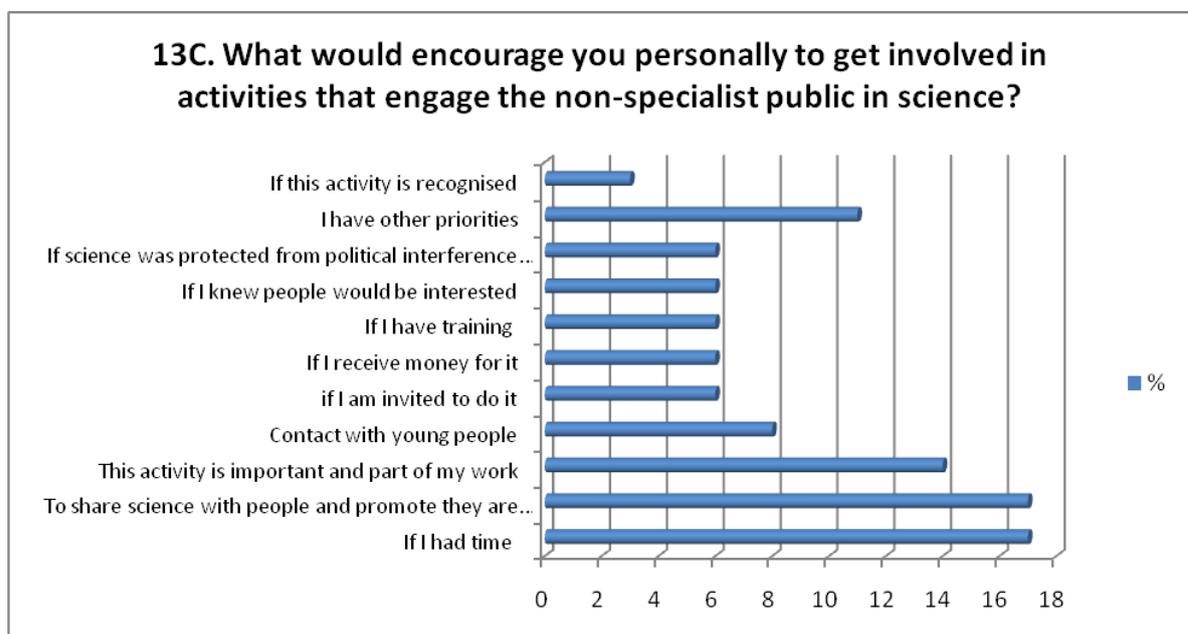
Some scientists explained:

“I think that my institution is fairly supportive of some participation with non-specialist groups; however if too much time is spent on outside groups there could be a reprimand”.

“The CNRS supports many initiatives that involve the non-specialist public. This can be problematic with reference to young researchers who are still developing their careers. The more mature scientists tend to have more freedom, and have already made a name for themselves, so find it easier to participate. I am at the end of my career, so have no problems”.

V. INCENTIVES FOR SCIENCE COMMUNICATION

When scientists were asked to define in their own terms what would encourage them to get involved in activities that engage the non-specialist public in science, the top incentives were: share science with people and promote they are better informed (17%) and that this activity is important and part of their work (14%). However they mentioned lack time (17%) and have other priorities (11%) as obstacles to public engagement activities. Some of the other comments were:



“Time... I have got a lot of things to do, it’s difficult to find time to do it; I use my time to find funds for my research...”

“I really like this activity but I am busy and worried about finding funds to do my research at the moment”

“If I only could reduce the amount of work I do, the amount of reports...”

“I think this activity is important but I don’t have time to participate”.

“Nothing, I know these activities are considered in our evaluation, but this is not clear and the most important thing is the research and teaching”.

“Give people the other faces of science, simple concepts and words, all those they need to know”.

“Ensure the public is well informed about science and technology and its benefits to society and how our research impacts on scientific work”.

“I love my work and I like to share what I am doing; the public is important because they don’t understand what we are doing...”

“To explain what scientific work is...what fundamental research is; its repercussion for the future and why it is important to invest money in it.”

“I don’t need money or any recognition, I am convinced that this activity it is part of my job”

“I like to help; this is part or my job...to show scientific progress, be accountable and highlight the scientific profession...”

“Communicating science to the public is part of the scientific work because it is part of the culture”

“To make science interesting to young people because many of them do not want to undertake a career in science, and participate with new ideas in political or public debates...”

“Recognition of this “extra” activity is important, but it is taboo to ask for funding or additional payment. For us it involves a lot of extra work and effort, such as work weekends... Politicians state that the activity is very important but who is going to provide the funds to support it?”

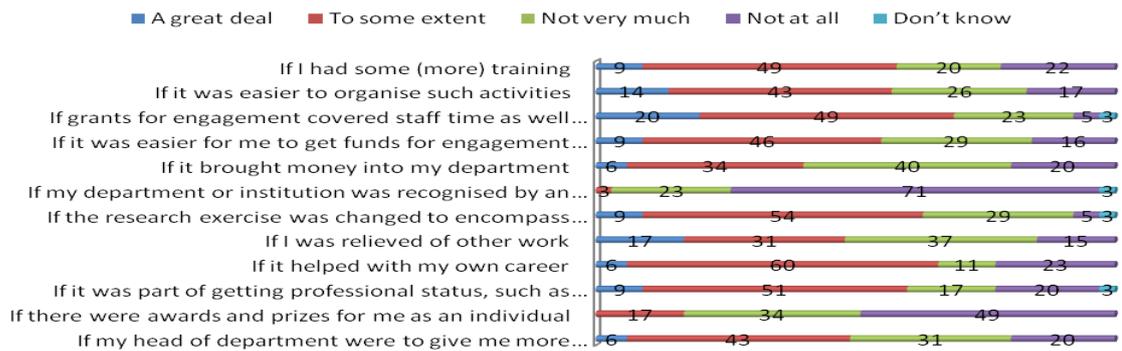
“If I received training then I would participate. I did receive invitations to attend some public debates but declined on the grounds that I did not want to be manipulated or ridiculed. Nanotechnology is a controversial area and we need skills to respond in the proper way”.

“I do not have extraordinary research results to show the public but if someone asks for them, a journalist for example, I can explain it to them”.

“If I have specific invitations to participate I may accept. I am not in the habit of looking for these opportunities”.

In the closed-answer questions on the subject of, to what extent scientists would be encouraged to get more involved in activities to engage the non-specialist public in science, grants that covered both staff time and expenses was the top incentive (69%). It added to their own career prospects (66%), if the research exercise included communication with the non-specialists public (63%), and if it was part of getting professional recognition (60%) were also important.

14C. To what extent would you personally be encouraged to get more involved in activities to engage the non-specialist public in science by each of the following?



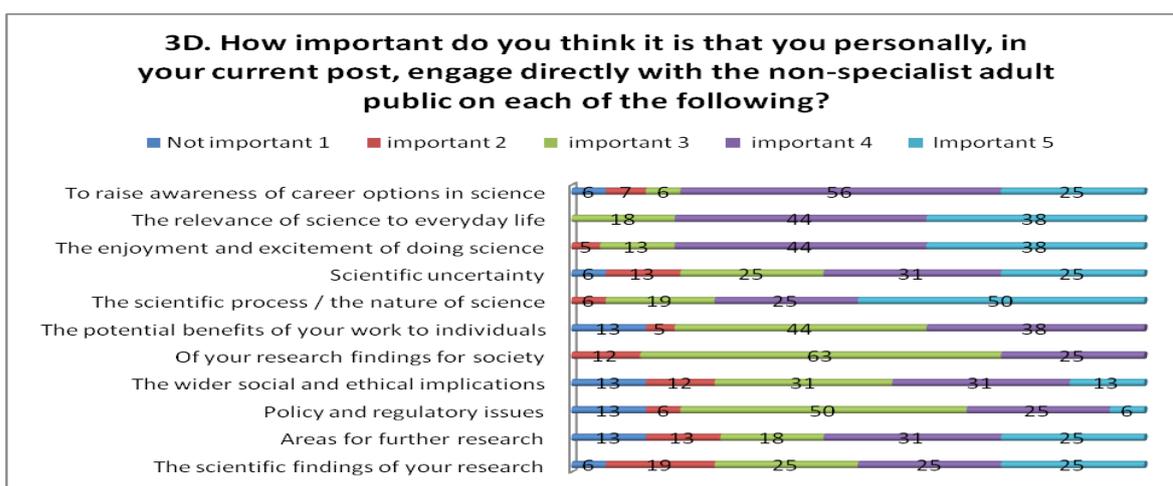
One observation that was highlighted in this section:

“The recognition of this activity is good. However, it could also be dangerous, as one researcher may have excellent communication skills and yet be a poor researcher; his final objective should always be to become a good researcher”.

4.3.3. DONOSTIA PHYSICS CENTER – SAN SEBASTIAN, SPAIN

I. WHAT DOES PUBLIC ENGAGEMENT MEAN TO SCIENTISTS AND WHY IS IT IMPORTANT?

When scientists considered their own research, the most important issues with which to engage the non-specialist public over were: the scientific process (50%), the relevance of science to everyday life (38%) and the enjoyment and excitement of doing science (38%). Next in priority were to raise awareness of career options in science (25%); scientific uncertainty (25%); areas for further research (25%); and the scientific findings of your research (25%).



Additional comments included by the respondents were:

“Sometimes scientific findings are very technical and not interesting to the public, whereas talking about how science will affect everyday life in the future is more appealing”

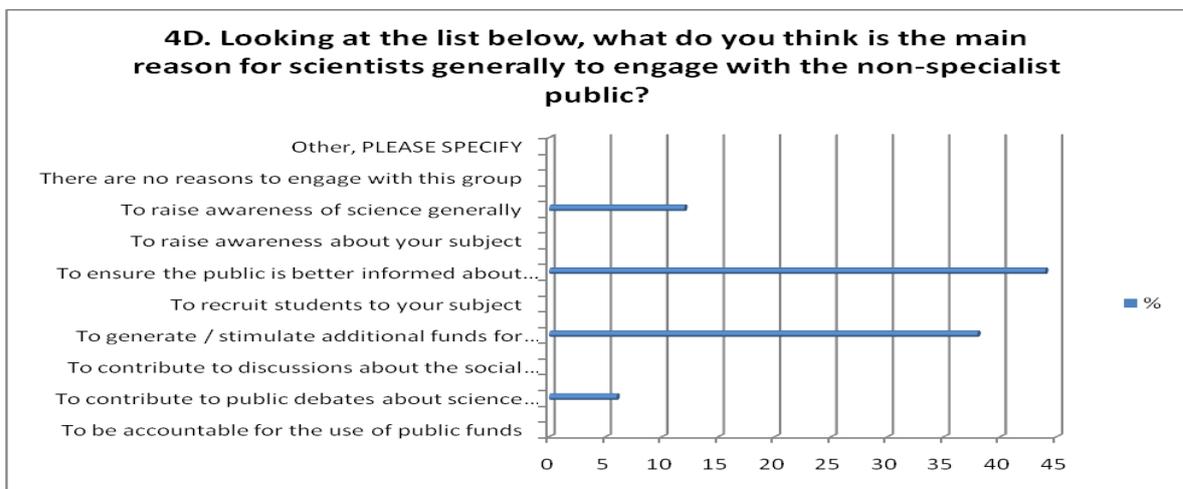
“The uncertainty of science is interesting but it does not help to promote science...”

“My research is so detailed that it may be of little interest to the public; they only want to see the final product. However, I can make it easier to understand by showing the scientific process involved”.

“My research is complex, it can be difficult to discuss even with fellow scientists. Furthermore our findings are not immediately applicable. I doubt that people could generally understand the importance of my research....”

“It is relevant to talk about my results but I need to simplify it in a way the general public can understand”.

The most important reason for scientists to engage with the non-specialist public was to ensure the public is better informed about science and technology (44%); close was to stimulate additional funds for universities and colleges (38%) also.

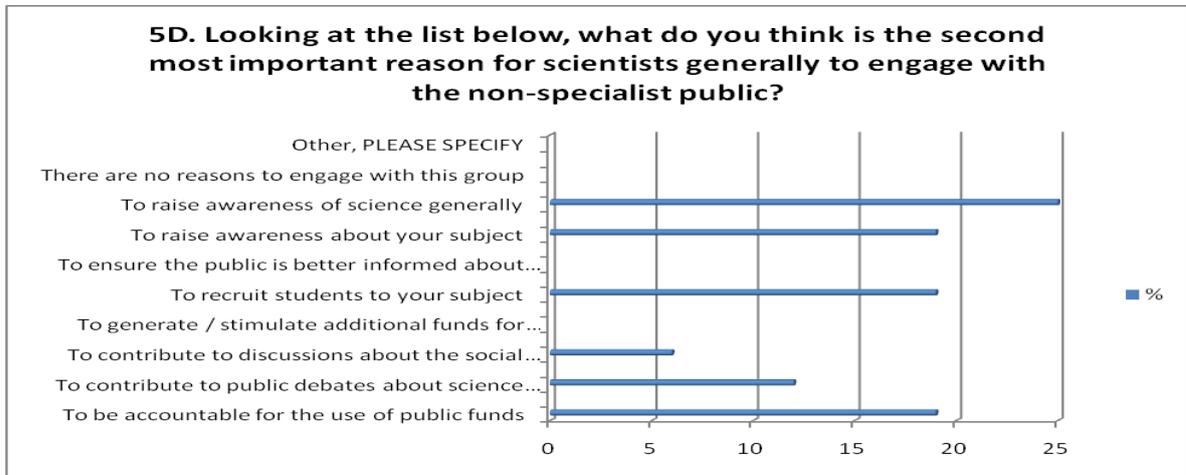


“We need to attract politicians to get funds; we don’t like to do this. In General, showing what we are doing is what we really enjoy.”

“It is important that people are better informed about science and technology because then they will become interested in science. It is necessary to support scientific research. The politicians take decisions about it, but it is the people who vote for them. They have to hear what society demands – we can see that in the health area. But the participation of people in most areas of science is low. So, if we inform the public it will ensure funds go to scientific research.”

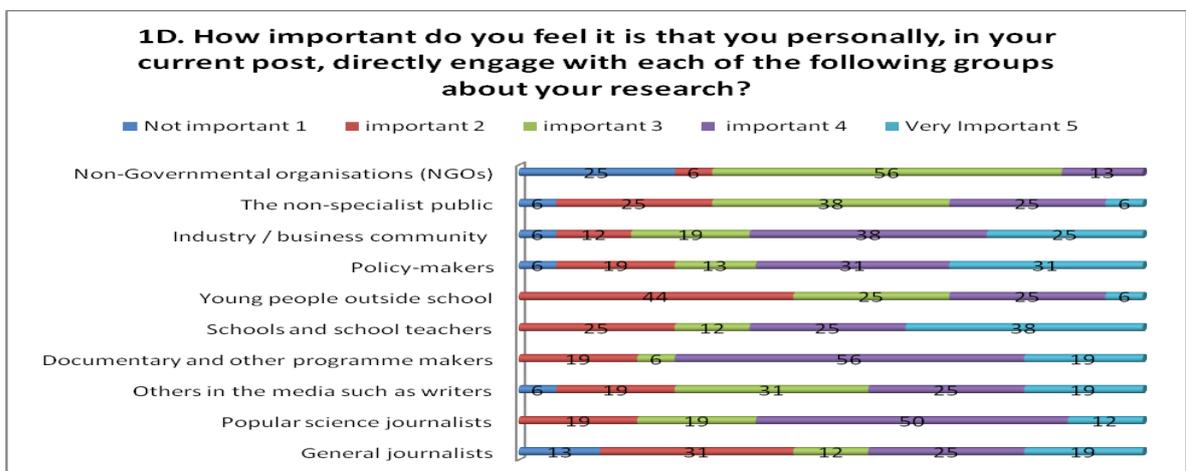
“If the public is informed they will support science policies”.

Also, the second most important reason for scientists to engage with the non-specialist public was to raise awareness of science generally (25%).



II. AUDIENCES AND ACTIVITY.

The most important audiences that scientists identified to directly engage with about their research (ranked 4 and 5 on scale of 1-5) were: documentary and other programme makers (75%), popular science journalist (75%), schools and school teachers (75%), industry (63%) and policy makers (62%). Least important audience was: non-governmental organizations (13%).



The opinions that emerged at this point were:

“The directors or people in similar positions are the ones who have to be in charge of these responsibilities...”

“I am working in basic research and I don't have many contacts...this activity is normally done by the boss, they have to promote what we are doing.”

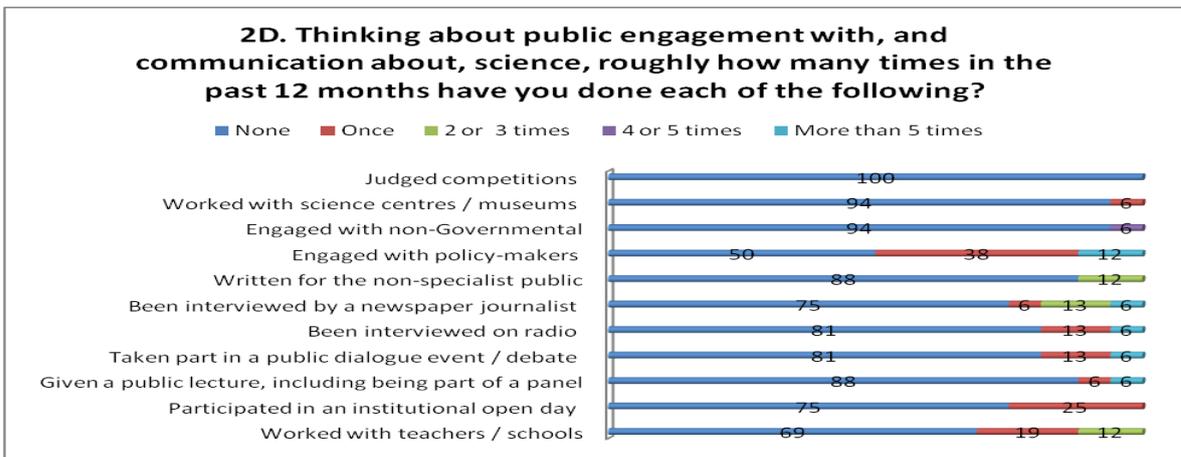
“The scientific community is very hierarchical and sometimes this is a delicate matter. Here it is the head of the institute who is engaging with the public.”

“It is very important, with regard to communication with the general public, to show that our work is important to society, although I am sceptical about when this work is being done by non-professionals because sometimes they are giving out disinformation; things which are not true or which help other interests, not scientific interests...”

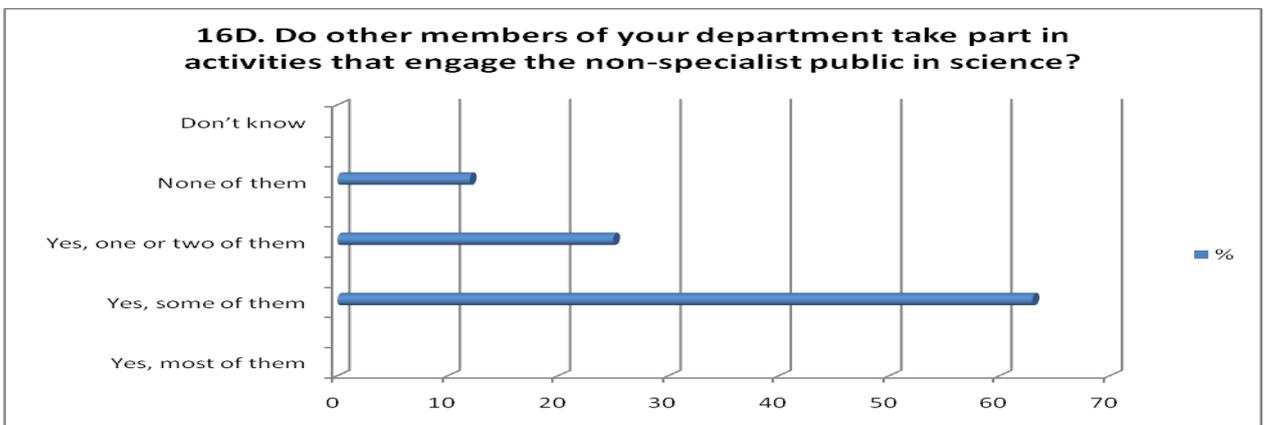
“The area of materials is not a very interesting subject to the general public and journalists prefer information about medicine or astronomy...”

“My research and results are very technical and they are difficult for public communication...”

When scientists were asked about their public engagement activities in the past 12 months, 51% of scientists said they had engaged with policy-makers, 31% had worked with teachers or schools, 25% had participated in an institutional open day and 25% had been interviewed by a newspaper journalist. The activities with low engagement were judging competitions (0%), and engagement with NGO's (6%) and with science centres or museums (6%).



Focusing on the appreciation of scientists' participation; most of the participants respond that some of the other members of their department take part in activities that engage the non-specialist public in science (63%).

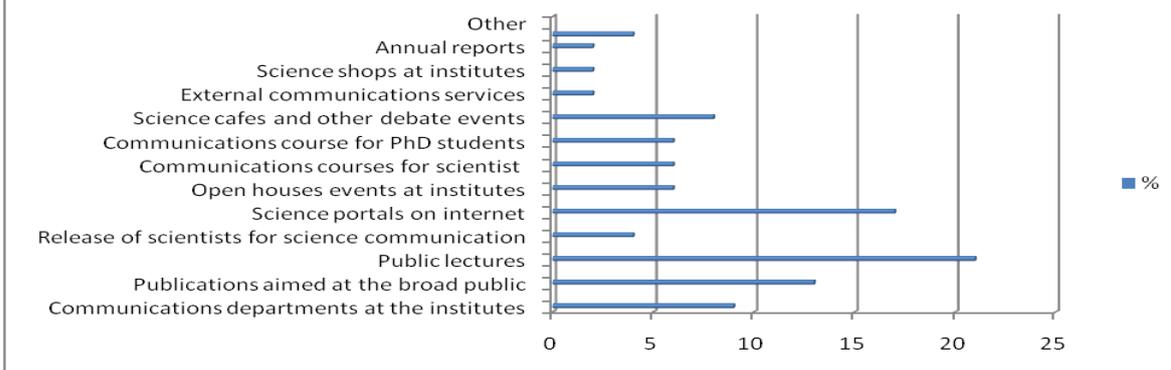


One comment emerged was:

“These activities don't help our professional career although some scientists receive some extra money for doing them”

Regarding which activities for science communication the scientist would spend money on, 21% of participants agreed on public lectures, 17% science portals on the internet, and 13% publications aimed at the general public.

19D. If you were the administer of the reserach budget for science communication, what would you spend the money on?



Other themes which emerged were:

“There have to be projects that match science with culture and with arts: literature, for example. This is the way to show the real position of science. But it is important that these initiatives come from the scientific side.”

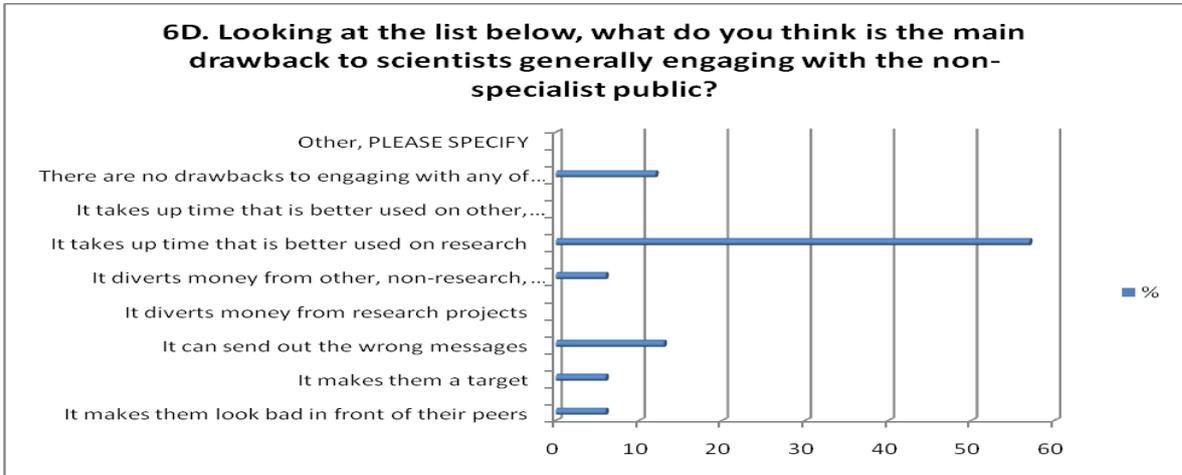
“The communications departments at the institutes are important but they spend a lot of money and I am not sure about it.”

“There is the necessity for a project or strategy to really promote science so that people become interested in it. Something in the mass media, for example. They talk about many silly things and they could talk about some science information as well.”

“The communication departments of institutes put a lot of pressure onto scientists. They want to have their own agendas without consulting us. What we need are events which really make changes in society. I think oral events have big impact.”

III. BARRIERS TO SCIENCE COMMUNICATION

The main drawback to scientists engaging with the non-specialist public was that it takes up time that is better used on research (56%).



Some of the observations were:

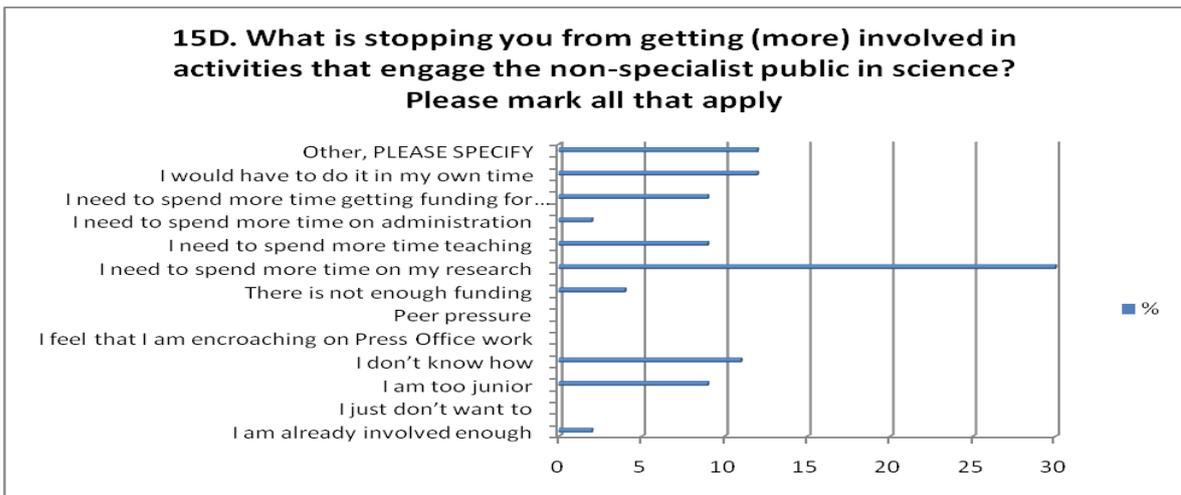
“We are really busy; therefore it is relevant that there should be a professional to be in charge of these activities”

“To participate or be involved in these activities does not look good inside the scientific community because it looks like you are not paying sufficient attention to your research”

“We don’t have tools to engage with the public and there is a fear that they would not understand us and a fear of appearing ridiculous”

“There is no drawback really; however, these activities take time, effort and it is not rewarded, and not paid.”

When scientists were asked about what stopped them taking part in public engagement activities, thirty per cent of scientists said the need to spend more time on their research was stopping them getting more engaged with the non-specialist public in science.



Others comments were:

“It is not clear what the benefits are, apart from promoting scientific careers for young people. Also, these activities are complicated - the messages or images which we are sending, may not be clear or may be wrong”.

“The problem is, that these activities are not recognized, and we have a lot of pressure keeping our position and writing papers...”

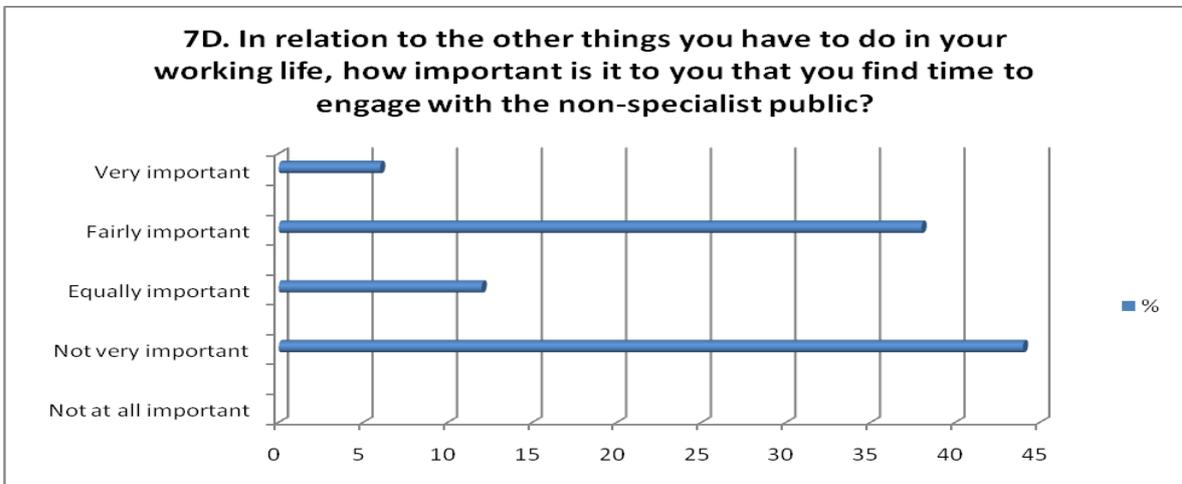
“There is not a structure to be involved in. There are not many options, events to participate in, for example.”

“I can do it, but there are no invitations and I won't go out to look for them...”

“The problem is how this activity fits in with the daily scientific work, because there is not time, and in the end the time to do this is from our own time...”

IV. TRAINING AND DEMAND FOR PUBLIC ENGAGEMENT WITH THE NON-SPECIALIST PUBLIC.

Regarding the importance to find time to public engagement, fifty six percent of scientists gave at least some importance to the activity whereas 44% said that it is not very important to find time to engage with the non-specialist public.



The scientists explained:

“Of course I think this activity is important but in daily life you are in your own research which is very demanding”

“This is not in my list of priorities, it is even difficult for me find time to do exercise, for example...”

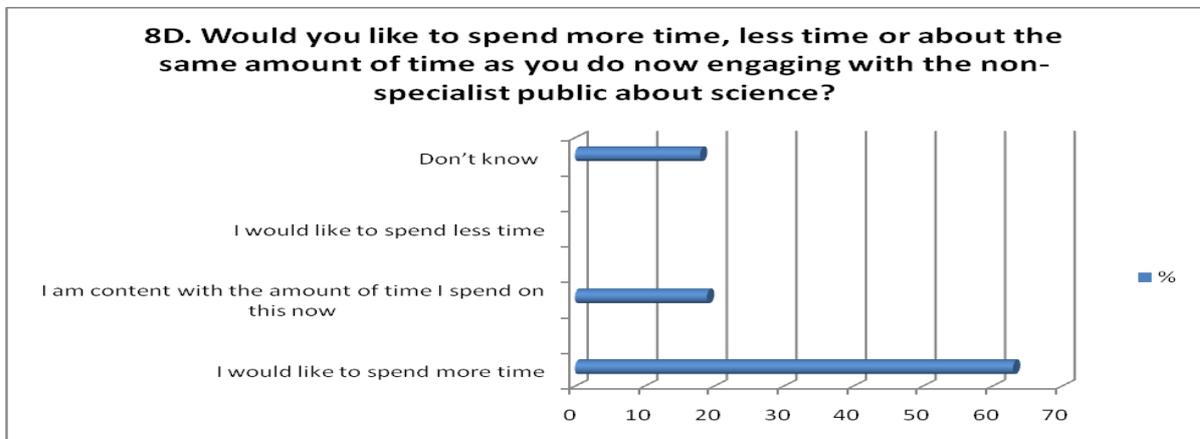
“I am a junior researcher so you are more involved in your career as a scientist; furthermore this activity is done by the directors.”

“In theory this activity is equally important but in practice it is not so important. However, I have participated on a few occasions.”

“I am passive, so the problem is that someone needs to come to invite me to participate, and I will do it.”

I don't have time; if I had, I would consider it"

Furthermore, sixty three percent of respondents said they would like to spend more time, while 19% were content with the amount of time that they spend engaging with the non-specialist public, 18% did not know.



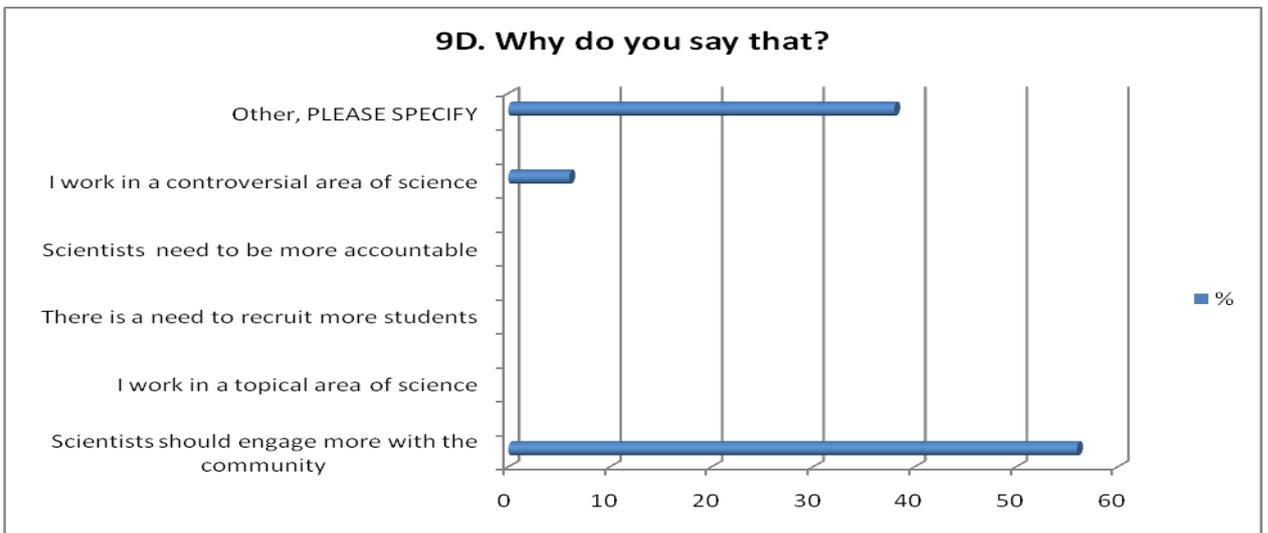
Scientists added:

"To participate or not depends on the circumstances: if you have support or you have to do it, if there are invitations, etc..."

"The problem is time; I am involved in four research projects at the moment..."

"I think this depends on whether you have something to tell..."

The participants agreed that scientists should engage more with the community (56%). However in their words the scientists stressed that to find time is part of the problem in engaging with the public (26%) as well as sending wrong messages (6%), while others considered that if there are invitations to participate they would do so (6%).



“Nowadays there are myths spreading about science in order to get more funds. It is portrayed as making miracles and this is exaggerated; we need to explain its limits. Likewise some knowledge is not diffuse; it is kept only to a few privileged people.”

“In my view this activity should be part of scientific work and then we would be able to participate...”

“To the public science is a black box so we need to open it up to them; they need to know what we are doing...”

“We have a commitment to society. The funds come from them and they have to know how we are using their money. But also for relevant political decisions, politicians need to listen to the voice of the scientists. So politicians and scientists must engage with each other.”

“

“Scientists have to be more involved in social debates, not only because we need funds, but what’s more we have a high responsibility for the kind of work we are doing...”

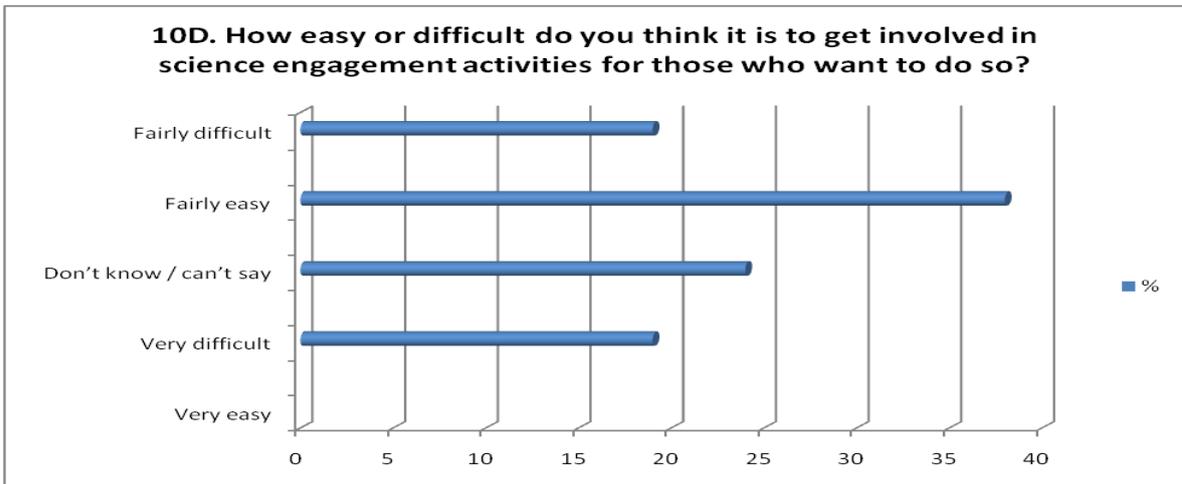
“It is not part of my obligations because the scientific system itself makes it difficult to participate at the moment. We have to write papers and there is not much for other activities”.

“To me it is not important because I need to invest in my career as a scientist, to get a permanent position. I will not receive any promotion with these activities.”

“It is not easy to communicate science to the public: sometimes the message is not true, and we are not helping because we are not giving attractive messages, either...”

“If we have invitations we usually participate, if not we are working on our research, and this is the best benefit which we can giving to society, -the benefit of good research. We are not bad scientists if we cannot be involved with the public. Furthermore, journalists and the public are only interested in applications. It means they only want to know about what the engineers are doing...”

Moreover, thirty-eight percent of scientists agreed that it is easy to get involved in science engagement activities and equally 38% that it is difficult, while 24% did not know.



Some of the opinions were:

“For a few researchers maybe it is not very difficult, especially if there are funds to support activities. I think it is not especially difficult to do it, but it requires time and effort, the same as research demands.”

“It is difficult. I tried before and really it is difficult; Scientists are not ready to do this, to transform scientific information with simple words; moreover people have a lot prejudices. Within the scientific profession there is not any training about this.”

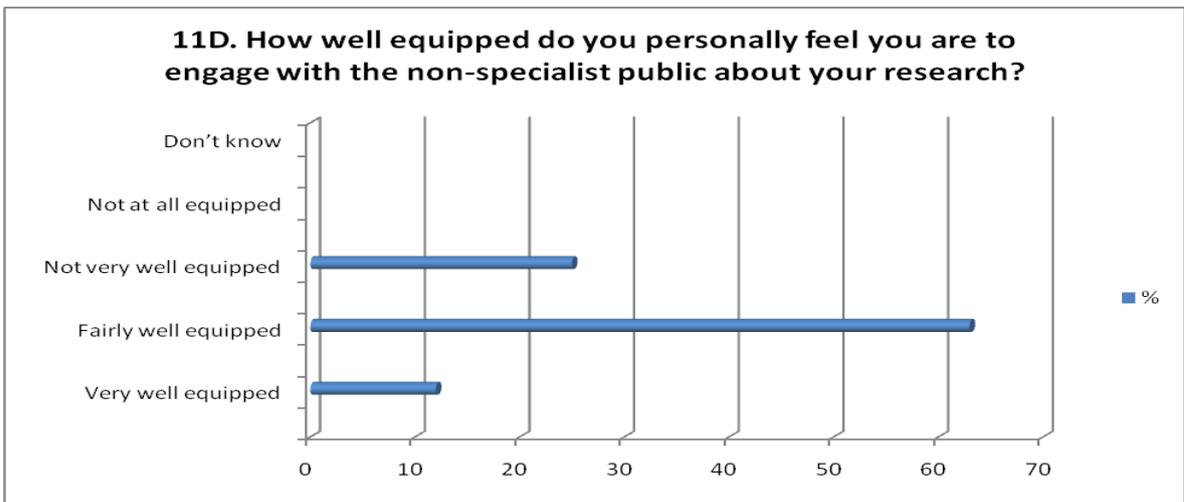
“It is not easy; there are a few things which get in the way of this activity. However, we need to go out and work with the public. It is important to spread ideas even if they lose some exactitude or precision: we need to be more flexible about this. Public science communication is not about just giving a lesson.”

“It is easy, if you want to participate there are options; but time and recognition are involved so if my salary depends upon scientific production, this is my priority.”

“It is easy, although lack of experience it is a limitation, because dealing with difficult audiences could be hard.”

“Here it is easier, there is support and interest, and our director considers these activities are relevant.”

Furthermore, seventy-five percent of participants felt they are well equipped to engage with the non-specialist public about their research.



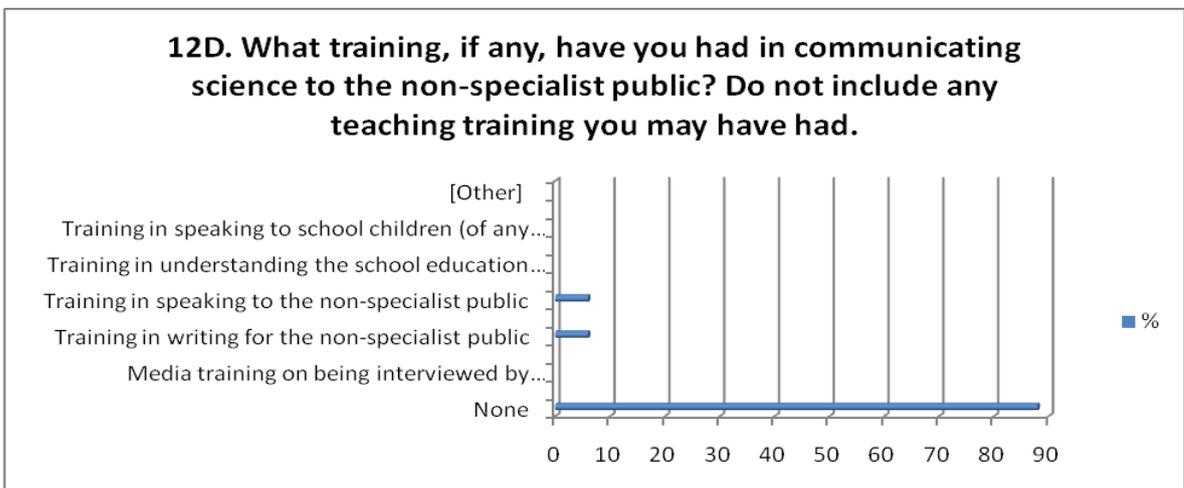
They added:

“I have been a teacher so it that helps. Furthermore I am interested in this activity”

“I can do it but I need time to prepare my presentations”

“I can do it well, even though I am a little shy and I am not a charismatic speaker. It is about practise...”

Nevertheless, eighty-eight percent of scientists surveyed have had no training in communicating science to the non-specialist public.



Some comments emerged were:

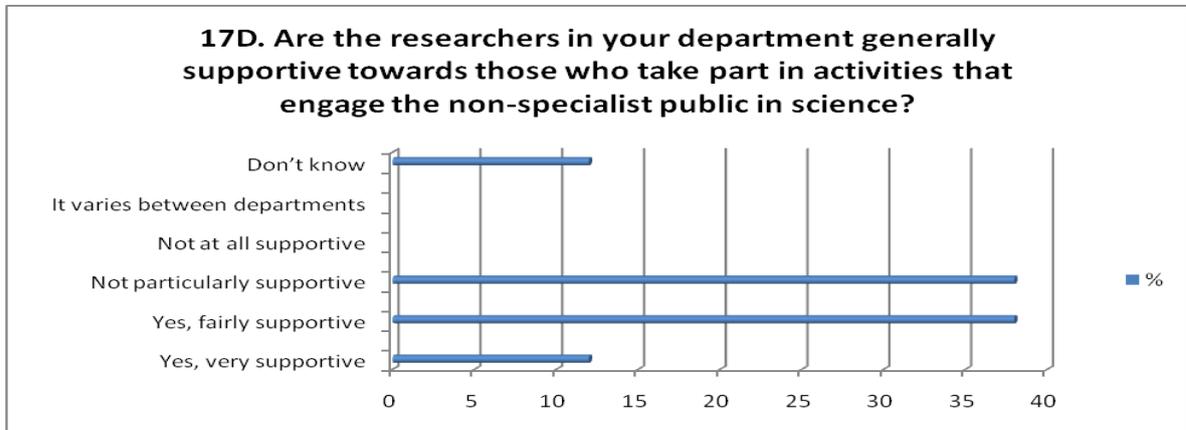
“I do not have any training, because there are no providers here.”

“I took these courses as part of my PhD in Liverpool”

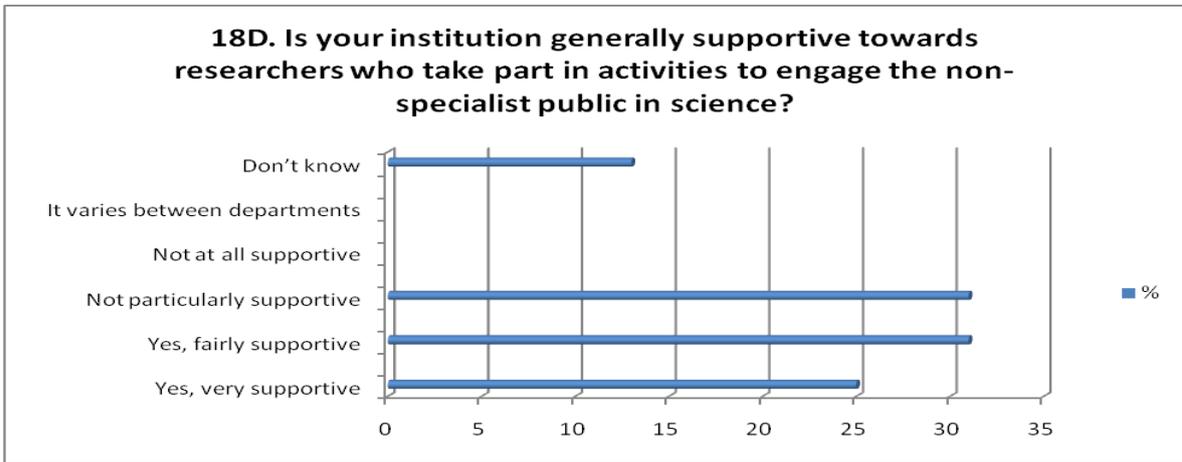
“Not having any training has been a problem because it would help.”

“The very good scientists can communicate well with the public because they have passion and experience in their field. I support the idea that practice is the best training.”

Focusing on colleague’s support, 38% of the researchers said that their fellow scientists are fairly supportive towards those who take part in activities that engage the non-specialist public, while 38% are not particularly supportive.



Concerning the support of their institution towards researchers who take part in activities to engage the non-specialist public, 31% said it is fairly supportive and 25% very supportive, while 31% of scientists said it is not particularly supportive.

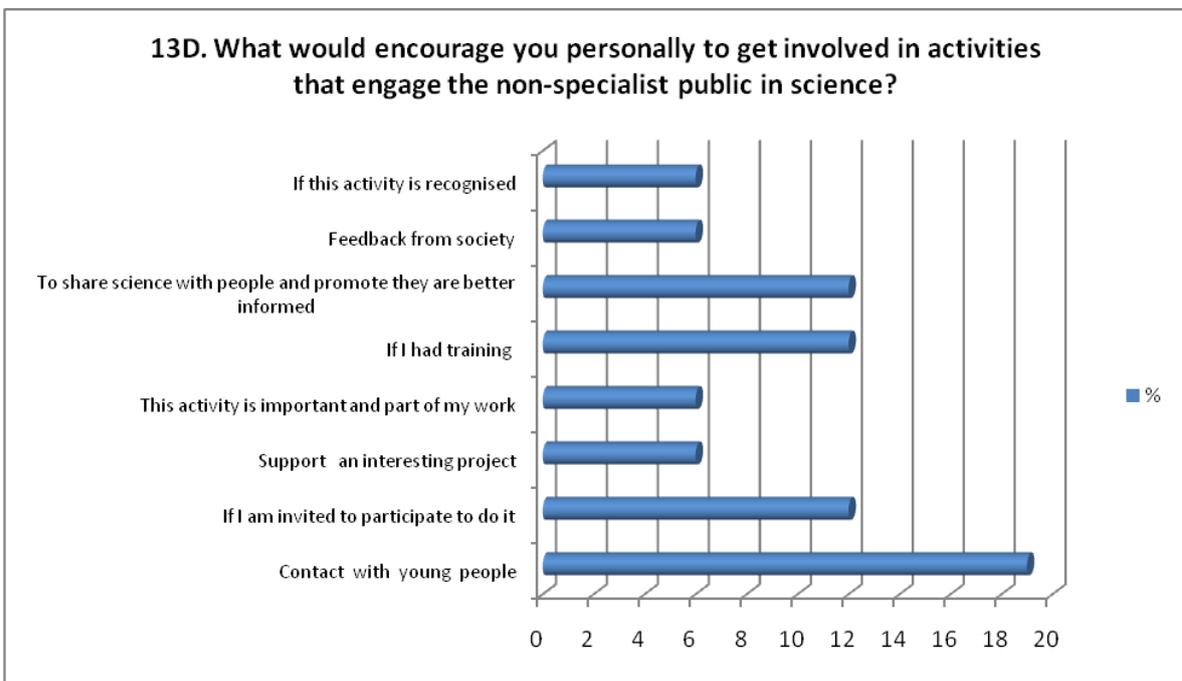


One opinion was that:

“This institution is supportive, but not with funds or money...”

V. INCENTIVES FOR SCIENCE COMMUNICATION

In the words of the scientists, what would encourage them to get involved with the non-specialist public in science was: to raise awareness of science (20%); having contact with students and promoting scientific careers (20%); having invitations to participate (12%); to share science with people and promote they are better informed (12%). Also they mentioned having training, having recognition and doing it for interesting projects.



Some of their comments were:

“It is relevant to explain the real place of science in culture and society; also its limits”

“That people know what we are doing, and show that we are close to them...”

“I think a society with scientific culture is more able to take better decisions. Science is an essential part of modern society. If the people consider science important then scientific research will be safe from irrational policies against it.”

“To promote the fact that science is something real; also to try to erase that image of a mad scientists or the idea that science is only for brilliant minds. It is about putting science’s world nearer to the people...”

“I consider it is a scientist’s duty to show their results to society because of the social and economic implications of science.”

“I like to talk with people who are interested in science as a profession; and discuss the advantages and disadvantages of it, for example...”

“Maybe I will try when I am bored of doing science... I believe that there needs to be some professional communicator because communicating science properly takes time and we need that time to do science.”

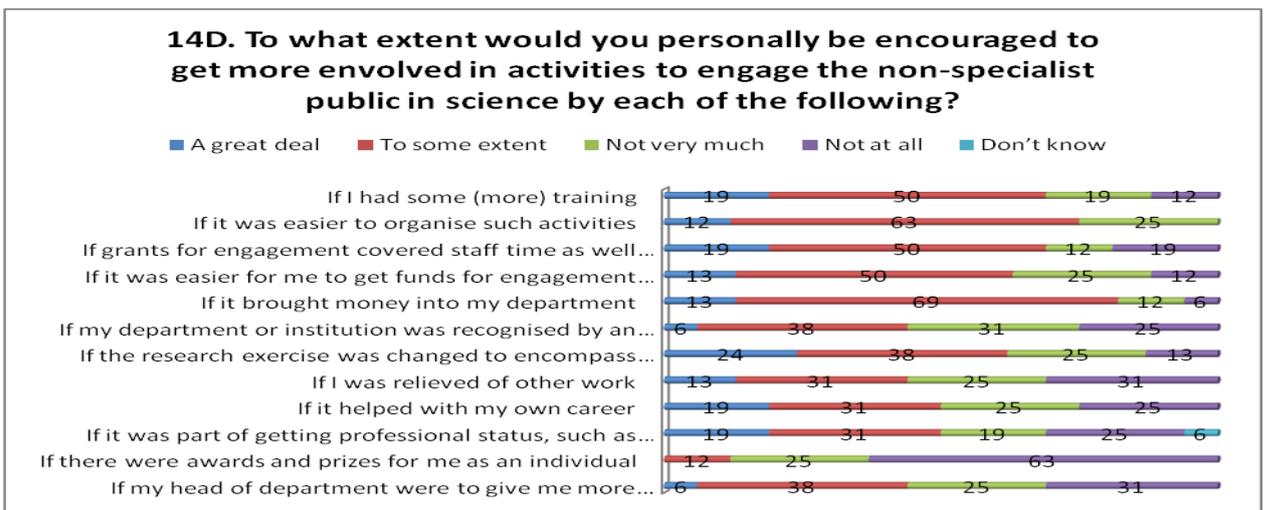
“In the future, with more years under my belt, when I will have things to tell... Currently I do not have interesting things to tell, I am too specialised and I do not know if my research will be useful...”

“This activity is a challenge and I don’t know how to manage it; we do not have the tools to do it. History of science and public communication are

subjects which are not taught in the scientific profession... However, if there was professional recognition, I would at least try...

“If I receive invitations to participate, but we will not go looking for them...”

In the closed answer questions on the subject of to what extent scientists would be encouraged to get more involved in activities with the non-specialist public, the top incentives were: it brought money into my department (82%), it was easier to organise such activities (76%), grants for engagements covered staff time as well other costs, and having some (more) training (69%).



A couple of scientist added that:

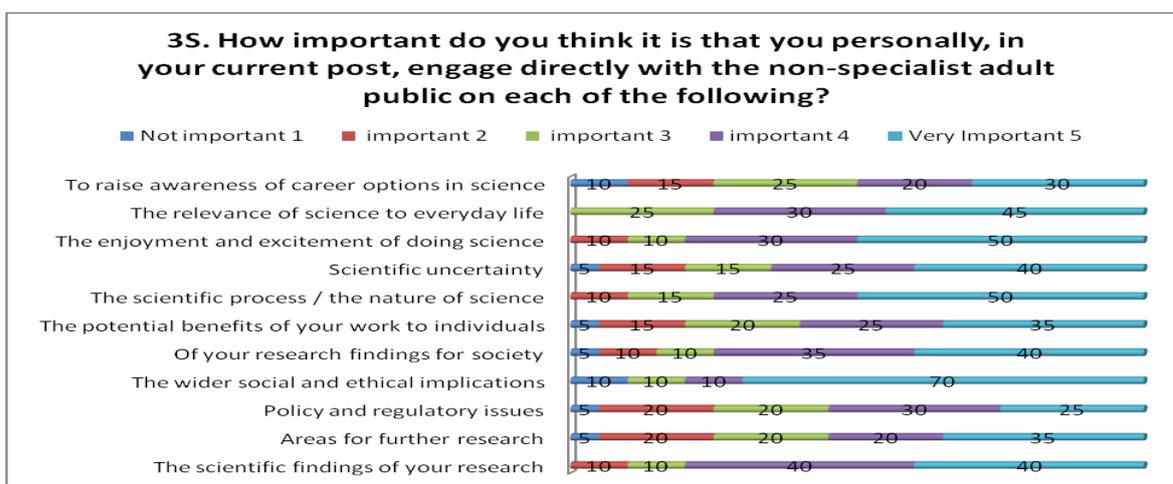
“There are no real motivations for scientists to be involved. It is not true that it helps my scientific career. Taking time away from research is not helpful, it could affect scientific work. Furthermore a scientist does not have to be a great communicator. However, if there are more invitations we will participate”.

“I am in that stage of my career and of an age in which I don't win or lose anything if I am involved in these activities”

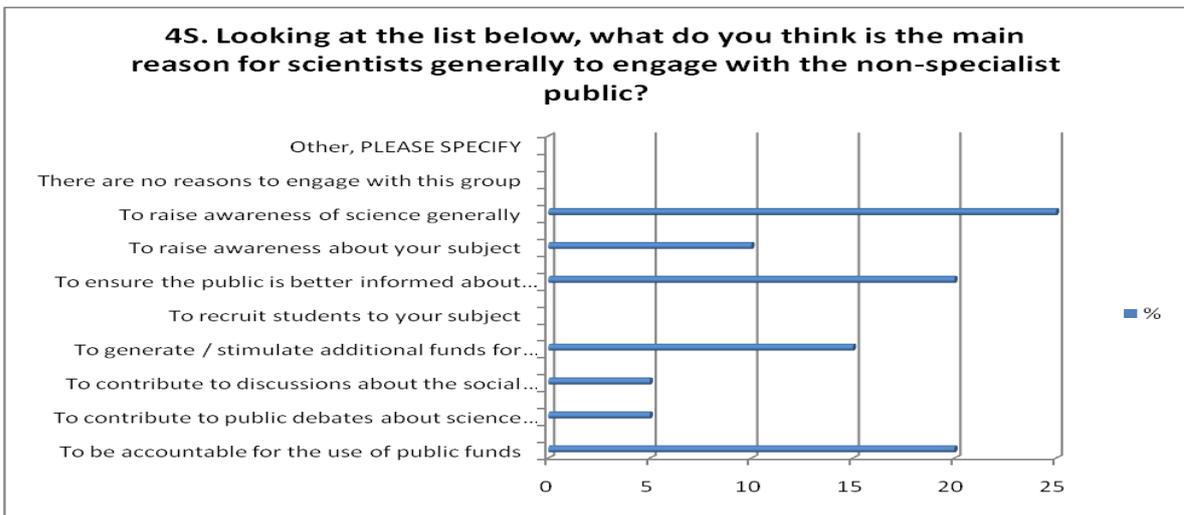
4.3.3 INSTITUTE FOR NANOSTRUCTURED MATERIALS - BOLOGNA

I. WHAT DOES PUBLIC ENGAGEMENT MEAN TO SCIENTISTS AND WHY IS IT IMPORTANT?

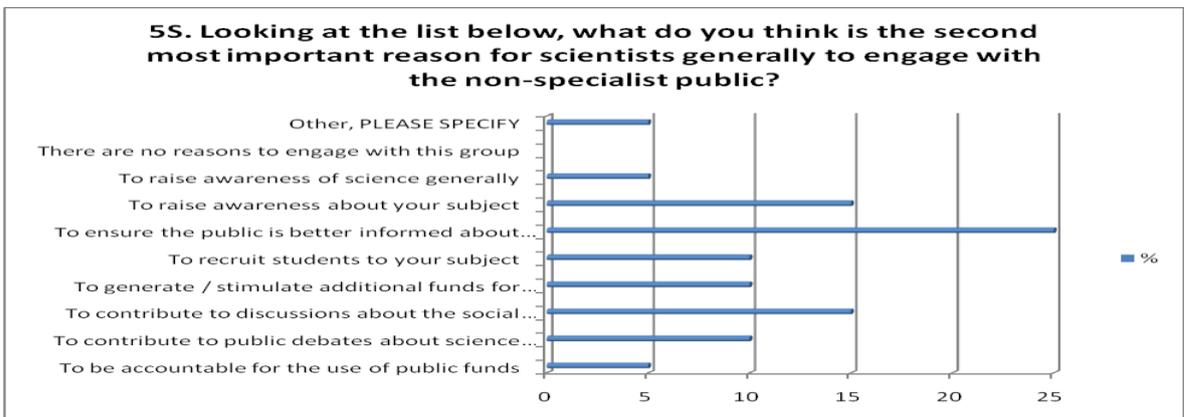
When considering their own research the most important issues over which to engage the non-specialist public were the wider social and ethical implications (70%); the enjoyment and excitement of doing science (50%); the scientific process (50%); and the relevance of science to everyday life (45%). Next in priority were the scientific findings of your research (40%); the importance of your research findings for society (40%); the potential benefits of your work to individuals (35%) and areas for further research (35%).



Regarding the most important reason for scientists generally to engage with the non-specialist public it was to raise awareness of science generally (25%).



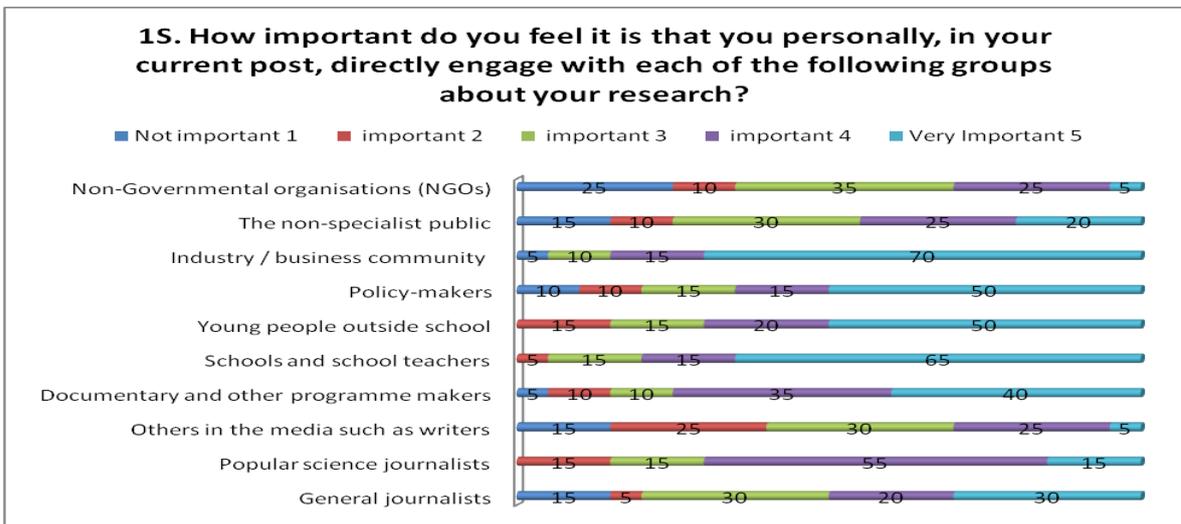
Also, the second most important reason for scientists generally to engage with the non-specialist public was to ensure that the public is better informed about science and technology (25%).



Another reason mentioned was to raise awareness with young people.

II. AUDIENCES AND ACTIVITY.

The most important audiences identified by scientists to directly engage with about their research (ranked 4 and 5 on scale of 1-5) were: industry (85%), schools and school teachers (80%), documentary and other program makers (75%). The least important audiences were writers (30%), and non-governmental organisations (30%).



Scientists added:

“It is important to attract politicians in order to get funds and good business; young people are another interesting public because some of them will become our future scientists; but I think it does not work when scientists engage directly with the general public...”

“The non-specialist public is a difficult public. They don’t understand much of scientific work. Nevertheless, we need to get close to them and inform them about our research.”

“Because of our current poor economic situation it is necessary to promote the public perception of the importance of investment in basic science”.

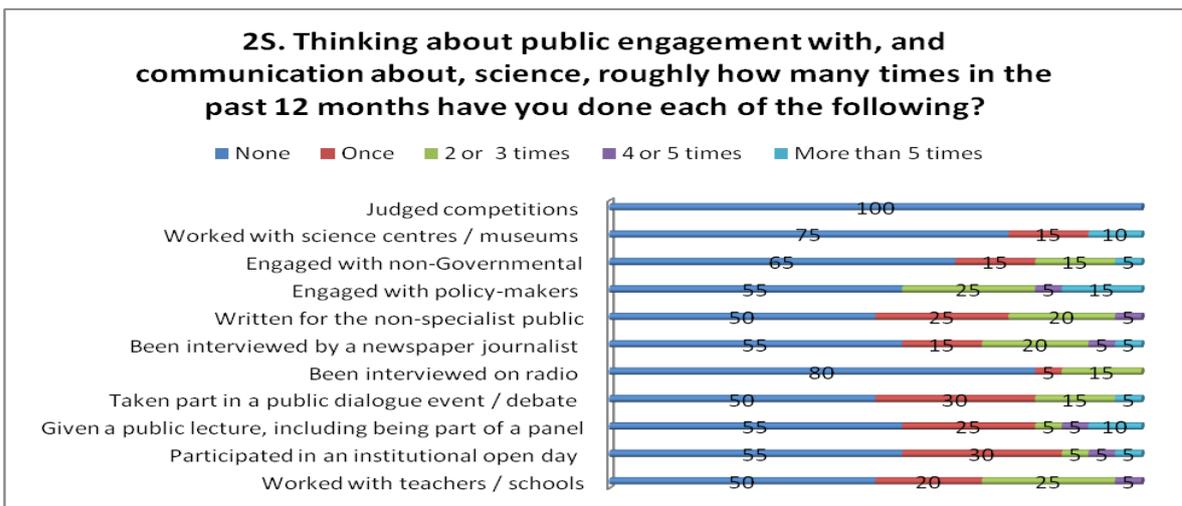
“The situation here is not good, I feel no one is really interested in science, it seems like medieval times. When I was in a German Institute there was a lot of activities for the general public; although the public did not fully understand what they were being shown at the events, they still came. In Italy, it is a shame; especially that there is no interest from parents...”

“We have to engage with the journalist and politicians, it is part of our work to promote the scientific activities. We have to explain and show the human side of science and the relevance to people’s daily lives...”

People have to know about our current situation. We don’t have any stability; there is no consideration for scientific work...”

“The relationship with the mass media is very important, because it is the best way to connect with society. However, here this relation is not very good. The journalists are not looking for scientists; in fact, we need to call them...”

When scientists were asked about their public engagement activities in the past 12 months, 50% of scientists said that they had worked with teachers or schools, 50% had taken part in a public dialogue event, 50% had written for the non-specialist public; 45% had participated in an institutional open day, 45% had given a public lecture, 45% had been interviewed by a newspaper journalist and 45% had engaged with policy-makers.

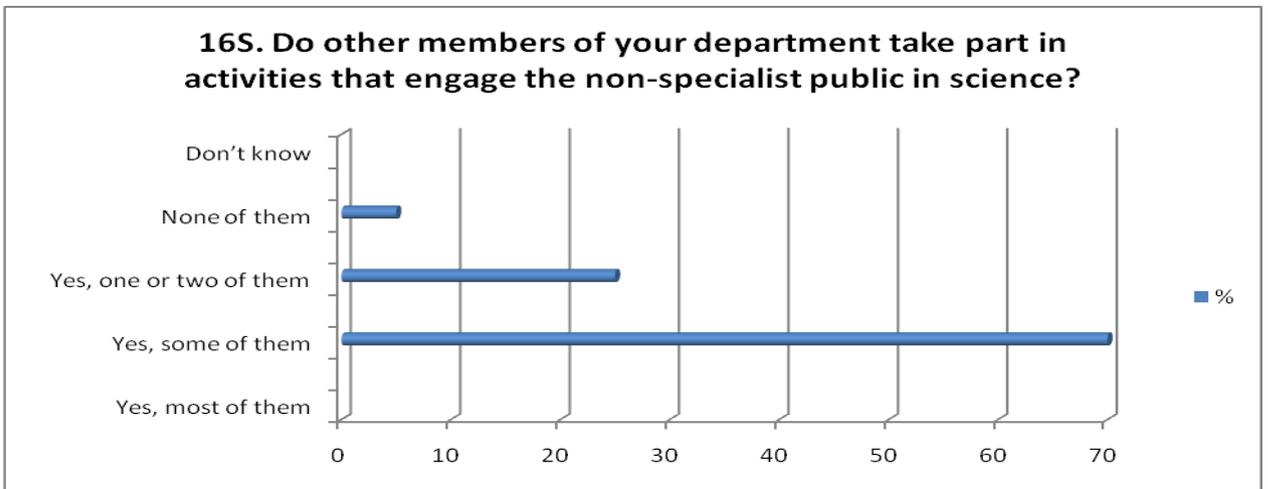


Some scientists explained:

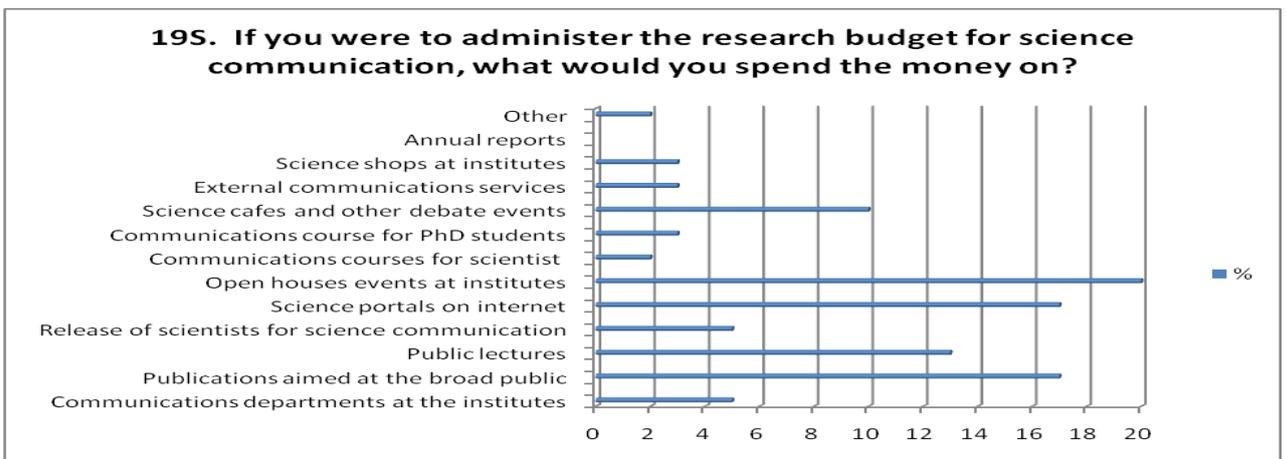
“When I received a prize I was interviewed more than 5 times...”

“I don’t have a relationship with any of these institutions, and it is difficult for me to start one...”

Focus on the appreciation of scientists’ participation; the participants respond that some of the members of their departments do take part in activities that engage the non-specialist public in science (70%).



About the activities for science communication that the scientist would spend money on, 20% preferred open house events at institutes, 17% publications aimed at the broad public and 17% science portals on the internet.



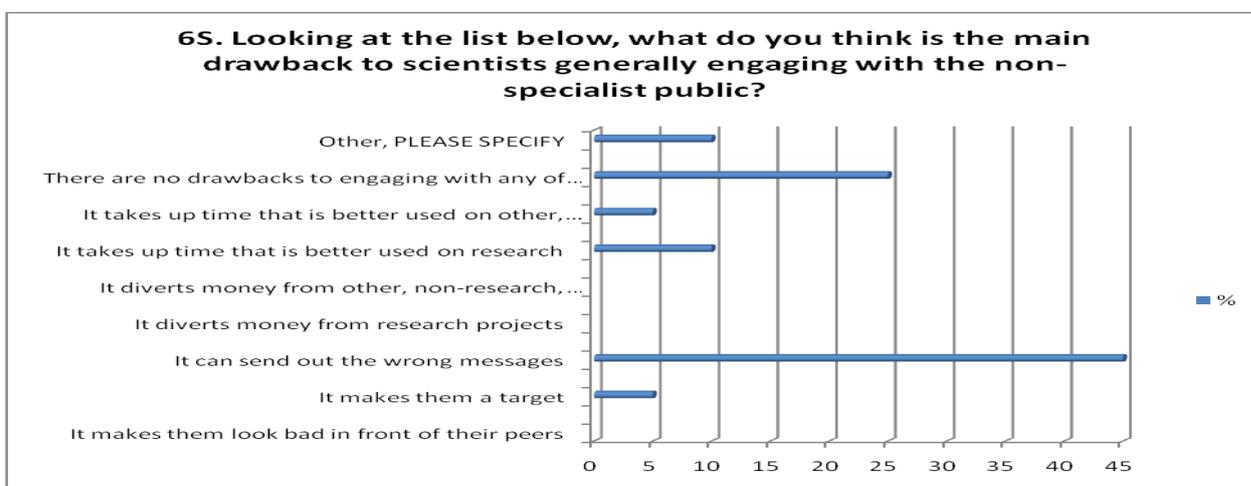
A few extra points of view were:

“I like the idea of science cafes because they are informal, they promote interest and there is freedom: people go there because they want to go...”

“I would like to invest in publications such as newspapers and debates on TV as well...”

III. BARRIERS TO SCIENCE COMMUNICATION

The main drawback to scientists engaging with the non-specialist public was that: it can send out the wrong messages (45%), followed by there are no drawbacks to engaging with any of... (25%), it takes up time that is better used on research (10%), it takes up time that is better used on other, non-research, ... (5%), it makes them a target (5%), and it makes them look bad in front of their peers (5%).



Some of the opinions expressed were:

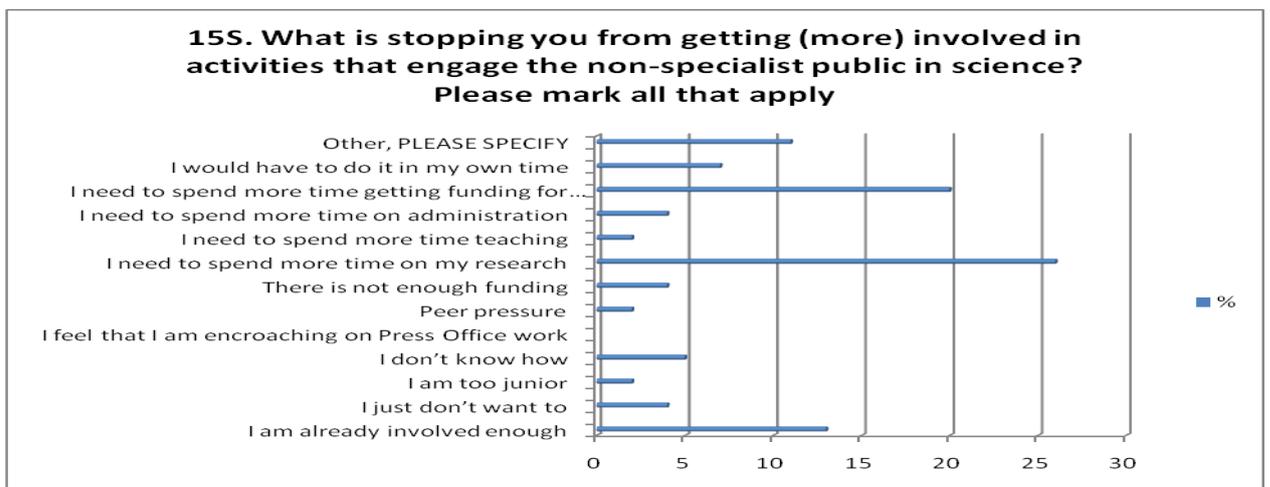
“If you want to do these activities right, they take up time...”

“It is difficult to participate with the mass media. The scientist is always presented as arrogant when we have to combat esoteric ideas or religious prejudices and false images about science, and we do not have the tools or training to do it.”

“The journalists generally do not understand what we say and they publish some distorted stories...and as a consequence our image is affected...”

“I prefer to have direct contact with the public; if you use the mass media, the journalists usually introduce mistakes...”

When scientists were asked about what stopped them taking part of public engagement activities, twenty six percent of scientists said the need to spend more time on research was stopping them getting more engaged with the non-specialist public in science; and 20% said they need to spend more time getting funding for their research.



In their own words they explain:

“My priority is my research and there is no more time for other things. However, I do not have invitations to participate in this kind of activity; it is not organised well here”.

“This activity is important, therefore there has to be a structure to support it; and we have to participate to create what it is necessary...”

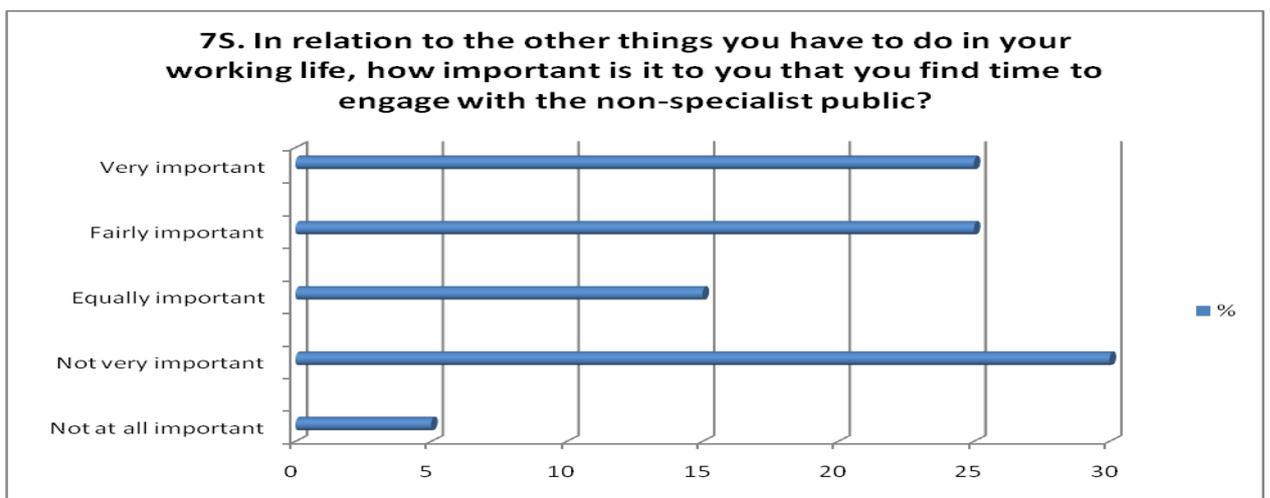
“My opinion is that it is a waste of time, this activity is not paid or rewarded, and not many people understand it anyway...”

“This is easier when you are older because you have things to tell and you are better known...”

“Finding time is the problem...”

IV. TRAINING AND DEMAND.

Regarding the importance to find time to public engagement, fifty per cent of scientists gave importance to finding time to engage with the non-specialist public. Some of them (15%) defined this activity as equally important as other things in their daily work, while 35% of scientists considered it is not important.



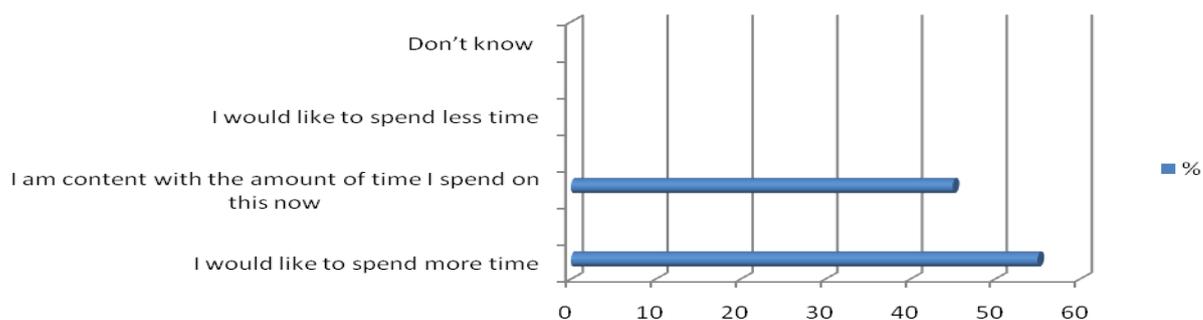
“In first place is my scientific career and then, if there is time, it is possible to participate”

“Of course it is important, but most of the time I am at the laboratory...”

“It is important when you need to create interest in your area, or if your area becomes a target in the media”

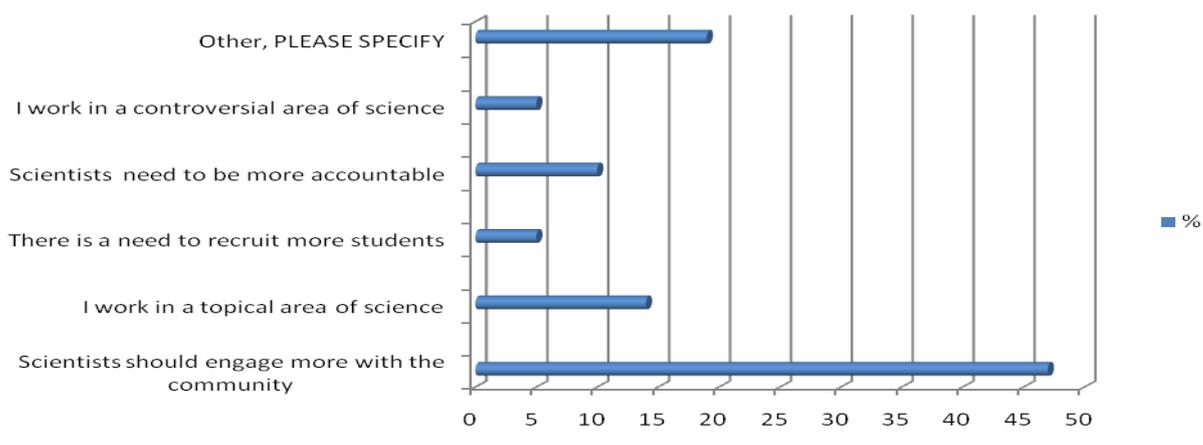
Furthermore, fifty-five of scientists would like to spend more time engaging with the non-specialist public, while 45% said they were been content with the amount of time that they spend on it.

8S. Would you like to spend more time, less time or about the same amount of time as you do now engaging with the non-specialist public about science?



Also, forty seven percent of participants agreed that they ought to engage more with the community. The next largest group (19%) offered their own reasons as follows: they don't have time for this activity because they need to spend more time on their own research (14%); or they need to have institutional support or a specialist communicator (5%).

9S. Why do you say that?



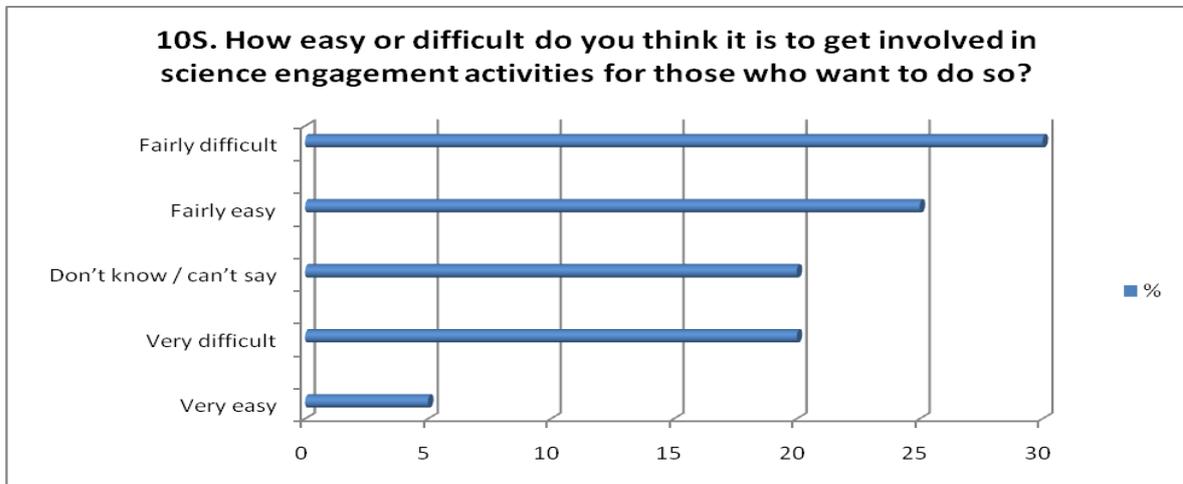
Some of the comments were:

“It is not that this is not important, it is that I don't have time...”

“Maybe in the future; but currently it is not good for my career. I prefer to do other things...”

“There is a need for structures which support these kinds of activities, specialists with the tools to do it and to help us, because our priority is the research”

Moreover, fifty per cent of the scientists agreed that it is difficult to get involved in science engagement activities whereas 30% said it is easy.



They explained:

“Scientists use technical language and simplifying it for people is difficult...”

“It is difficult because we need to make the effort to change the language, change it to popular language in order for people to understand us...”

“It is necessary to have a scientific background and the capacity to project it in two languages: scientific and popular.”

“We don't have the tools to explain to the general public what we are doing. We are educated in scientific terms. What's more, these kinds of activities seem like second class: if you are doing them, there can be suspicion about your qualifications as a scientist”.

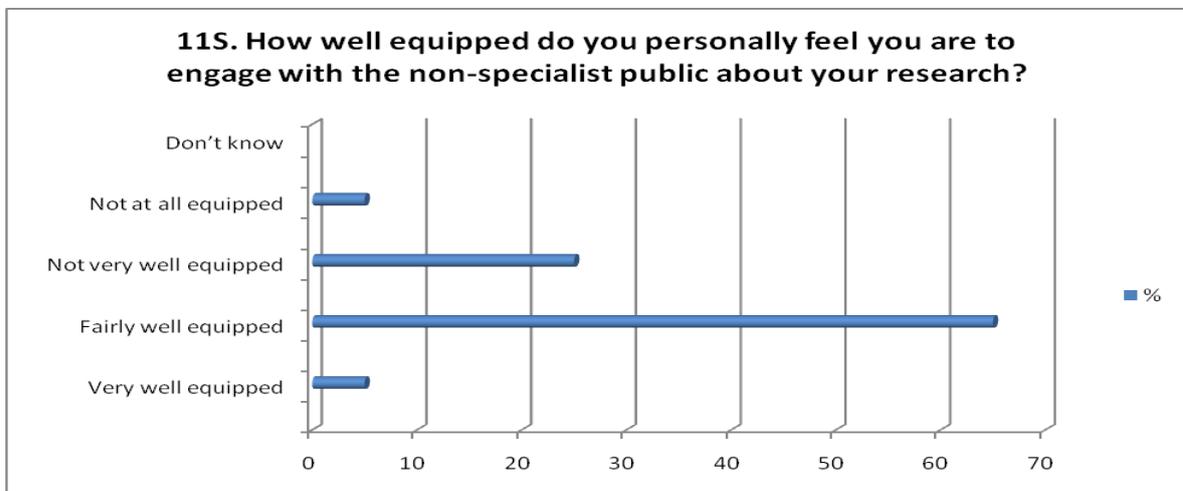
“It is difficult if we consider the political and economic situations; we don’t have permanent positions; also the projects are short term.”

“It is difficult to have contact with the public. I am not famous, nor is my research, so how can there be contact?”

“In this country our opinion is not important; we are not invited to the important national discussions.”

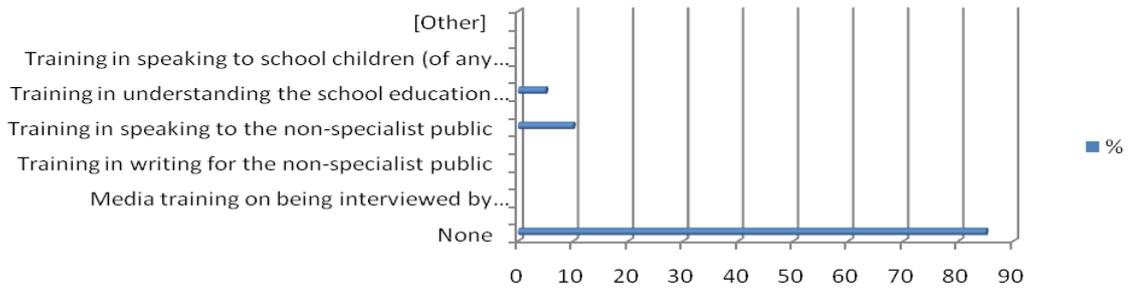
“I think access is limited, moreover talking with people, even with politicians, does not change anything”

Most of participants (70%) felt they are well equipped to engage with the non-specialist public about their research.



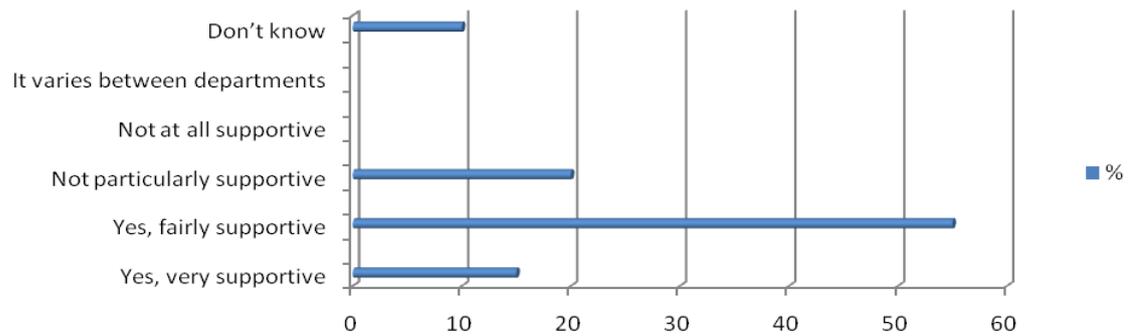
Nevertheless, eighty-five percent of scientists surveyed have had no training in communicating science to the non-specialist public.

12S. What training, if any, have you had in communicating science to the non-specialist public? Do not include any teaching training you may have had.

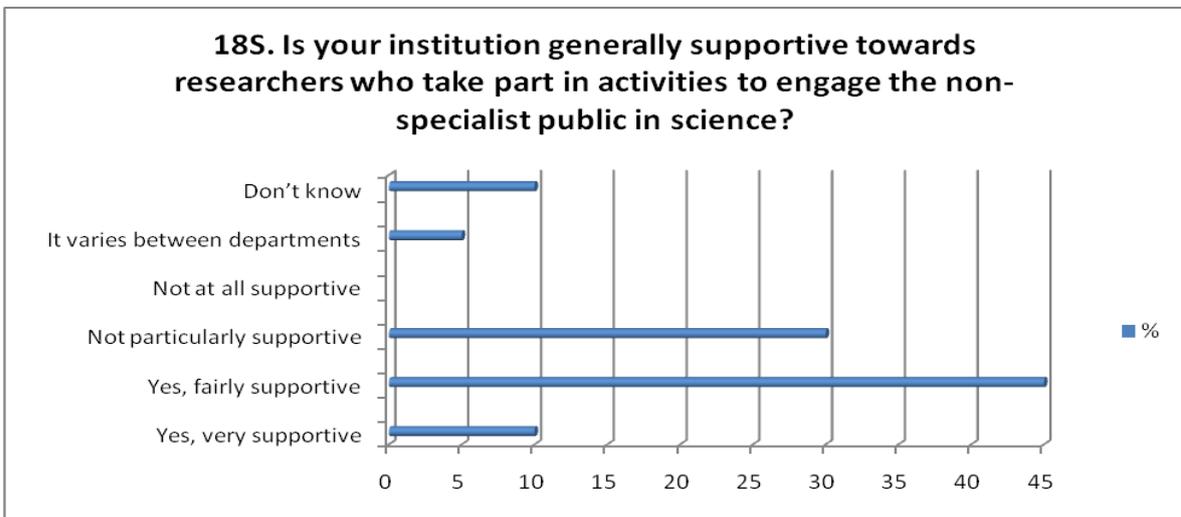


Focusing on colleague's support, 55% of the researchers said that their fellow scientists are fairly supportive towards those who take part in activities that engage the non-specialist public.

17S. Are the researchers in your department generally supportive towards those who take part in activities that engage the non-specialist public in science?



Regarding the support given by institution towards researchers who take part in activities to engage the non-specialist public, 45% of scientists said it is fairly supportive and 10% very supportive. However, 30% of them said it is not particularly supportive.



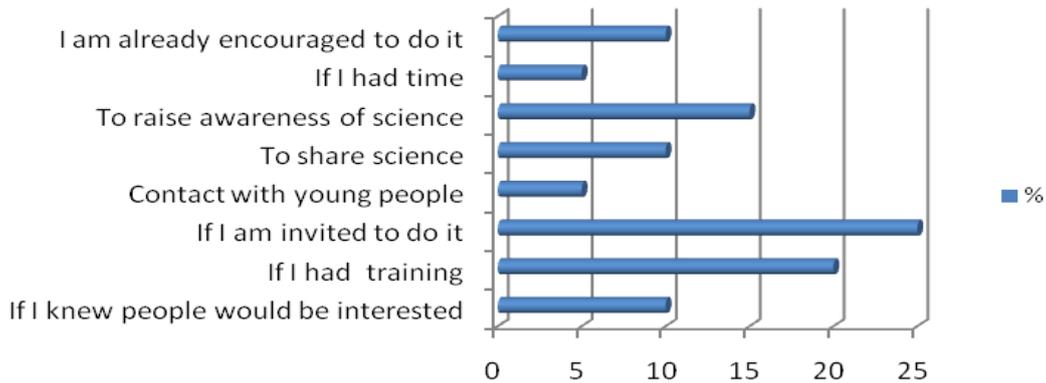
One of scientist added:

“Well, the institution doesn’t support with any money but they give moral support. Nowadays we feel the economic crisis, our situation is not good, so there are strict priorities, especially on how we can spend the money...”

V. INCENTIVES FOR SCIENCE COMMUNICATION

When scientists were asked about what would encourage them to get involved in activities that engage the non-specialist public in science, 25% said that having invitations; having some training (20%); raising awareness (15%) and sharing science (10%) also would encourage them. Some of the comments about were:

13S. What would encourage you personally to get involved in activities that engage the non-specialist public in science?



“I think that the people who work in science have a feeling of duty towards sharing knowledge about their work, although maybe that people are not interested...”

“I would like to change something inside society, in public attitudes, to inform about benefits and limits; promote awareness, about new energy resources, or environmental issues for example; the scientist can help in this...”

“We are living in ‘the society of knowledge’, and there are various philosophical issues to confront. We have to be informing people about scientific progress, and future possibilities, but also raise the question of what kind of society we want to be, and what roles people should play in it.”

“It is easier if you have contacts; if you have good relations with the media or with people involved in this activity”

“It is encouraging if there is interest, someone who wants to talk with you...”

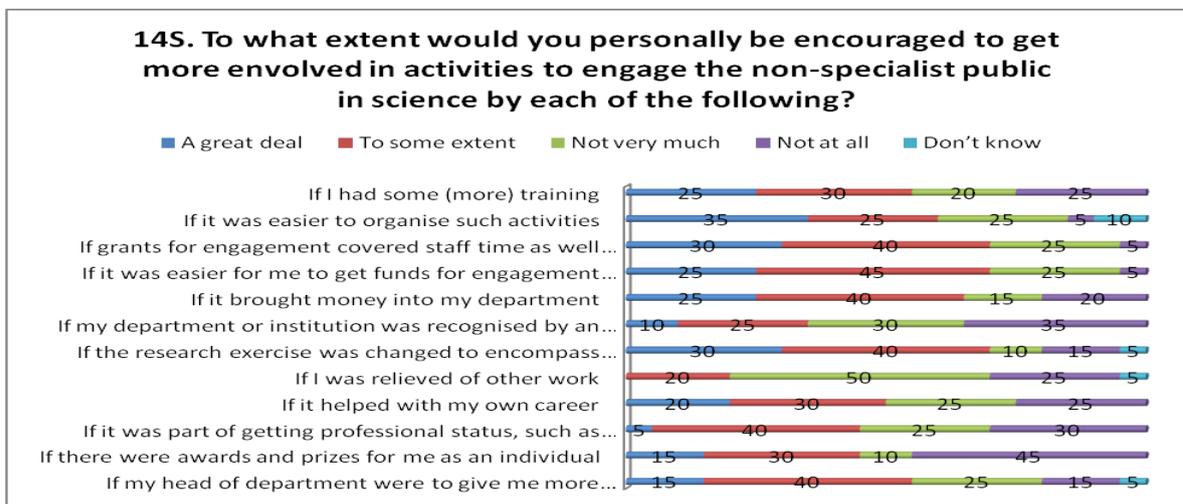
“Interesting, if there is feedback from the people...”

“I would like to have more tools also, how to prepare a proper lecture for the public”

“I only need to have an invitation...”

“To promote the scientific profession with young people”

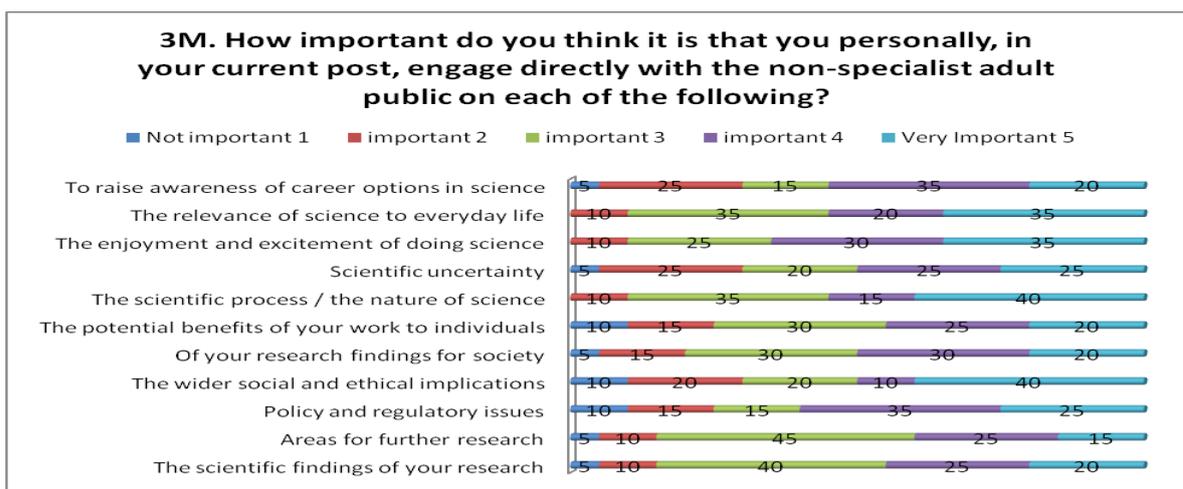
In the closed answer questions on the subject of “to what extent scientists would be encouraged to get more involved in activities to engage the non-specialist public in science”, the top incentives were: if the research exercise were changed to encompass communication with the non-specialist public (70%); if it was easier for scientists to get funds for engagement activities (70%) ; and if grants for engagement covered staff time as well as other costs (70%). It was also important if it brought money into their department (65%).



4.3.4 CENTRE OF MATERIALS SCIENCE AND ENGINEERING – EDINBURGH

I. WHAT DOES PUBLIC ENGAGEMENT MEAN TO SCIENTISTS AND WHY IS IT IMPORTANT?

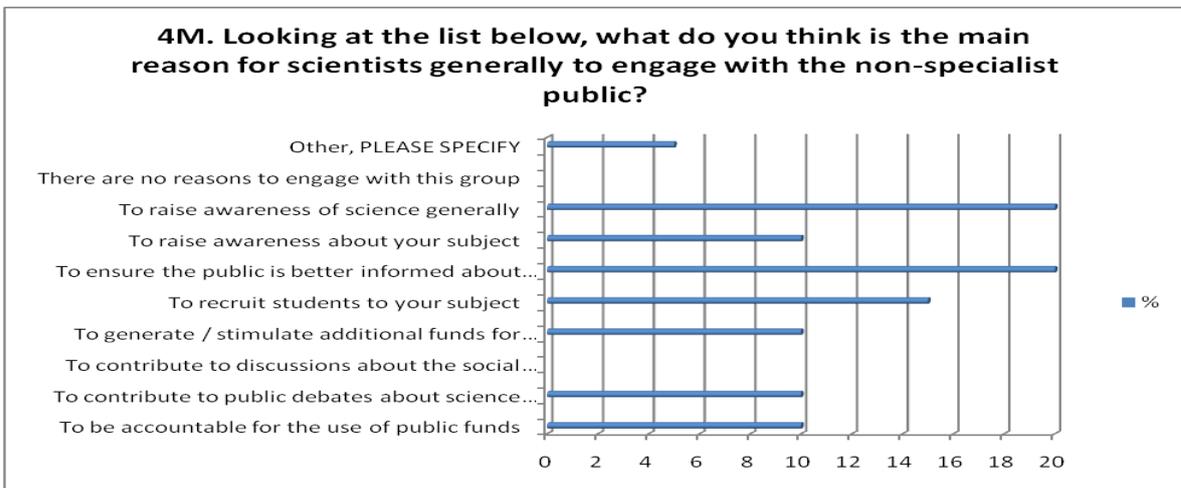
When scientists considered their own research the most important issues to engage the non-specialist public were the scientific process (40%) and the wider and social and ethical implications (40%), the enjoyment and excitement of doing science (30%). Next in priority were the relevance of science to everyday life (35%); policy and regulatory issues (25%); scientific uncertainty (25%) and to raise awareness of career options in science (20%).



In addition, one researcher pointed out:

“It is important because we need to stimulate the industry and fix a few problems with new knowledge that the politicians ignore. However there are not incentives to promote this kind of participation. We need to bring social and politic aspects to these scientific themes.”

Regarding the most important reason for scientists generally to engage with the non-specialist public it was to ensure the public is better informed about science and technology, and to raise awareness of science generally (20%). The least important reasons were to contribute to ethical discussions about science (0%).



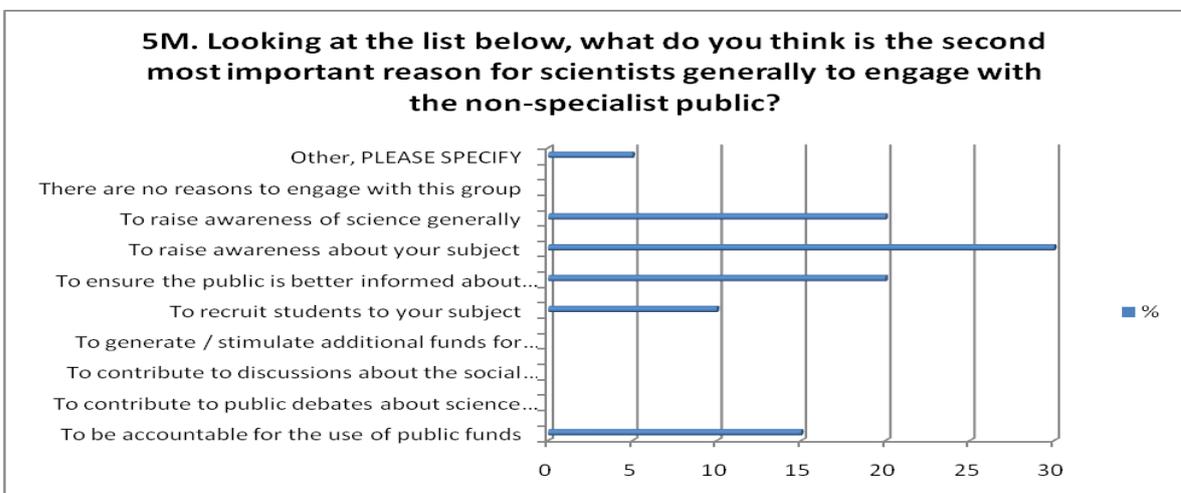
Other comments about reasons to engage with the general public were:

“To show that doing science is exciting and very enjoyable”

To try to promote one’s profile, this can help with one’s career, to be a recognisable figure...”

“It is about boosting one’s ego, through society recognising and valuating one’s work...”

Also, the second most important reason for scientists generally to engage with the non-specialist public was to raise awareness about their subject (30%).

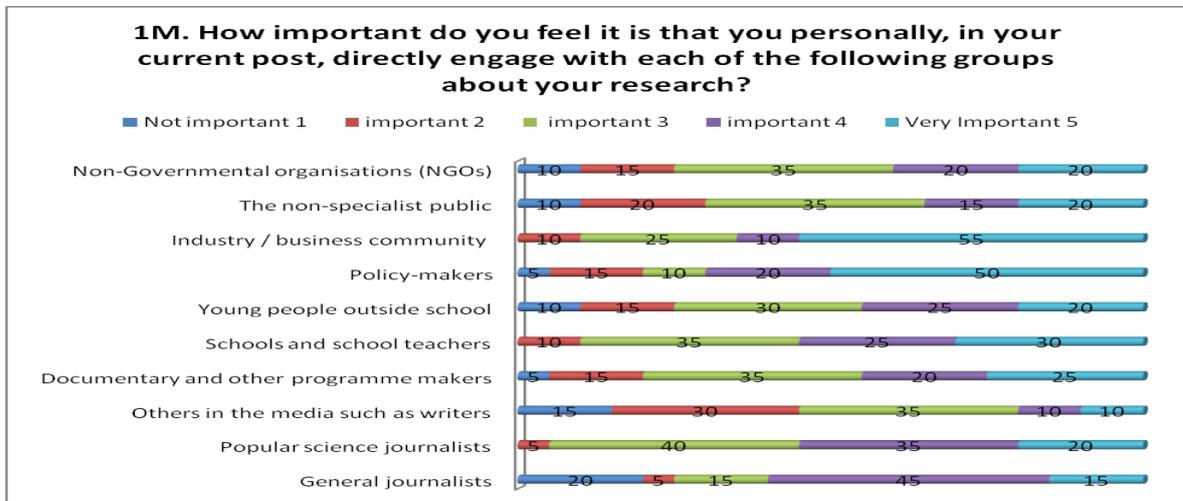


A comment was:

“We need to promote our place inside society, because we don’t have a social voice in the community...”

II. AUDIENCES AND ACTIVITY.

The most important audiences identified by scientists to directly engage with about their research (ranked 4 and 5 on scale of 1-5) were Policy-makers (70%), industry (65%) and general journalists (60%). The least important audiences (ranked 1 and 2) were writers (45%), the non-specialist public (30%), non-governmental organisations (25%) and young people outside the school (25%).



Some extra opinions were:

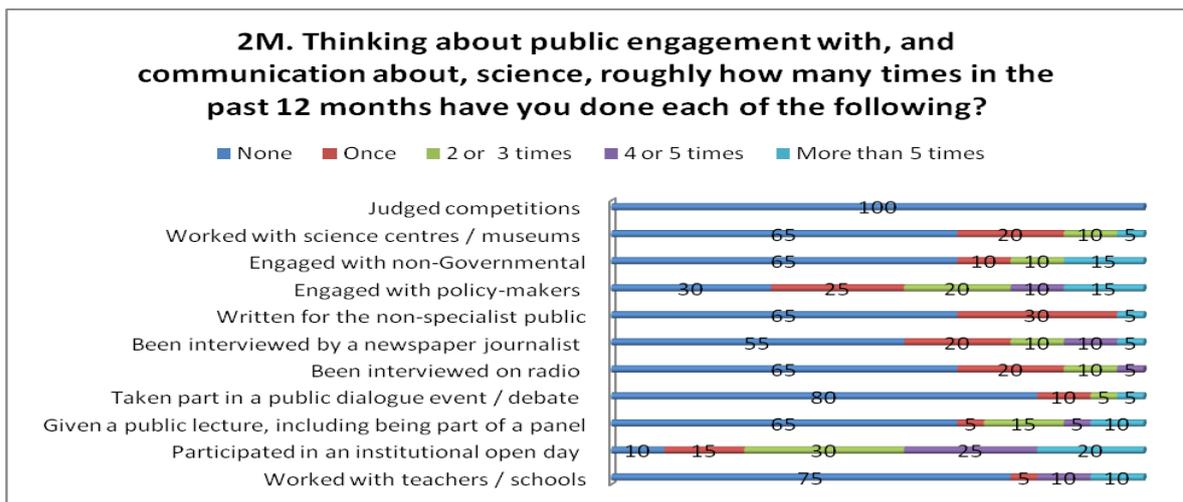
“I am sceptical about these activities, because everything depends on the interest of the public. Moreover it is difficult for me to make contact with the public”

“I think my research is not interesting to the mass media and I don’t have time to engage with them; also I do not have any influence with politicians...”

It is difficult to get contact with journalists”

“Nowadays our research area is very important and we are doing many things, but the public do not know about new developments and their impact, and because of this there are many misunderstandings and much ignorance of which a few chatterboxes or tricksters may take advantage. We are trying to work with the mass media but the problem is that they want quick answers. We prefer to work on programs like Horizon (documentaries), where you are working together (with the producers) in order to get agreements and compromises”.

When scientists were asked about their public engagement activities in the past 12 months, 90% of them said they had participated in an institutional open day; 70% engaged with policy-makers; 45% had been interviewed by a newspaper journalists; 35% had written for the non-specialist public; 35% had given a public lecture; 35% had worked with science centres; 35% had participated in a radio program; 25% had worked with schools; 19% had taken part in public debates.



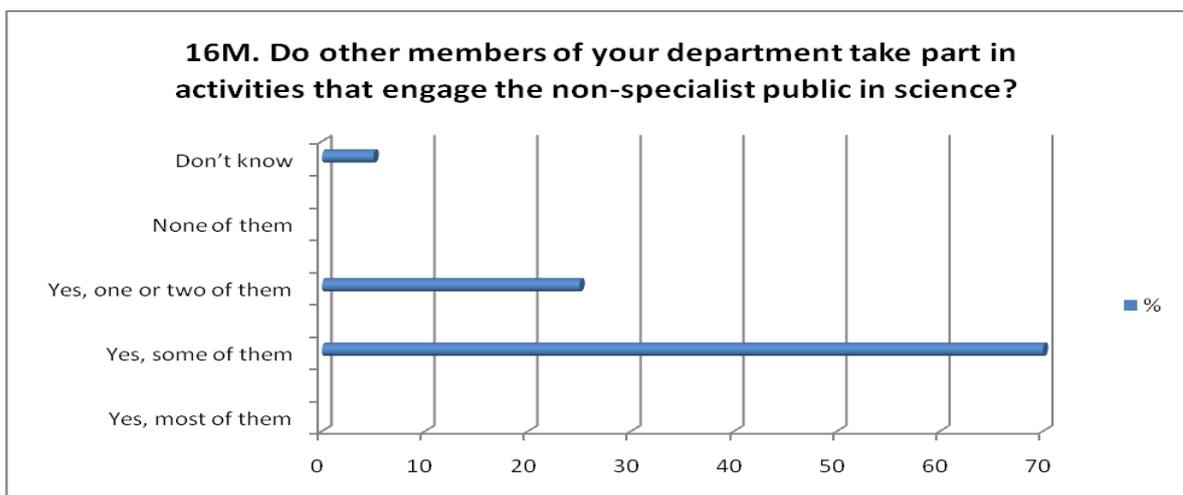
Some researchers put it as follows:

“Here you have to participate in the open day in order to attract students...”

“I have been participating at the open day because it is obligatory for us...”

“In the past I was working in very interesting research for the people so I participated in many public activities; but my current research is not very interesting to them. Nevertheless, when you try to get funds you publicize your research...”

Focusing on the appreciation of scientists’ participation; seventy per cent of the participants responded that some of the members of your department take part in activities that engage the non-specialist public in science.

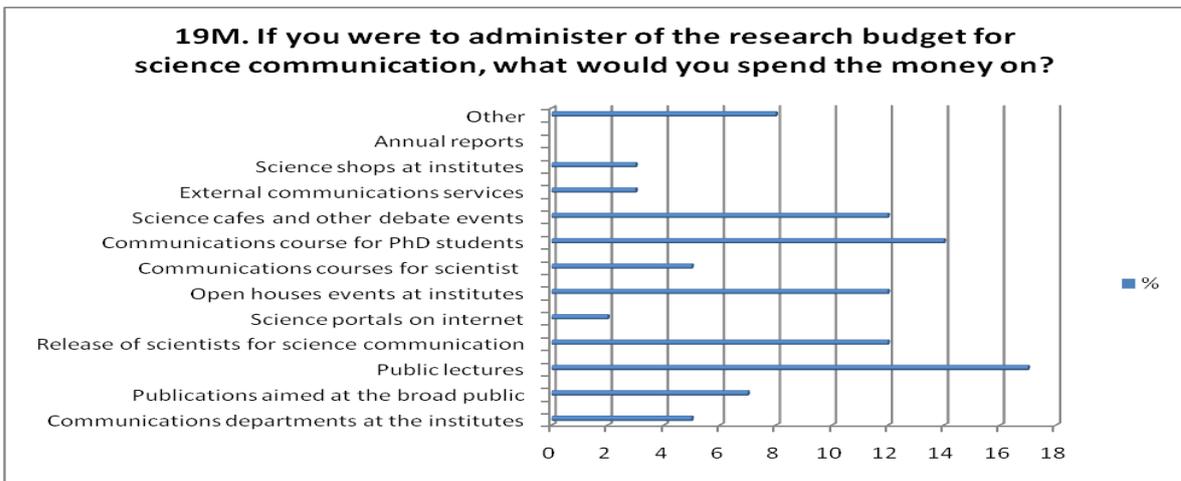


A couple of comments were:

“To be honest, at this centre we are not very active in these activities”

“One or two scientists from here really participate; although in the open day all of us have to participate...”

When asked which activities for science communication the scientists would spend money on, 17% of participants agreed on public lectures and communications courses for PhD students and 12% agreed on the releases of scientists for science communication and open house events at institutes.



Some of scientists put it as follows:

“It is necessary for only one professional to be in charge on these activities, not an administrator but someone who promotes the activity and works along with the scientists, making contacts and simplifying the work...”

“We need scientist as expert communicators on charge of communications departments, not communicators. We need people really involved in science, who understand it. The communications departments are a disaster, they spend a lot of money, and put a lot of pressure on the administration...we don't need to increase the administrator's staff...”

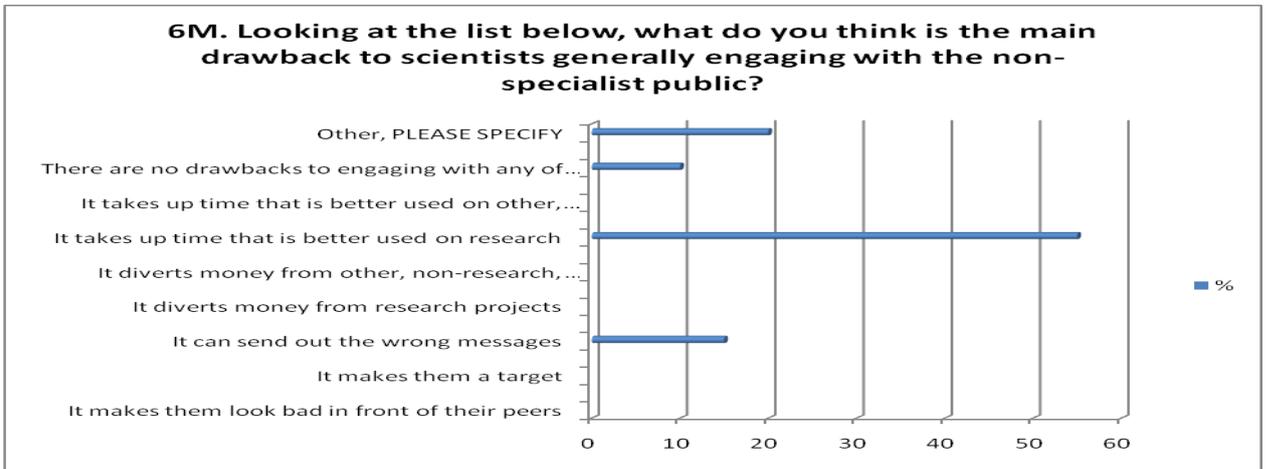
“Maybe with external communications departments there would be more possibilities...”

“It is important to support PhD students because some of them will take scientific career...”

“On supporting the production of movies, and documentaries for TV aimed at the general public”

III. BARRIERS TO SCIENCE COMMUNICATION

The main drawback to scientists engaging with the non-specialist public was it takes up time that could be better used on research (55%). In their words the scientists stressed also that this activity is not recognised (10%) and their difficulty is doing it because they do not have support or training (10%).



Some points of view were:

“We are more interested in our research and promotion...”

“This activity does not have a value and we lack time...My colleagues say that to participate is a waste of time because it is not part of the promotion system.”

“There are many misunderstandings around this activity, with colleagues and the media.”

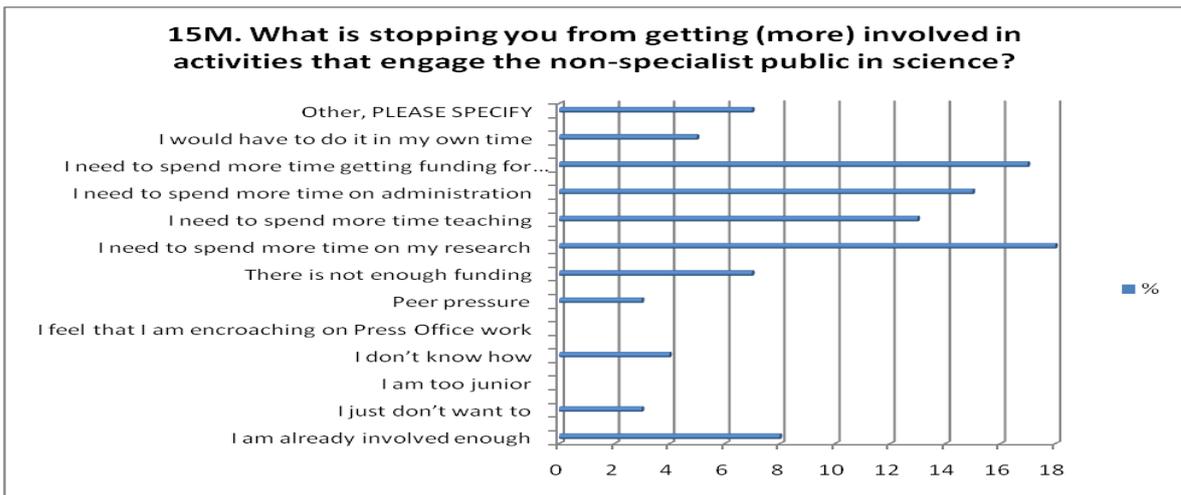
“It is difficult to manage with the gap between the ignorance of the people and our capacity to show our results...”

“I think it is very arrogant to say that this activity takes up time for research. The real point is that this activity is a lesser priority...”

“We are not expert communicators and it is difficult to do it...”

“There are restrictions on doing these activities...”

When asked about what stopping them getting more engaged with the non-specialist public, 18% of scientists said the need to spend more time on research and 17% more time getting funding for their research.



In their own words they put it as follows:

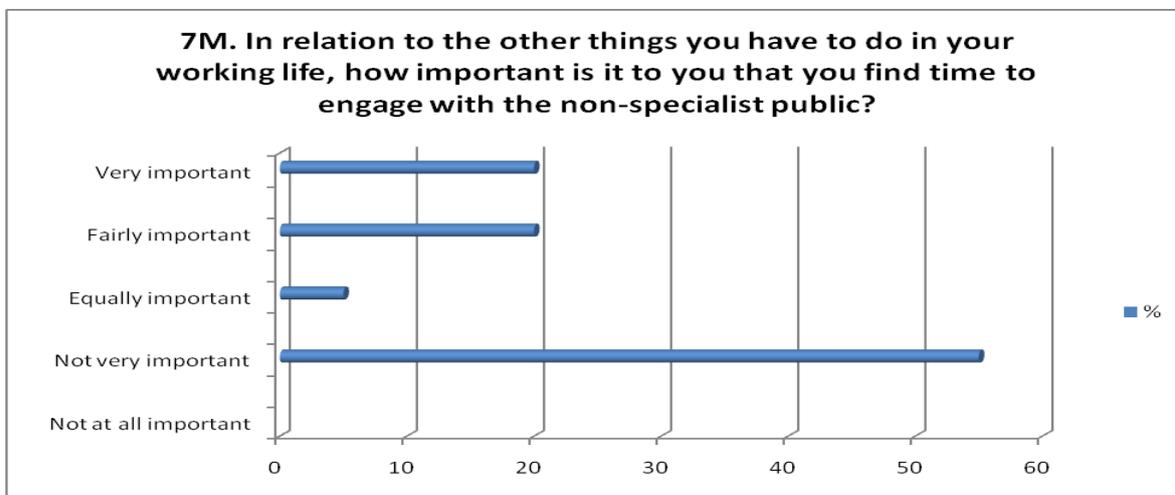
“There are colleagues who are doing these kinds of activities very well, so I prefer them to still do that...”

“I don't feel there is recognition for doing this...and help about professional promotion”

“I don't have enough time to do it...”

IV. TRAINING AND DEMAND.

Regarding the importance to find time to public engagement, fifty five per cent of scientists said that it is not very important to find time to engage with the non-specialist public whereas 40% of scientists gave some importance to this activity.



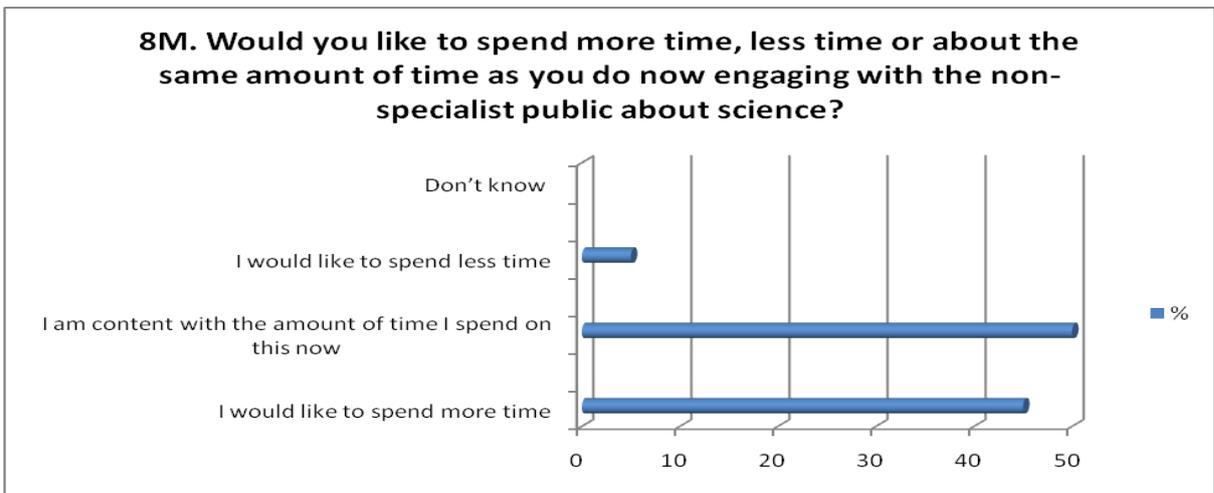
Some scientist added:

“Of course it is important but there needs to be mechanisms and funds to help to do it”

“It is relevant. However, I cannot do everything and the most important thing is my research...”

“My research is supported by funds from a governmental organization therefore it is so important to promote what we are doing”

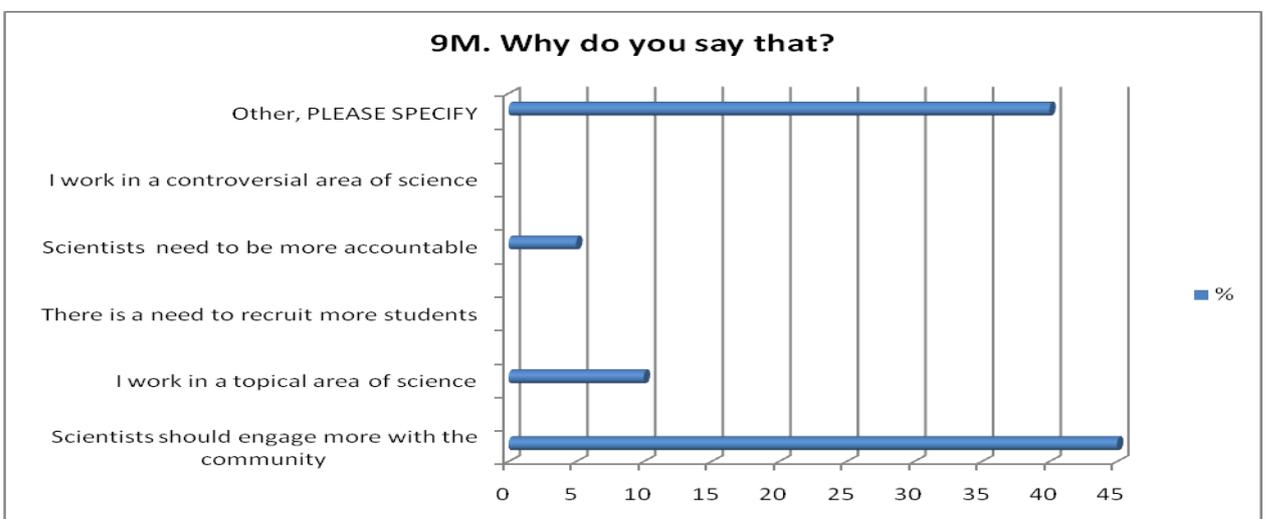
Furthermore, fifty per cent of scientists said they had been content with the amount of time spend in engaging with the non-specialist public; meanwhile 45% would like to spend more time.



One scientist highlighted:

“I am a researcher so I like to dedicate my time to my research”

Moreover, forty five per cent of the participants agreed that scientists should engage more with the community. However in their own terms (40%) the scientists stressed some of the problems with engaging; being busy in their research; difficulty in talking to the general public about their research; the need of more support to do it; lack of training; no recognition, and also not interested in being involved.



Some of their opinions were:

“I am working in a special area in which you can talk with specialists but it is difficult with the general public. It requires special skills to do it so there needs to be professionals working in this area.”

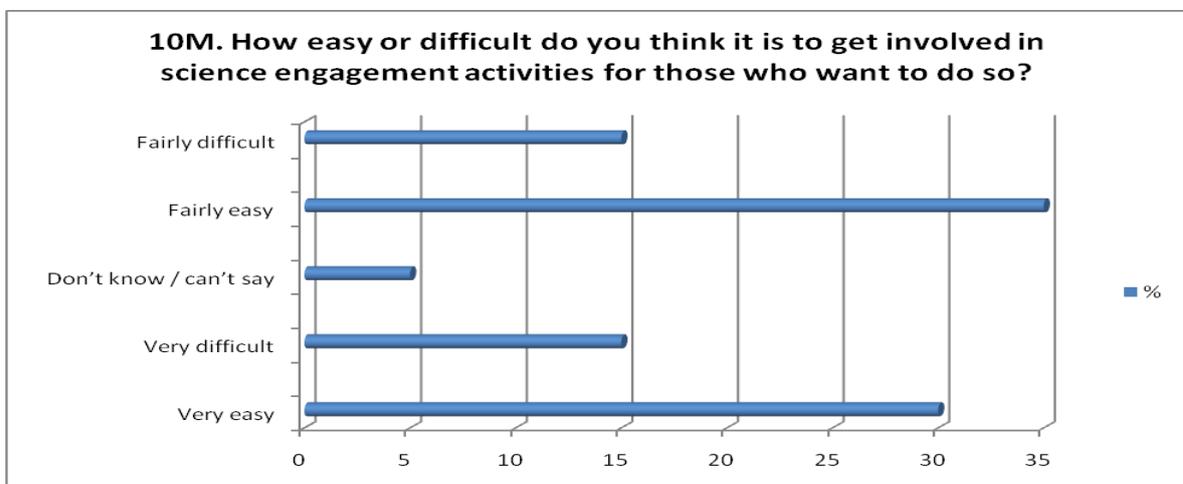
“There needs to be a stimulus to this activity, motivations, money, something, but there is not much.”

“I would like to participate more if it was easier but the point is you need training and more...”

“It is difficult to work with the gap between people and research, because we manage different languages and I do not feel that the public is really interested in science.”

“We are under pressure about our research and this activity does not have recognition.”

Most of the scientists (65%) agreed that it is easy to get involved in science engagement activities.



The respondents added:

“There are many opportunities to do it. The Universities have professionals who try to make these activities easier...”

“In this University it is easy because they organized several activities and training sessions.”

“There are different programmes so it is only about whether you want to do it”

“It is now easier to participate in these activities in the UK than 10 years ago because there are more opportunities. This change was originated to try to promote transparency, the development of the scientific profession and a scientific literacy useful to a democratic society.”

“It is easy because there are departments with the tools to do it”

“I think is easy if you want because there is much support. However it is difficult to find time and they do not pay for doing it and there are not direct benefits to my work...”

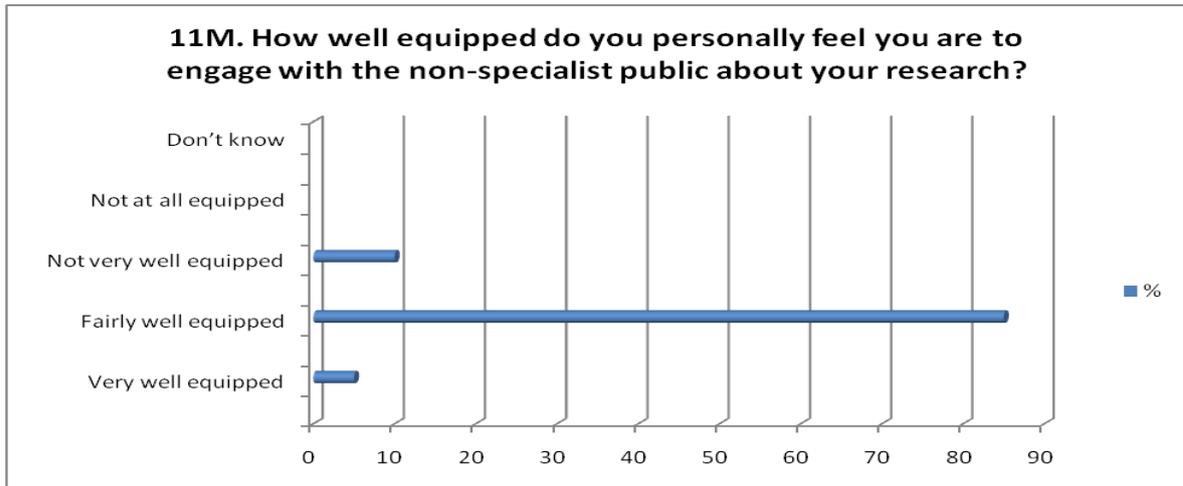
“It is difficult because there are not the right mechanisms and infrastructure to support this activity. One example is when there is a conflict and the media need you...”

“You need to make special efforts to be involved...”

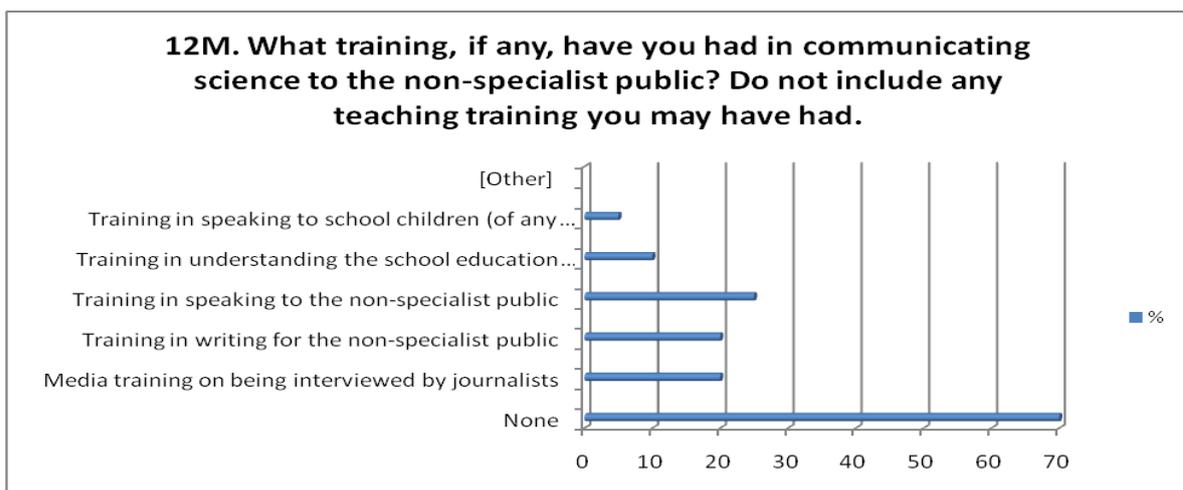
“It is difficult; I think sometimes we only frighten people and then the objective is not achieved. We do not know about the public reaction...”

“Audience are different publics and this makes it difficult. To try to find a way to make something interesting is difficult too...”

Most of the participants (90%) felt they are well equipped to engage with the non-specialist public about their research.

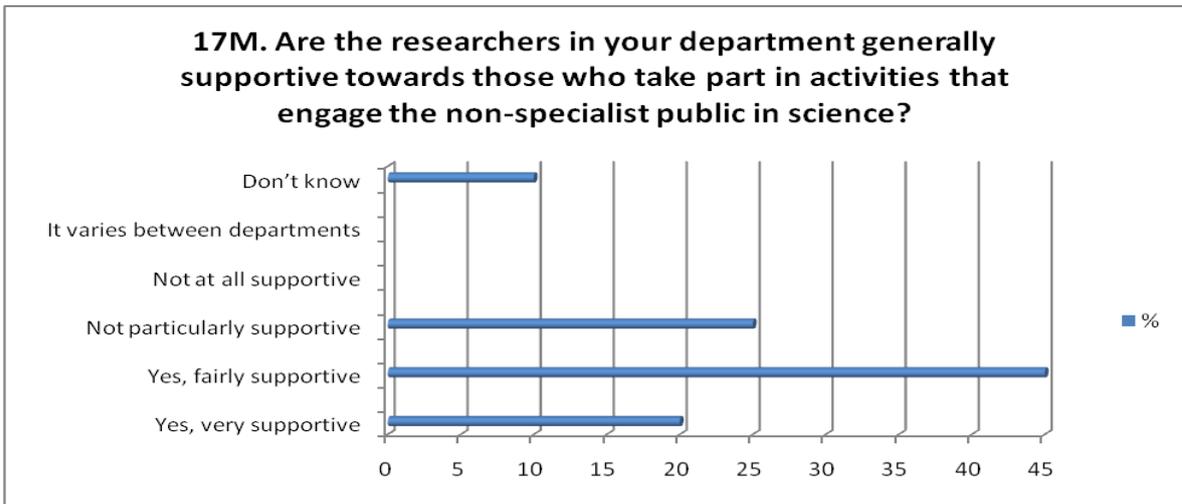


Nevertheless, seventy per cent of scientists surveyed have had no training in communicating science to the non-specialist public, whereas 30% had taken diverse training.



Four researchers specified that they had taken their training in communicating at Edinburgh University, and at an institution in Australia. The Royal Society in London, during the month of science, was another institution mentioned; also in postgraduate courses in Germany.

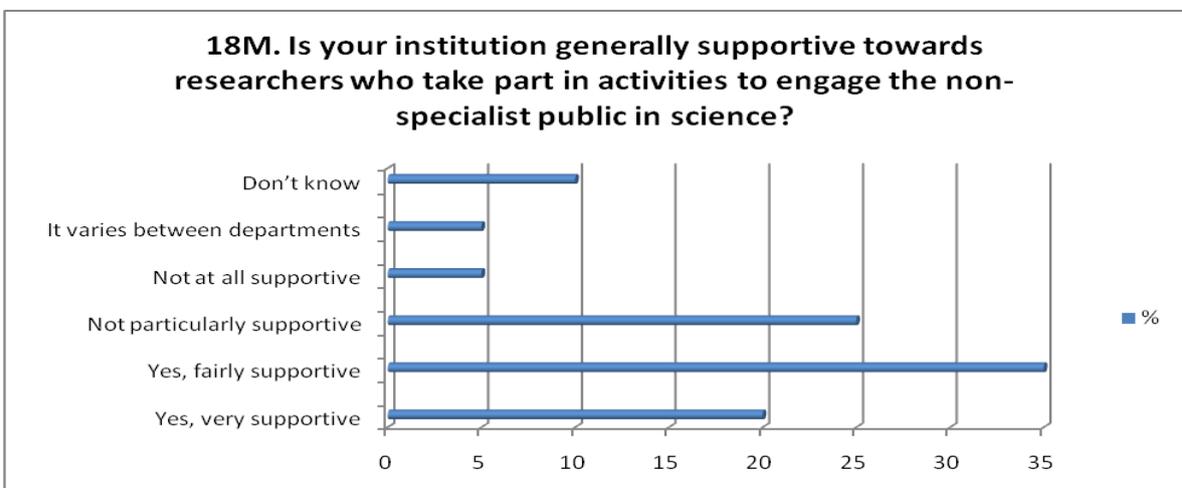
When asked to focus on colleague’s support, 45% of the researchers said that their fellow scientists are fairly supportive towards those who take part in activities that engage the non-specialist public while 20% were very supportive.



One important observation was:

“All my colleagues recognized that this activity is good and important”

Concerning the support of institutions towards researchers who take part in activities to engage the non-specialist public, 35% of scientists said it is fairly supportive and 20% very supportive. However 25% considered it not particularly supportive.



Some comments were as follows:

“The institution says it is important but the fact is that these activities do not have any value.”

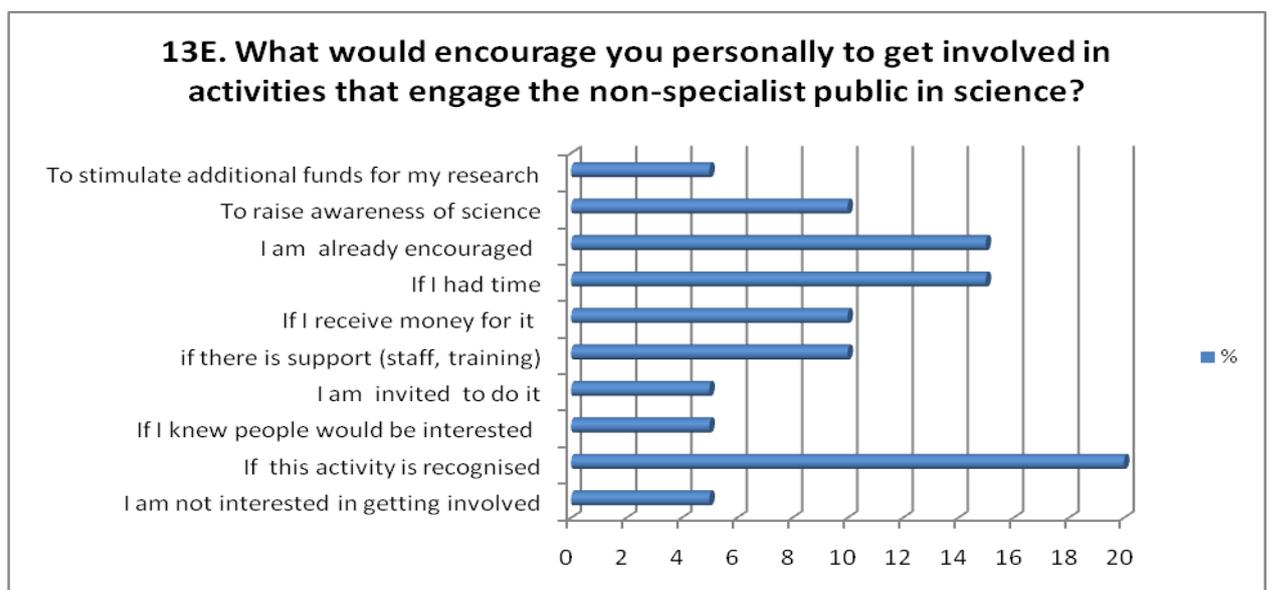
“These activities are considered as third order in priority”

“We participate in the open day in order to get funds for the university”

“The boss will say, yes go ahead, but when in future I want promotion those activities are not valued”

V. INCENTIVES FOR SCIENCE COMMUNICATION

When scientists were asked about what would encourage them to get involved in activities that engage the non-specialist public in science they highlighted as incentives if this activity is recognised (20%), they would have time (15%), there are supports like staff or training (10%) and getting invitations (10%). Also raise awareness of science (10%); if they receive money for it (10%) and that they are encouraged already (15%).



Some of the comments about what encouraged them were:

“It is important for scientists to explain what we are doing with simple words and persuade them about the enjoyment and benefits of doing science.”

“I am a young researcher and it is important for professional promotion. Nowadays these activities are recognized by the University, and they help establish external contact with society, and get funds for research as well. So now the point is to find a balance between both activities.”

“We need incentives, tangible things, money, students...”

“Promote my research in order to get funds”

“Only if there is real recognition, because we need to keep the equilibrium between research and engagement activities, and justify them. Now that it is more difficult to find time to do it, we are under pressure to write papers and the competition is very intense.”

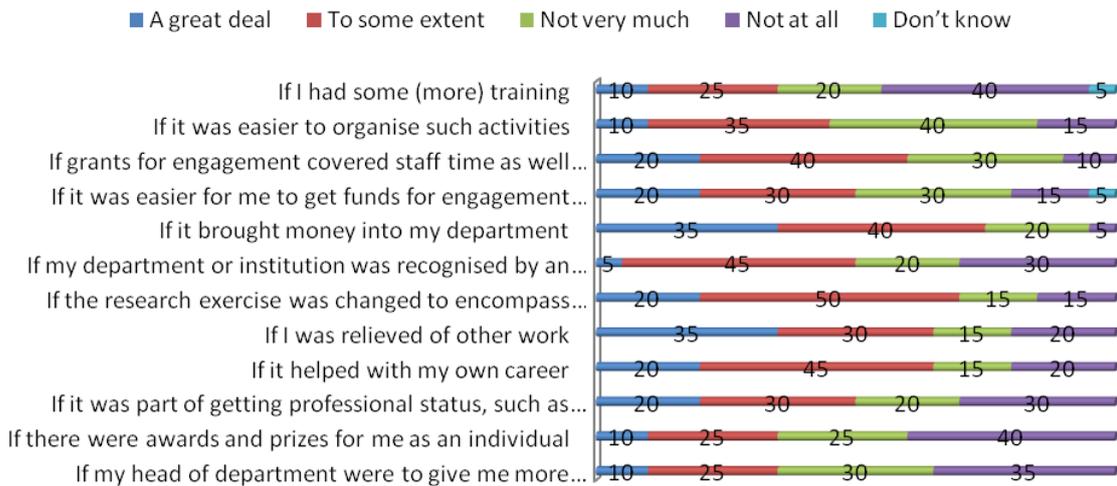
“If I had the time, the funds, the support; my priority is looking for funds for my research, this is the most important thing...”

“If I could have someone to help me to organize...”

“It is simple, if someone comes and asks me...”

In the closed answer questions on the subject of to what extent scientists be encouraged to get more involved in activities to engage the non-specialists public in science, bringing money into their department was the top incentive (75%). It was also important that the research exercise was changed to encompass communication with the non-specialist public (70%), they were relieved of other work (65%) and it helped with their own career (65%).

14M. To what extent would you personally be encouraged to get more involved in activities to engage the non-specialist public in science by each of the following?



Some scientists added:

“Time for my research is my priority...”

“I need people and funds to do my research mainly...”

“The most important thing to encourage must be feedback with society, because this participation helps scientific research, this interaction must be part of our scientific work...”

“I would like to be relieved of other work but not from my research...”

Chapter 5

General findings

5. GENERAL FINDINGS

This section summarised the findings (quantitative and qualitative) obtained in the five European Research Institutes ($n_t=112$) surveyed: FHI, Berlin, **Germany** ($n=21$); CEMES, Toulouse, **France** ($n=35$); ISMN, Bologna, **Italy** ($n=20$) and CSME, Edinburgh, **United Kingdom** ($n=20$); and DIPC, Donostia-San Sebastian, **Spain** ($n=16$). The results are classified in the 5 categories of information established in the methodology:

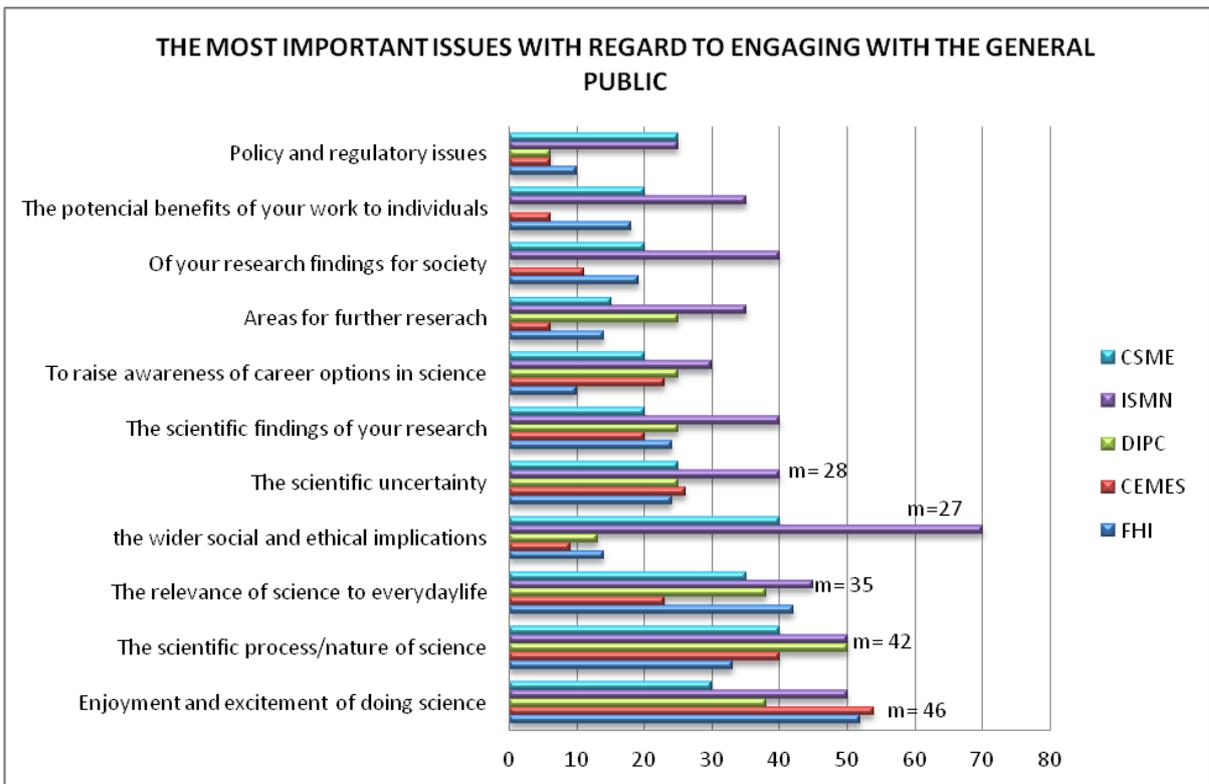
- 5.1. What public engagement means to scientists and why it is important.
- 5.2. Audiences and Activity
- 5.3. Barriers to science communication
- 5.4. Training and demand
- 5.5. Incentives for science communication.

5.1. WHAT PUBLIC ENGAGEMENT MEANS TO SCIENTISTS AND WHY IT IS IMPORTANT.

Important issues to engage

The most important issues in which scientists of the five institutes agreed to engage with the general public (in order of importance) were:

- the enjoyment and excitement of doing science,
- the scientific process,
- the relevance of science to everyday life,
- the wider social and ethical implications,
- The scientific uncertainty.



Distribution of responses (%) by research centre, and the relevant average scores (m) obtained by item. See tables in the Appendixes (p.249) for a breakdown of responses by centre.

These results show that for scientists it is more relevant to explain generally the nature of science and scientific work, and promote awareness of scientific limits and its implications in culture and society, than to explain their research findings and possible benefits.

They highlighted the difficulties involved in showing their findings such as: the translation to a simple language; that their results would not be interesting to the general public or could be difficult to understand; that getting scientific findings is a long process of work and there would not be immediate applications or benefits to society.

“It is relevant to talk about my results but I need to simplify it in a way the general public can understand”. (DIPC, Spain)

“My research and results are very technical and they are difficult for public communication...” (DIPC, Spain)

“Sometimes scientific findings are very technical and not interesting to the public, whereas talking about how science will affect everyday life in the future is more appealing” (DIPC, Spain)

“You can only place your research in the public domain when you have got results.” (CEMES, France)

“My research is complex, it can be difficult to discuss even with fellow scientists. Furthermore our findings are not immediately applicable. I doubt that people could generally understand the importance of my research.... (DIPC, Spain)

Scientists emphasised also the way that the mass media reports scientific work, focusing mainly on results and applications. Also they suggested the need that the media change this tendency and try to connect with the scientific process, and the social and political aspects that scientific research is involved with.

“To the mass media, public science communication is just about application and I don’t think this is right...” (CEMES, France)

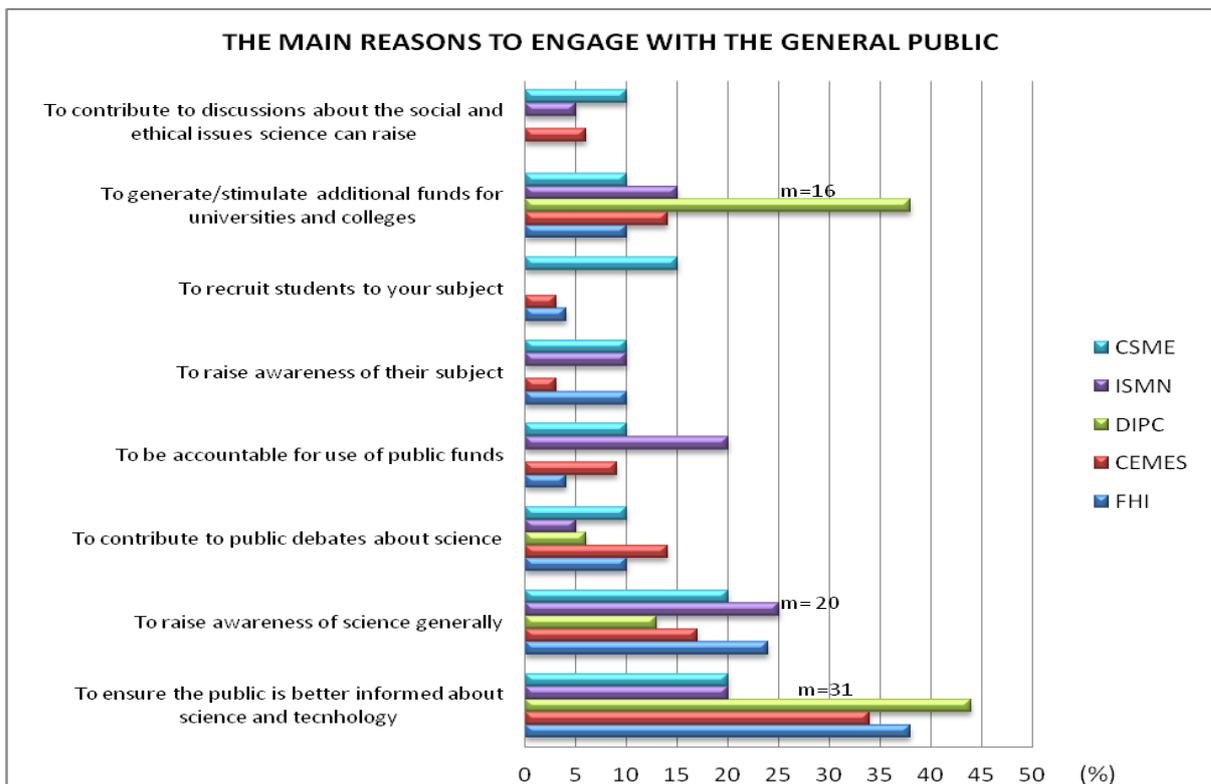
“My research is so detailed that it may be of little interest to the public; they only want to see the final product. However, I can make it easier to understand by showing the scientific process involved” (DIPC, Spain)

“It is important [participate in public science communication] because we need to stimulate the industry and fix a few problems with new knowledge that the politicians ignore. However there are not incentives to promote this kind of participation. We need to bring social and politic aspects to these scientific themes.” (CMSE, UK)

Reasons to engage

The main reasons for scientists of the five institutes stated to engage with the non-specialist public were:

- To ensure the public is better informed about science and technology, and
- To raise awareness of science generally; also
- To generate funds.



Distribution of responses (%) by research centre, and the relevant average scores (m) obtained by item. See tables in the Appendixes (p.249) for a breakdown of responses by centre.

Some researchers pointed out that if society is better informed about science and becomes aware of it, this may support favourable funds and public policies for scientific research.

“If the public is informed they will support science policies”. (DIPC, Spain)

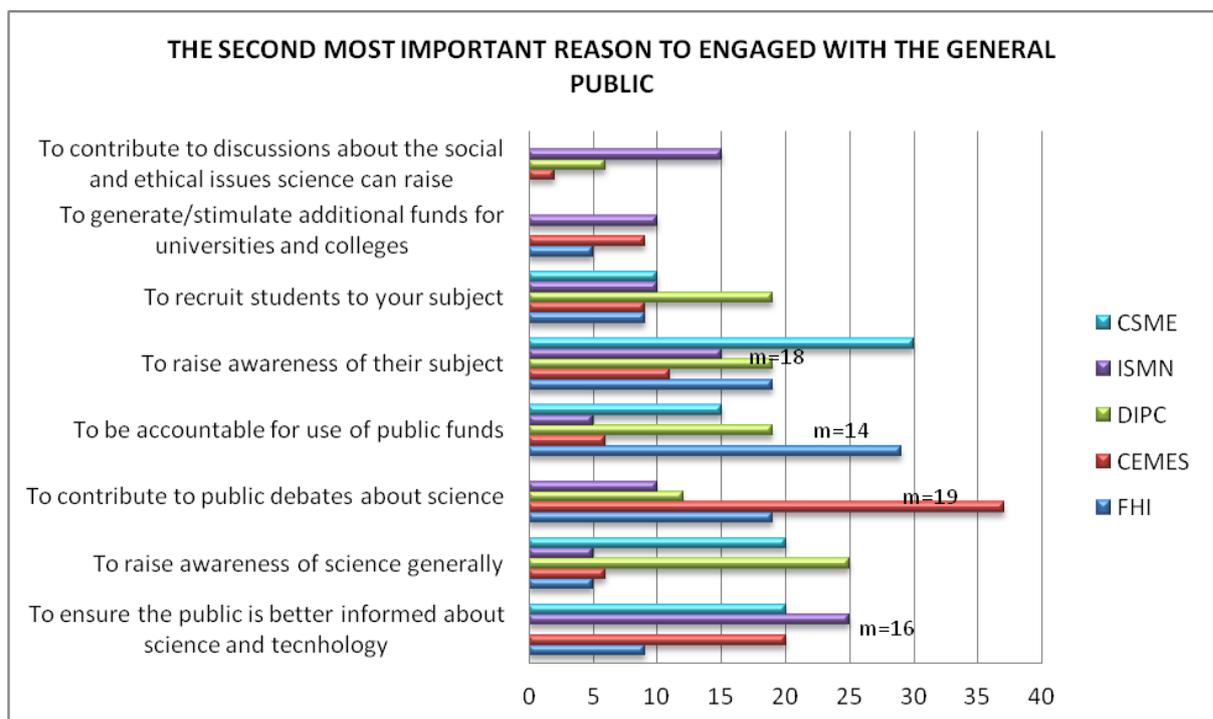
“We need to attract politicians to get funds; we don’t like to do this. In general, showing what we are doing is what we really enjoy.” (DIPC, Spain)

“It is important that people are better informed about science and technology because then they will become interested in science. It is necessary to support scientific research. The politicians take decisions

about it, but it is the people who vote for them. They have to hear what society demands – we can see that in the health area. But the participation of people in most areas of science is low. So, if we inform the public it will ensure funds go to scientific research.” (DIPC, Spain)

The second most important reasons scientists identified were:

- To raise awareness of their subject
- To contribute to public debates about science
- To ensure the people are better informed; also
- To be accountable for use of public funds.



Distribution of responses (%) by research centre, and the relevant average scores (m) obtained by item. See tables in the Appendixes (p.249) for a breakdown of responses by centre.

Some participants pointed out the relevance of attending to public doubts about their topic in order again to gain support for their research.

“The success of allaying the doubts of the non-scientific public can be reflected in funding issues for future project”.(CEMES, France)

“It is important to explain what we are doing in the laboratory, because people think that nanotechnology is harmful”.(CEMES, France)

Other reasons that scientists mentioned for engaging with the general public were that engagement could help to promote their position in the society.

“To try to promote one’s profile, this can help with one’s career, to be a recognisable figure...” (CSME, UK)

“Some scientists could benefit from the personal publicity”. (FHI, Germany)

“It is about boosting one’s ego, through society recognising and valuating one’s work...” (CSME,UK)

“We need to promote our place inside society, because we don’t have a social voice in the community...” (CSME,UK)

5.2. AUDIENCES AND ACTIVITY

The important groups to engage

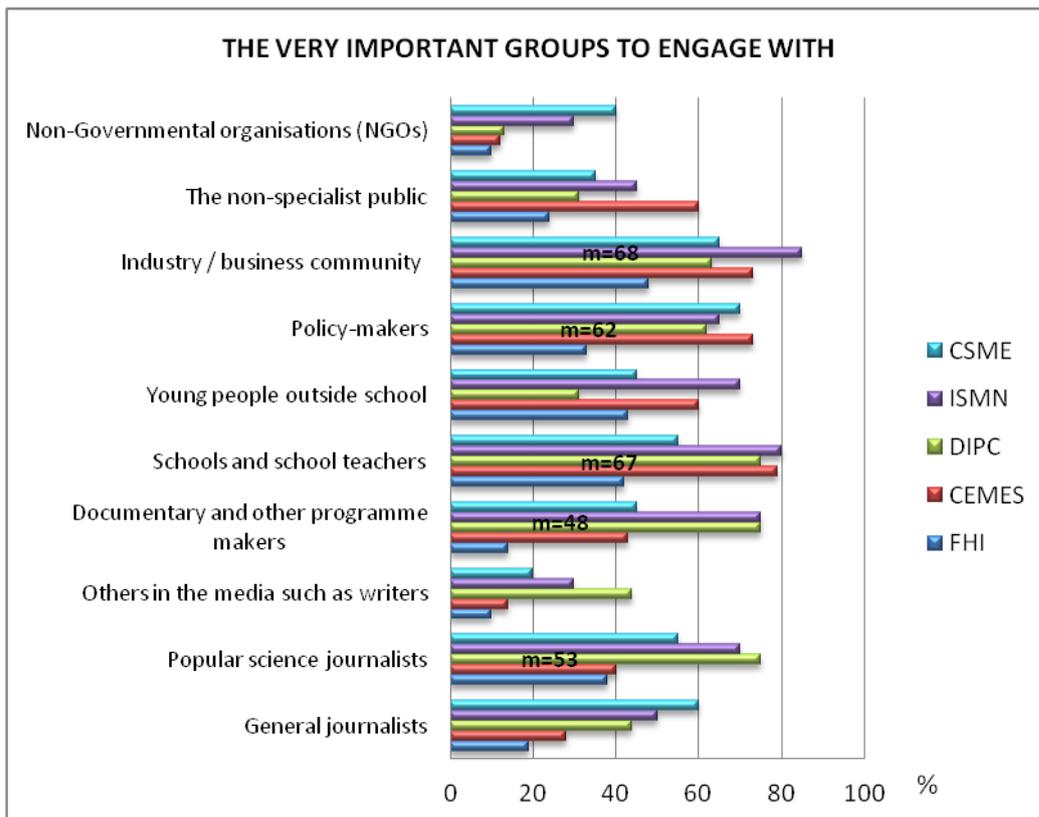
The researchers identified the following very important groups to engage with (in order of relevance):

- Industry/business community or others directly concerned with funding their research
- Schools and school teachers
- Policy makers

Also:

- Popular science journalists
- Documentary and other programme makers

The groups that were less important to engage directly with were: non-governmental organizations and writers.



Distribution of responses (%) by research centre, and the relevant average scores (m) obtained by item. See tables in the Appendixes (p.249) for a breakdown of responses by centre.

Scientists explained that the reason for their interest in **politicians** is to raise funds for scientific research and for schools and young people it is the promotion of careers in science because this is an essential part of future.

“I think the most important thing is to work with schools and young people because they are the future, we can guide them...The general public should have the right to know what scientific research their taxes are spent on. As for NGO’s, as a rule they do not seek advice”. (CEMES, France)

“It is important to attract politicians in order to get funds and good business; young people are another interesting public because some of them will become our future scientists; but I think it does not work when scientists engage directly with the general public...” (ISMN, Italy)

“We have to engage with the journalists and politicians as it is part of our work to promote scientific activities. We have to explain and show the human side of science and the relevance to people’s daily lives.” (ISMN, Italy)

Researchers remarked that **journalists** are mainly interested in new discoveries and attractive developments and most of the research is not part of these criteria. Also, that the interest of the latter is concentrated in specific areas of science and in some famous scientists. Some Scientists added that their relations with journalists were not very good due to lack of interest in researchers and also to lack of precision in messages.

“The relationship with the mass media is very important, because it is the best way to connect with society. However, here this relation is not very good. The journalists are not looking for the scientists; in fact, we need to call them...” (ISMN, Italy)

“I have no interest in developing a relationship with journalists; I am not famous and therefore they are not interested in me or my work.” (CEMES, France)

“The journalists are not interested in science as the daily routine of science is not headline material”. (CEMES, France)

“The area of materials is not a very interesting subject to the general public and journalists prefer information about medicine or astronomy...” (DIPC, Spain)

“I prefer to communicate directly with the public rather than with journalists, that way I know that information is correct”. (CEMES, France)

Other comments regarding the **general public** as an audience, mentioned that although the general public is maybe not interested in scientific work, they are a powerful lobby group in society and scientists need to work with them.

“I am sceptical about these activities, because everything depends on the interest of the public. Moreover it is difficult for me to make contact with the public” (CSME, UK)

“The non-specialist public is a difficult public. They don’t understand much of scientific work. Nevertheless, we need to get close to them and inform them about our research.” (ISMN, Italy)

“The situation here (Italy) is not good, I feel no one is really interested in science, it seems like medieval times. When I was working in a German Institute there was a lot of activities for the general public. Although the public did not fully understand what they were being shown at the events, they still came. In Italy, it is a shame; especially that there is no interest from parents...” (ISMN, Italy)

People have to know about our current situation. We don’t have any stability; there is no consideration for scientific work...” (ISMN, Italy)

“Because of our current poor economic situation it is necessary to promote the public perception of the importance of investment in basic science”. (ISMN, Italy)

Moreover some scientists stated that the obligation to engage with some of these groups concerns their **directors, heads of department or the press or public relations officers**, either because it is part of their responsibility or because they are in a better position to do it (contacts, relations, knowledge, etc).

“The directors or people in similar positions are the ones who have to be in charge of these responsibilities...” (DIPC, Spain)

“I think it is the institution (the director) who must to be in contact with the public, not me...” (CEMES, France)

“The relationship with politicians is part of the directors business”. (FHI, Germany)

“The scientific community is very hierarchical and sometimes this is a delicate matter. Here it is the head of the institute who is engaging with the public.” (DIPC, Spain)

“I am working in basic research and I don’t have many contacts...this activity is normally done by the boss, they have to promote what we are doing.”(DIPC, Spain)

“The press office has to orientate the interaction with these groups” (FHI, Germany)

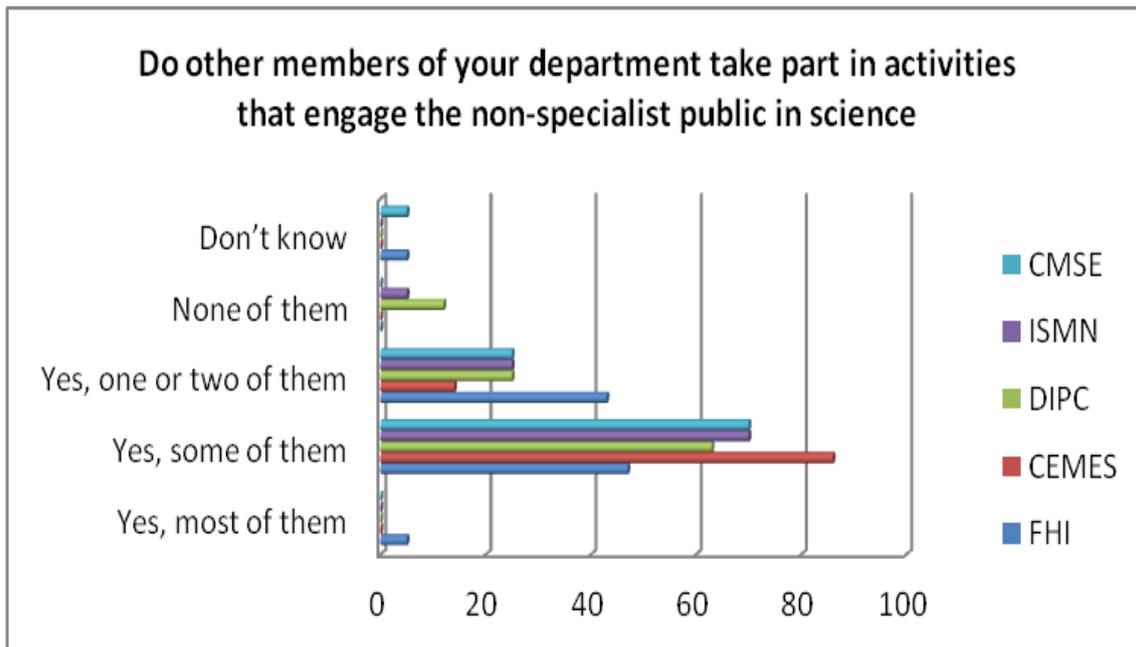
It is necessary to include a successful communicator who is aware of public perception, and act as a link between these groups.(CEMES, France)

“It is very important, with regard to communication with the general public, to show that our work is important to society, although I am sceptical about when this work is being doing by non-professionals because sometimes they are giving out disinformation; things which are not true or which help other interests, not scientific interests...” (DIPC, Spain)

“It is possible that direct contact with public groups is important for one’s ego but not necessarily for your career. It is good that your research is in the public domain, although I would never go to the lengths of contacting a journalist or any other public groups to try and arouse interest in my work”.(CEMES, France)

About scientists participation

Most of the scientists identified that some of the members of their department take part in activities that engage the non-specialist public in science.



A couple of comments were:

“Many of our colleagues don't have time to participate” (CEMES, France)

“We are under too much pressure at work”. (CEMES, France)

“These activities don't help our professional career although some scientists receive some extra money for doing them”. (DIPC, Spain)

“To be honest, at this centre we are not very active in these activities”. (CSME, UK)

“One or two scientists from here really participate; although in the open day all of us have to participate...”. (CSME, UK)

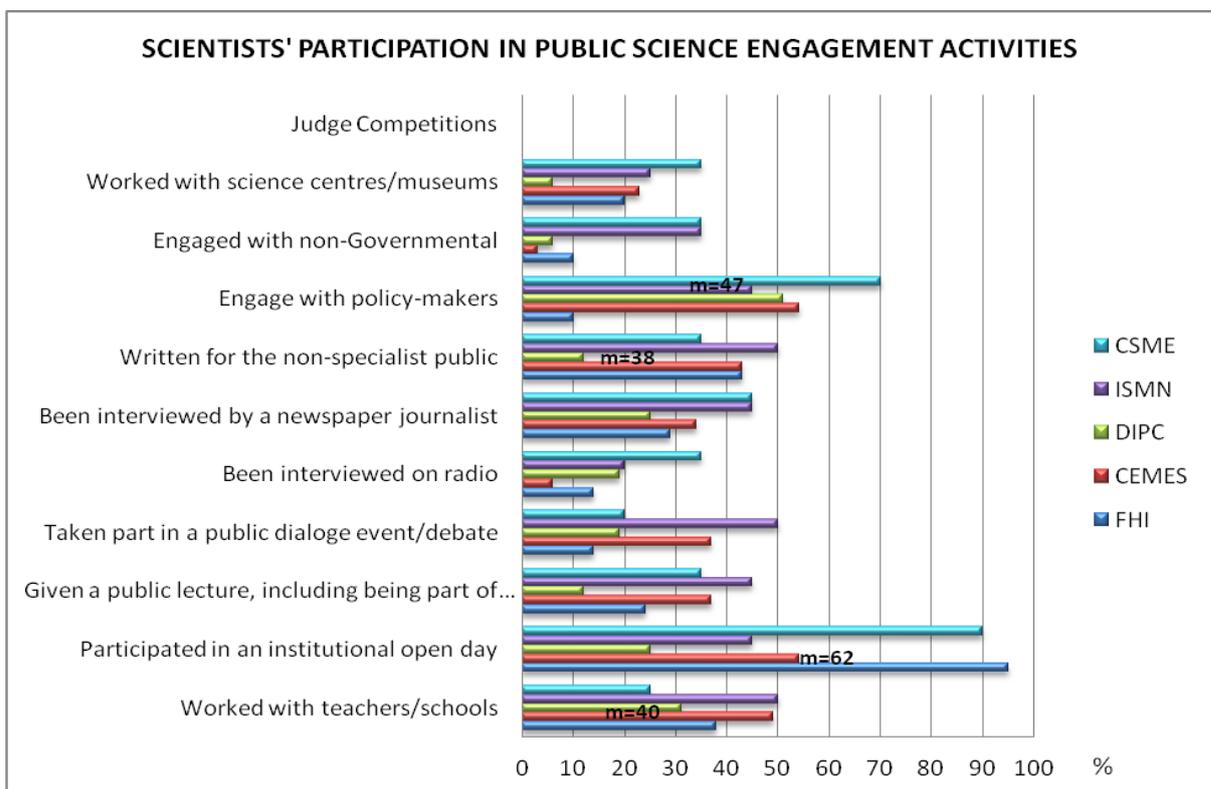
Main public scientists' activities

The amount of scientists' participation in public engagement activity varied by country; 95% of scientists at the FHI, Germany and 90% of scientists at CMSE

UK reported they had participated in some public engagement activity. Meanwhile 54% of scientists at CEMES, France; 50% of scientists at ISMN, Italy; and 31% of scientists at DIPC, Spain took part in some activity.

Scientists of the five Institutes had been involved in public engagement activities, mainly:

- participated in an institutional open day
- engaged with policy-makers
- worked with teachers and schools, and
- written for the non-specialists public



Distribution of responses (%) by research centre, and the relevant average scores (m) obtained by item. See tables in the Appendixes (p.249) for a breakdown of responses by centre.

The results show that each institution had its own policy or tendency towards public activities.

“Here you have to participate in the open day in order to attract students...” (CMSE, UK)

“I have been participating at the open day because it is obligatory for us...” (CMSE, UK)

“I didn’t participate in the Institutional open day because there was no funding”.(CEMES, France)

“This is a critical period for the French scientific community which is under extreme pressure. Productivity between scientific groups is extremely competitive. There is much more to do and constant difficulty finding more funds for our research, publishing papers...If this current situation perpetuates future research will be in danger”. (CEMES, France)

The Institutional open day is part of the regular activities at FHI (Berlin), CEMES (Toulouse) and CMSE (United Kingdom). Also, meetings with politicians or the business community is a common activity in the five institutions, including ISMN (Italy) and DIPC (Spain).

Scientists indicated that receiving awards, the publication of an article in prestigious scientific magazines and having an attractive research or discovery are conventional promoters of different public engagement activities such as interviews, notes in newspapers, magazines, participations on television and radio, and public lectures.

“When I received a prize I was interviewed more than 5 times...”. (ISMN, Italy)

“In the past I was working in very interesting research for the people so I participated in many public activities; but my current research is not very interesting to them. Nevertheless, when you try to get funds you publicize your research...” (CMSE, UK)

Some respondents from Toulouse and Berlin indicated that they had been involved in these kinds of activities because they are members of scientific or

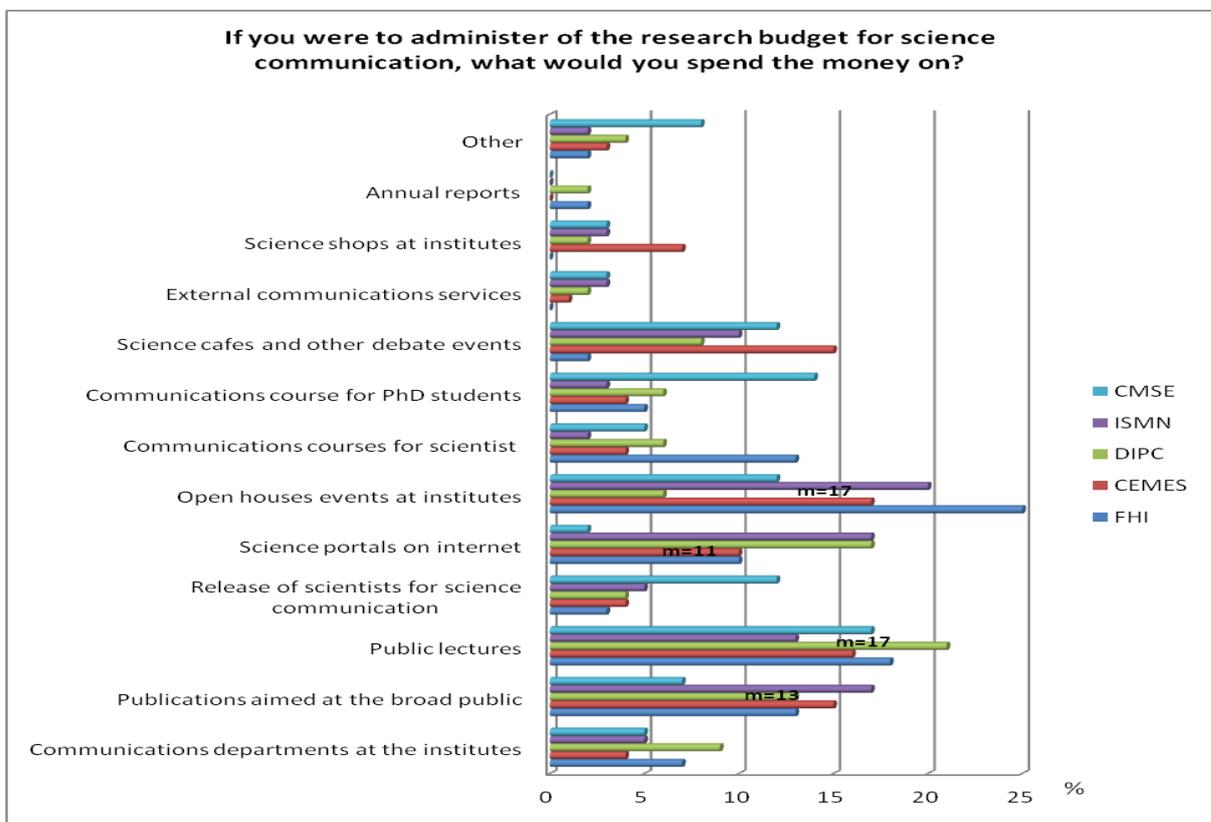
civil societies which promote engagement with the general public, such as the society of physics, etc.

“I have been collaborating for 10 years in a kindergarten science programme. I am convinced how important it is for young people to have contact with science”. (FHI, Berlin)

Scientists’ preferences on support of public activities

Scientists indicated as preferences on public science communication activities in which they would spend money on were:

- Open house
- Public lectures
- Publications aimed at the broad public, and
- Science portals



Distribution of responses (%) by research centre, and the relevant average scores (m) obtained by item. See tables in the Appendixes (p.249) for a breakdown of responses by centre.

Other projects mentioned were spending money on free access to magazines such as Nature or Science; support debates on television, production of documentaries, movies, projects in schools and art projects.

“Open day events demonstrate the reality of applied science...the science cafes for example, only provide a stage for vainglorious chats”.
(CEMES, France)

“There is the necessity for a project or strategy to really promote science so that people become interested in it. Something in the mass media, for example. They talk about many silly things and they could talk about some science information as well.” (DIPC, Spain)

“There have to be projects that match science with culture and with arts: literature, for example. This is the way to show the real position of science. But it is important that these initiatives come from the scientific side.”(DIPC, Spain)

On the subject of supporting **communications departments** at the Institutes, some respondents expressed doubts about it because they considered that these departments are usually often poorly structured and without experts in charge, who are able to understand scientists' needs. Moreover, a communication department spends a lot of money.

“The public relations office of internal departments in research institutes are not run by professionals. It is more efficient to contact the services of dedicated external public relations experts to carry out public scientific communication”. (CEMES, France)

“The communications departments at the institutes are important but they spend a lot of money and I am not sure about it.”(DIPC, Spain)

“The communication departments of institutes put a lot of pressure onto scientists. They want to have their own agendas without consulting us.

What we need are events which really make changes in society. I think oral events have big impact.” (DIPC, Spain)

“It is necessary for only one professional to be in charge on these activities, not an administrator but someone who promotes the activity and works along with the scientists, making contacts and simplifying the work...” (CMSE, UK)

“We need scientist as expert communicators in charge of the communication departments, not just communicators. We need people really involved in science, who understand it. The communications departments are a disaster, they spend a lot of money, and put a lot of pressure on the administration...we don't need to increase the administrator's staff...” (CMSE, UK)

“Maybe with external communications departments there would be more possibilities...” (CMSE, UK)

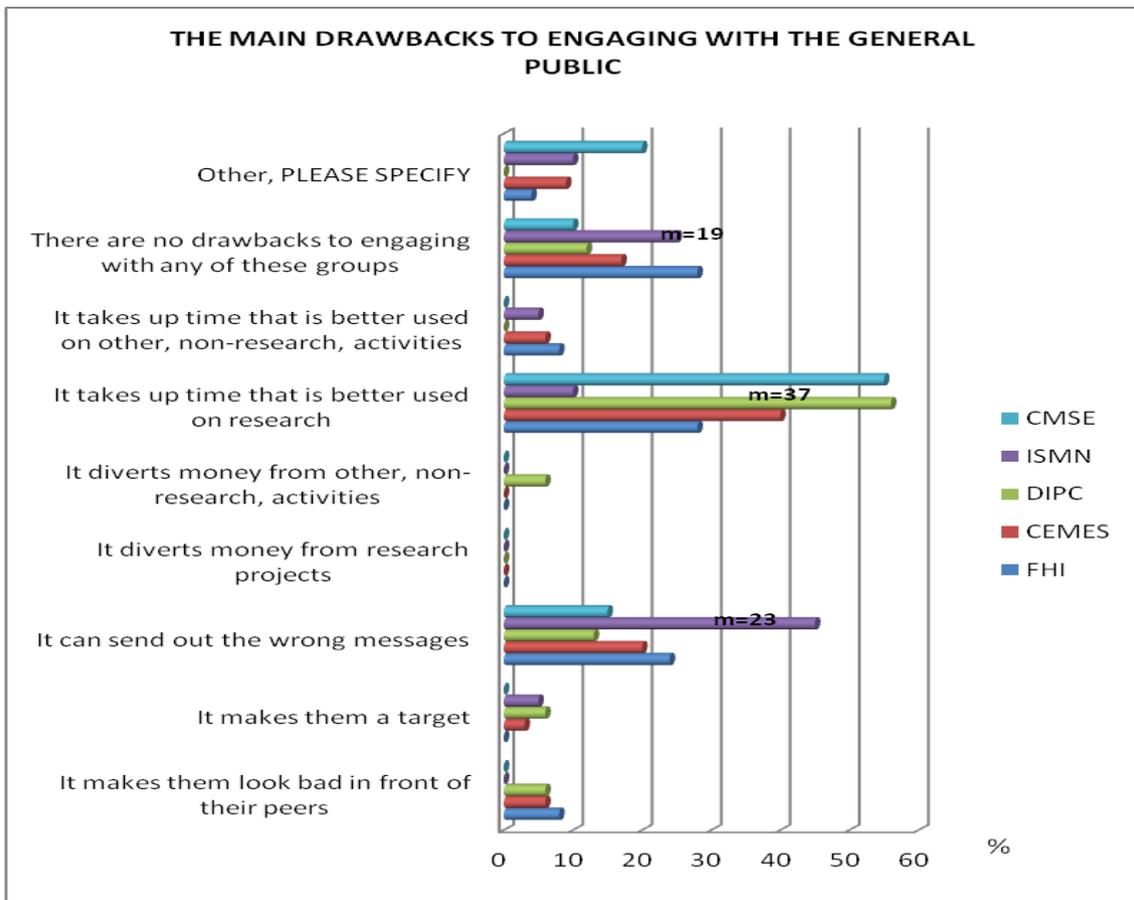
“I know we need professionals in communication because I am not going to do their work, but I would prefer that the money was spent on research...” (CEMES, France)

5.3. BARRIERS TO SCIENCE COMMUNICATION

Drawbacks to engagement

Scientists considered the main drawbacks to engaging with the non-specialists public as follows:

- takes up time that is better used on research
- sends out wrong messages
- no drawbacks



Distribution of responses (%) by research centre, and the relevant average scores (m) obtained by item. See tables in the Appendixes (p.249) for a breakdown of responses by centre.

Scientists pointed out that for them public science communication activity is a **lesser priority**, which also involves **extra work** and **entails time**.

“I think it is very arrogant to say that this activity takes up time for research. The real point is that this activity is a lesser priority...” (CMSE, UK)

“We are more interested in our research and promotion...” (CMSE, UK)

“If you want to do these activities right, they take up time...” (ISMN, Italy)

“We don’t have tools to engage with the public and there is a fear that they would not understand us and a fear of appearing ridiculous” (DIPC, Spain)

“There is no drawback really; however, these activities take time, effort and it is not rewarded, and not paid.” (DIPC, Spain)

Other obstacles that researchers mentioned with regard to engagement activities were: these activities are not **recognized**; that there is a **lack of support and training**; and that there is a difficult **relationship with the media**.

“This activity does not have a value and we lack time...My colleagues say that to participate is a waste of time because it is not part of the promotion system.” (CMSE, UK)

“To participate or be involved in these activities does not look good inside the scientific community because it looks like you are not paying sufficient attention to your research” (DIPC, Spain)

“Institutions encourage participation in public engagement but do not recognise these as beneficial, attributing more importance to the production of research papers and research findings” (CEMES, France)

“It is difficult to manage with the gap between the ignorance of the people and our inefficacy of show our results...” (CMSE, UK)

“We are not expert communicators and it is difficult to do it...” (CMSE, UK)

“We don’t have the tools to communicate with the people” (CEMES, France)

“We are really busy; therefore it is relevant that there should be a professional to be in charge of these activities” (DIPC, Spain)

“There are many misunderstandings around this activity, with colleagues and the media.”

(CMSE, UK)

“The scientists’ relationship with journalists isn’t always a good one; they alter information or present it in a superficial way. So if you have a bad experience it discourages you from working with them again...The truth is we don’t have any training in dealing with them”. (FHI, Germany)

“It is difficult to participate with the mass media. The scientist is always presented as arrogant when we have to combat esoteric ideas or religious prejudices and false images about science, and we do not have the tools or training to do it.” (ISMN, Italy)

“The journalists generally do not understand what we say and they publish some distorted stories...and as a consequence our image is affected...” (ISMN, Italy)

“I don’t want to risk being manipulated by journalists or being ridiculed.” (CEMES, France)

“I prefer to have direct contact with the public; if you use the mass media, the journalists usually introduce mistakes...” (ISMN, Italy)

Other drawbacks that scientists mentioned were: that some research topics are more **difficult to explain**, and are less **interesting** than others.

“The specific details of my research are not important to the public and it is difficult for them to understand...” (FHI, Germany)

“Explaining physics to the public is difficult”. (FHI, Germany)

“It is not about wasting money on engagement activities [diverts money from research] However, if the research project is not outstanding, what will we communicate?” (CEMES, France)

“I like to talk in detail about my research but the people do not need to know about it. You can often send out the wrong message. I think it is easier and more relevant to talk about science in general and some important processes...” (CEMES, France)

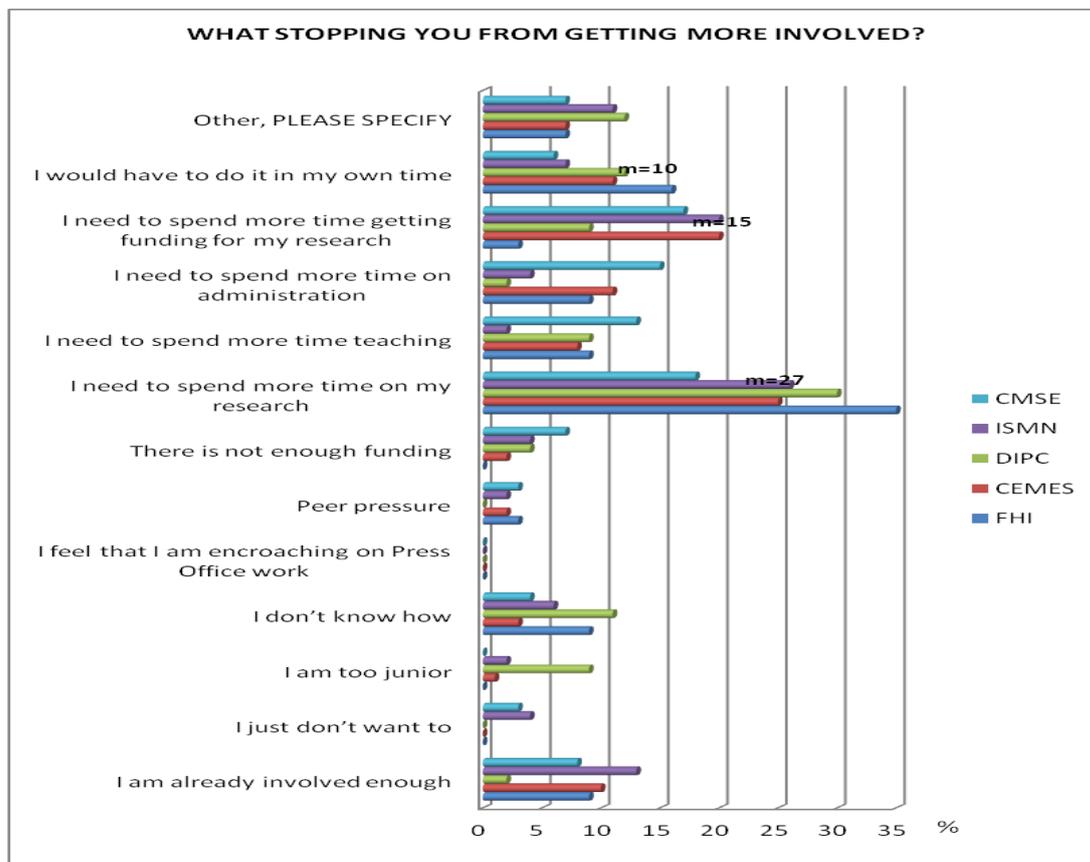
Also researchers asserted that the current **economic situation** in their countries and a **weak position at work** make it difficult to participate in public engagement activities.

“The current climate for the scientific community in France is difficult. There is great pressure to secure funding and publish research findings; this is what takes up all the time at the moment”. (CEMES, France)

Disincentives from getting more involved

When asked about what was stopping scientists from getting more involved in engagement activities, their answers were:

- having to spend more time on research
- having to spend time getting funds
- would have to do it in their own time



Distribution of responses (%) by research centre, and the relevant average scores (m) obtained by item. See tables in the Appendixes (p.249) for a breakdown of responses by centre.

The researchers once again asserted that their first **priority is the research** or matters around it such as teaching and administrative work, and that they lacked the time to attend to public communication activities.

“I have got other priorities...” (CEMES, France)

“I am under high pressure at the moment, I am a head of a team, and have got students too...” (CEMES, France)

“If I did not have so much administrative work to do then maybe I could find the time.” (CEMES, France)

“Finding time is the problem...” (ISMN, Italy)

“The problem is how this activity fits in with the daily scientific work, because there is not time, and in the end the time to do this is from our own time...”(DIPC, Spain)

“I do not have enough time to do it...”(CMSE, UK)

Researchers insisted that what was preventing them getting more involved in public science communication activities included: the **lack of recognition, training, institutional organization and invitations.**

“I don’t feel there is recognition for doing this...and help about professional promotion” (CMSE, UK)

“The problem is that these activities are not recognized, and we have a lot of pressure keeping our position and writing papers... (DIPC, Spain)

“My opinion is that it is a waste of time, this activity is not paid or rewarded, and not many people understand it anyway...” (ISMN, Italy)

“It is not clear what the benefits are, apart from promoting scientific careers for young people. Also, these activities are complicated - the messages or images which we are sending, may not be clear or may be wrong...” (DIPC, Spain)

“I don’t have any training to do it” (CEMES, France)

“There are colleagues who are doing these kinds of activities very well, so I prefer them to still do that...” (CMSE, UK)

“There is not a structure to be involved in. There are not many options, events to participate in, for example.” (DIPC, Spain)

“This activity is important, therefore there has to be a structure to support it; and we have to participate to create what it is necessary...”(ISMN, Italy)

My priority is my research and there is no more time for other things. However, I do not have invitations to participate in this kind of activity; it is not organised well here". (ISMN, Italy)

"I can do it, but there are no invitations and I won't go out to look for them..." (DIPC, Spain)

Being a **junior researcher** was also mentioned as a reason preventing more involvement.

"This is easier when you are older because you have things to tell and you are better known..." (ISMN, Italy)

"I am a junior researcher so you are more involved in your career as a scientist; furthermore this activity is done by the directors." (DIPC, Spain)

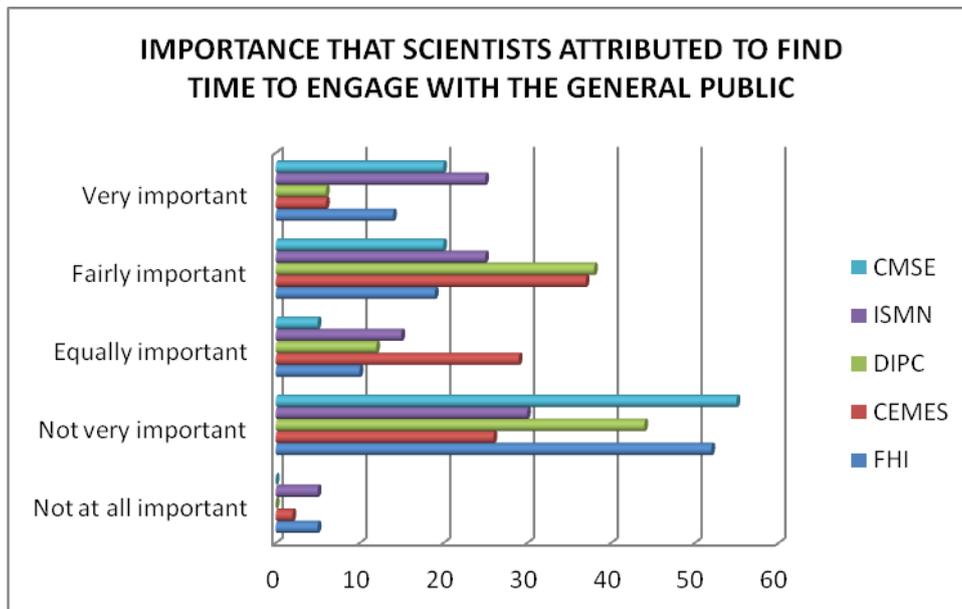
"I would like to do it but I am a junior researcher so I have got other priorities at the moment. Maybe in the future I will find time to be involved". (CEMES, France)

5.4. TRAINING AND DEMAND

Importance of finding time to engage

Regarding the importance that scientists attributed to finding time to engage with non-specialist public, the results showed diverse positions by country.

Researchers from CEMES, France (72%), from ISMN, Italy (65%) and from DIPC, Spain (56%) gave importance to finding time to engage in activities while researchers from FHI Institute, Germany (52%) and from CMSE, UK (52%) declared that it was not very important.



Furthermore participants expressed the view that even when scientists considered this activity important, they had other important priorities such as finding funds and working on their promotion;

“Nowadays these activities are more and more important, the people want to know more, become more aware and become more involved in the decisions. So it is necessary to explain the nature of science”(CEMES, France)

“Of course I think this activity is important but in daily life you are in your own research which is very demanding” (DIPC, Spain)

“In theory this activity is equally important but in practice it is not so important. However, I have participated on a few occasions.”(DIPC, Spain)

“Although I consider this activity to be equally important with my research, to be honest, it is not a priority” (CEMES, France)

“This is not in my list of priorities, it is even difficult for me find time to do any sports, for example...” (DIPC, Spain)

“In first place is my scientific career and then, if there is time, it is possible to participate” (ISMN, Italy)

*“Of course it is important, but most of the time I am at the laboratory...”
(ISMN, Italy)*

“It is relevant. However, I cannot do everything and the most important thing is my research...”(CMSE, UK)

Some of the researchers stated the importance of finding time for public engagement in relation either to their own accountability in terms of how public research funds are spent, or to the promotion of their own research.

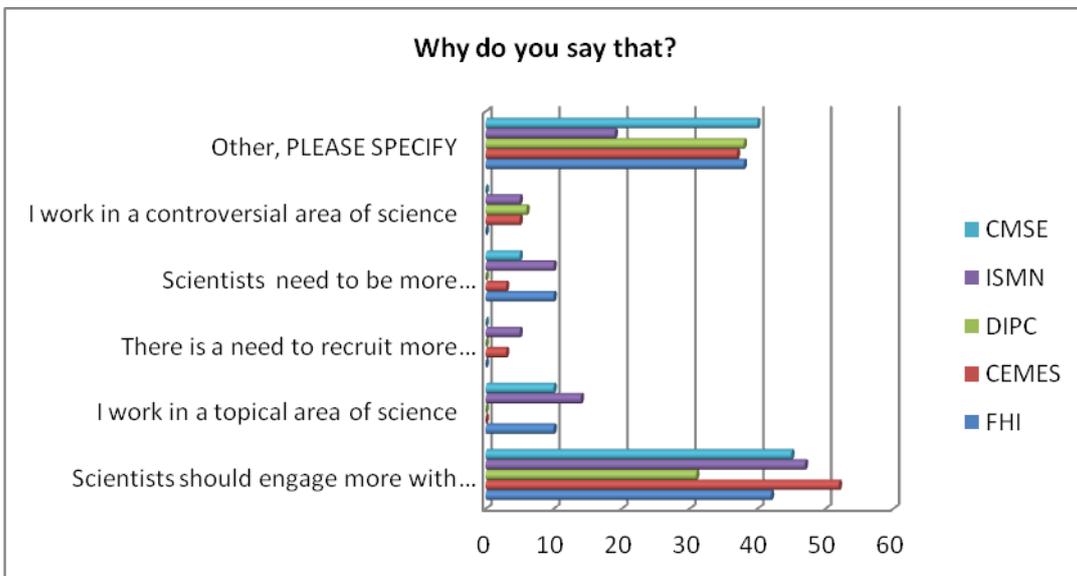
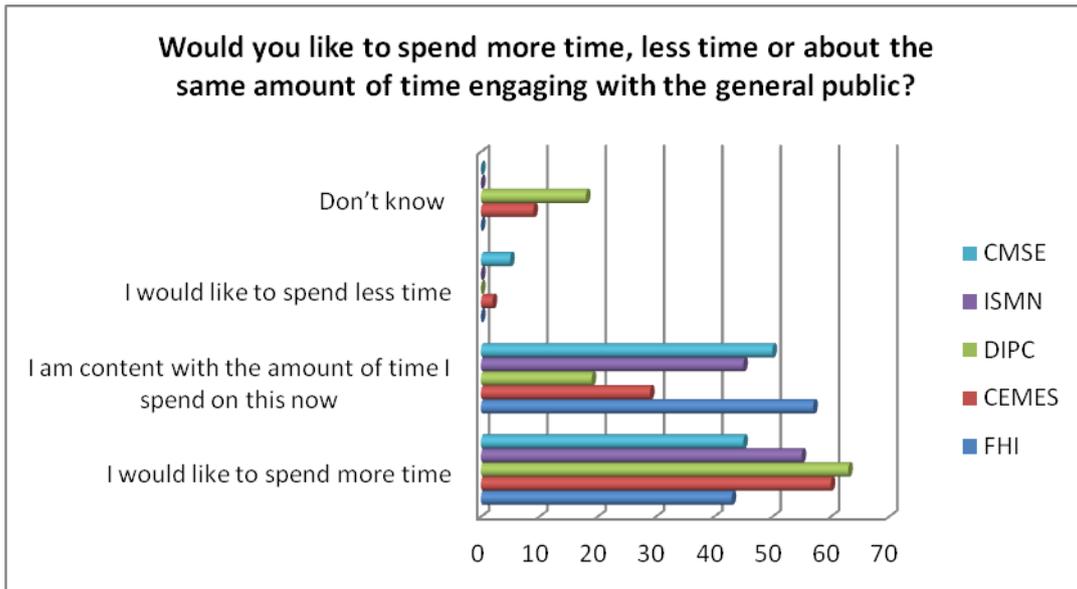
“My research is supported by funds from a governmental organization therefore it is so important to promote what we are doing” (CMSE, UK)

“It is important when you need to create interest in your area, or if your area becomes a target in the media” (ISMN, Italy)

Would you like to spend more time?

To the question about researchers spending more time engaging with the non-specialist public about science, their answers were:

Scientists from DIPC, Spain (63%); CEMES, France (60%) and from ISMN, Italy (55%) asserted that they would like to spend more time. While scientists from FHI, Berlin (57%) and CMSE, UK (50%) indicated that they were content with the amount of time they spent on this.



Half of the respondents agreed that scientists should engage more with the community. They explained that they would like spend more time because of a personal and scientific responsibility towards society and also because nowadays it's important to protect basic research and science from political interference such as cuts in public funds, myths that the mass media promote, etc.

“It is important to give the right messages regarding scientific work, as in why it is fundamental to do basic research. This is vital especially when dealing with politicians...” (CEMES, France)

“Communicating science is part of my work and my mission. We can avoid misunderstandings, in nanotechnology for example, if we answer public queries”. (CEMES, France)

“After all the alarming information regarding genetically modified organism, nuclear energy and risks associated with nanotechnology, I feel a lot of responsibility to give clear explanations concerning these topics...” (CEMES, France)

“We need to allay public fear and encourage young people and women to be interested in scientific careers”.(CEMES, France)

“I have been writing articles for the general public and have been involved with young people since I started my career; it is something which I really like”. (CEMES, France)

“I participate in scientific public debates for reasons of philanthropy”. (CEMES, France)

“Nowadays there are myths spreading about science in order to get more funds. It is portrayed as making miracles and this is exaggerated; we need to explain its limits. Likewise some knowledge is not diffuse, it is kept only to a few privileged people.”(DIPC, Spain)

“In my view this activity should be part of scientific work and then we would be able to participate...” (DIPC, Spain)

“To the public science is a black box so we have to open it up to them; they need to know what we are doing...” (DIPC, Spain)

“We have a commitment to society. The funds come from them and they have to know how we are using their money. But also for relevant political decisions, politicians need to listen to the voice of the scientists. So politicians and scientists must engage with each other.”(DIPC, Spain)

“Scientists have to be more involved in social debates, not only because we need funds, but what’s more we have a high responsibility for the kind of work we are doing...” (DIPC, Spain)

Some of the opinions from scientists who were content or did not want to be more involved in engagement activities, explained again in this point that they have **other priorities** such as promoting their own careers, finding funds and attending to students; They also referred to the **difficulties** that this activity involves such as **taking up time**, the **need for special skills**, the **lack of recognition and the lack of funds and support**.

“The research is hard work, it takes a lot of time and we are often under high pressure. Engaging with the public takes time and sometimes people find it hard to understand us.” (FHI, Germany)

“It is more important to find funds for research than attempting to explain our research to the public”. (FHI, Germany)

“Yes, I would like to spend more time...but I would have to limit other important activities” (CEMES, France)

“It is not that this is not important, it is that I don’t have time...” (ISMN, Italy)

“There is a need for structures which support these kinds of activities, specialists with the tools to do it and to help us, because our priority is the research” (ISMN, Italy)

“My priorities are to get more students and funding for my research. I would love to get more involved with the public, but my research comes first and therefore I do not have time”. (CEMES, France)

“If I give part of my time to this activity then I spend less time doing research and my promotion will be at risk. I would like to engage with the public but the problem is finding time to do it” (CEMES, France)

“To me it is not important because I need to invest in my career as a scientist, to get a permanent position. I will not receive any promotion with these activities.” (DIPC, Spain)

“I am a researcher so I like to dedicate my time to my research” (CMSE, UK)

“Maybe in the future; but currently it is not good for my career. I prefer to do other things...”(ISMN, Italy)

“The problem is time; I am involved in four research projects at the moment...”(DIPC, Spain)

“It is not part of my obligations because the scientific system itself makes it difficult to participate at the moment. We have to write papers and there is not much for other activities”. (DIPC, Spain)

“If we have invitations we usually participate, if not we are working on our research, and this is the best benefit which we can give to society –the benefit of good research. We are not bad scientists if we cannot be involved with the public. Furthermore, journalists and the public are only interested in applications. It means they only want to know about what the engineers are doing...” (DIPC, Spain)

“This activity is important, scientific awareness is part of the culture and society, so we should engage with the public, but in reality we do not have time to do so”.(CEMES, France)

“I think this depends on whether you have something to tell...” (DIPC, Spain)

“It is not easy to communicate science to the public: sometimes the message is not true, and we are not helping because we are not giving attractive messages, either...” (DIPC, Spain)

“I am working in a special area in which you can talk with specialists but it is difficult with the general public. It requires special skills to do it so there needs to be professionals working in this area. (CMSE, UK)

“I would like to participate more if it was easier but the point is you need training and more...” (CMSE, UK)

“It is difficult to work with the gap between people and research, because we manage different languages and I do not feel that the public is really interested in science.”(CMSE, UK)

“We are under pressure about our research and this activity does not have recognition.” (CMSE, UK)

“To participate or not depends on the circumstances: if you have support or you have to do it, if there are invitations, etc...” (DIPC, Spain)

“There needs to be a stimulus to this activity, motivations, money, something, but there is not much.” (CMSE, UK)

How difficult or easy is it to get involved?

To the question how easy or difficult it is to get involved in science engagement activities for those who want to do so, the answers were:

Researchers from CMSE, UK (65%), FHI, Germany (62%), and CEMES, France (57%) expressed that it is easy. Whereas researchers from ISMN, Italy (50%) said that it is difficult. Researchers from DIPC, Spain had divided opinions, 38% of respondents said it is easy, and 38% that it is difficult.



From their point of view, it is **easy** to get involved in these activities if there is the **will to do it**, **have experience** in these activities, **time**, **support** and **funds**, and **invitations** to do it.

“It is easy if you want to do it” (CEMES, France)

*“It is easy, because I am teaching and talking to students all the time”.
(CEMES, France)*

“It is easy, if you want to participate there are options; but time and recognition are involved so if my salary depends upon scientific production, this is my priority.”(DIPC, Spain)

“I like to talk in detail about my research but the public do not need to know about it. You can often send out the wrong message. I think it is easier and more relevant to talk about science in general and some important processes... Actually, we need a bridge between the scientific community and society...” (CEMES, France)

*“It is not difficult to do, what it is difficult is finding the time to do it...”
(CEMES, France)*

“It is easy, although lack of experience it is a limitation, because dealing with difficult audiences could be hard.” (DIPC, Spain)

“Here it is easier, there is support and interest, and our director considers these activities are relevant.” (DIPC, Spain)

“For a few researchers maybe it is not very difficult, especially if there are funds to support activities. I think it is not especially difficult to do it, but it requires time and effort, the same as research demands.” (DIPC, Spain)

“There are many opportunities to do it. The Universities have professionals who try to make these activities easier...”(CMSE, UK)

“In this University it is easy because they organized several activities and training sessions.” (CMSE, UK)

“There are different programmes so it is only about whether you want to do it” (CMSE, UK)

“It is now easier to participate in these activities in the UK than 10 years ago because there are more opportunities. This change was originated to try to promote transparency, the development of the scientific profession and a scientific literacy useful to a democratic society.” (CMSE, UK)

“It is easy because there are departments with the tools to do it” (CMSE, UK)

“I think is easy if you want because there is much support. However it is difficult to find time and they do not pay for doing it and there are not direct benefits to my work...” (CMSE, UK)

Regarding why it is **difficult** to get involved in public communication activities, some scientists recognized that because these **activities are different from teaching**, it **needs professionals** doing it. Furthermore they mentioned that the **lack of tools and training, experience, contacts, invitations, budget and support** are issues which makes it difficult to participate and can also result in a vulnerable work position.

“Engagement activities are complicated and it is necessary to have professionals to deal with them”. (FHI, Germany)

“It is important to indentify which objectives we need to reach because it is not about education, it is about communicating science”. (FHI, Germany)

“It is not easy; there are a few things which get in the way of this activity. However, we need to go out and work with the public. It is important to spread ideas even if they lose some exactitude or precision: we need to be more flexible about this. Public science communication is not about just giving a lesson.” (DIPC, Spain)

“It is difficult to find time to do it because it is not part of scientific work, it is an extra activity” (CEMES, France)

“You need to make special efforts to be involved...” (CEMSE, UK)

“There are a lot of concepts difficult to explain and understand; you need to find the right words and images to help you” (CEMES, France)

“To talk to people you need to find the right language. It is sometimes difficult to simplify scientific language in order to make the subject understandable and right...it is also important not to be boring...” (CEMES, France)

“It is difficult. I tried before and really it is difficult; Scientists are not ready to do this, to transform scientific information with simple word; moreover people have a lot prejudices. Within the scientific profession there is not any training about this.” (DIPC, Spain)

“Scientists use technical language and simplifying it for people is difficult...”(ISMN, Italy)

“It is difficult because we need to make the effort to change the language, change it to popular language in order for people to understand us...” (ISMN, Italy)

“It is necessary to have a scientific background and the capacity to project it in two languages: scientific and popular.” (ISMN, Italy)

“We don’t have the tools to explain to the general public what we are doing. We are educated in scientific terms. What’s more, these kinds of activities seem like second class: if you are doing them, there can be suspicion about your qualifications as a scientist”. (ISMN, Italy)

“It is difficult because there are not the right mechanisms and infrastructure to support this activity. One example is when there is a conflict and the media need you...”(CEMSE, UK)

“It would be easier if you have assistance” (CEMES, France)

“You need time, to find out about the audience...The research is complex and difficult to communicate and I don’t have the tools to do it” (CEMES, France)

“It is difficult; I think sometimes we only frighten people and then the objective is not achieved. We do not know about the public reaction...” (CEMSE, UK)

“Audience are different and this makes it difficult. To try to find a way to make something interesting is difficult too...” (CEMSE, UK)

“It is difficult to have contact with the public. I am not famous, nor is my research, so how can there be contact?” (ISMN, Italy)

“In this country our opinion is not important; we are not invited to the important national discussions.” (ISMN, Italy)

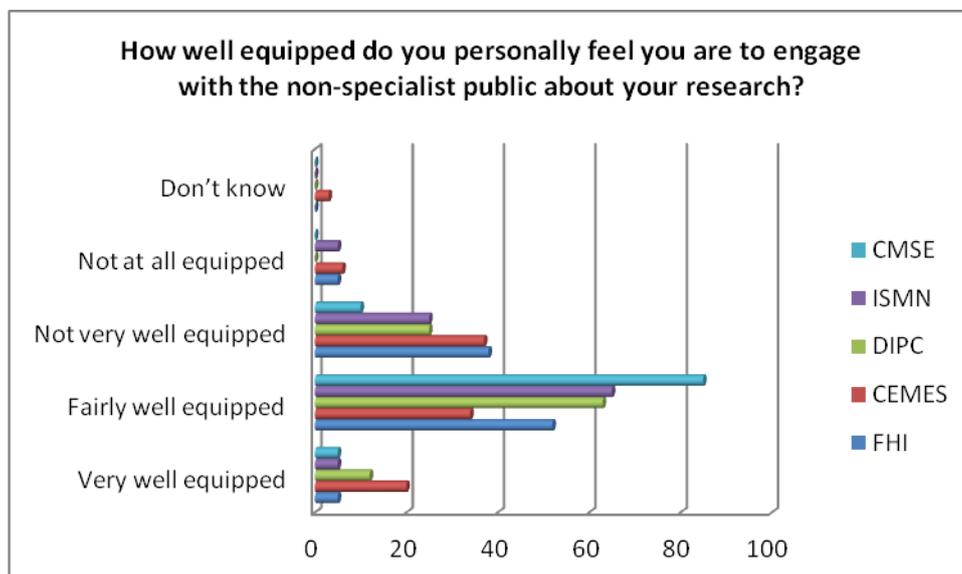
“I think access is limited, moreover talking with people, even with politicians, does not change anything” (ISMN, Italy)

“It is difficult if we consider the political and economic situations; we don't have permanent positions; also our projects are short term.” (ISMN, Italy)

Equipped to engage

Concerning how Scientists personally felt equipped to engage with the non-specialist public about their research:

Most scientists agreed that they are well equipped: 90% in CEMSE, UK, 75% DIPC, Spain, 70% ISMN, Italy. However in Germany and France the proportion of acceptance was less, 57% FHI, Germany, 54% CEMES, France.



Some scientists remarked that even though they do not have any training, they can engage with the general public.

“There is not any training during our scientific career, so it is difficult to explain science with simple words. But we learn a few rules”. (FHI, Germany)

“I feel I can communicate because I can talk with my family or friends about my research for example...” (FHI, Germany)

“My research it is close to people, it is part of their daily live so it is easier to talk about it” (CEMES, France)

“I have been a teacher so it that helps. Furthermore I am interested in this activity” (DIPC, Spain)

“I can do it but I need time to prepare my presentations”. (DIPC, Spain)

“I can do it well, even though I am a little shy and I am not a charismatic speaker. It is about practise...” (DIPC, Spain)

“I can talk with the general public and they listen. Journalists on the other hand question me as if they already know everything but they do not”. (CEMES, France)

“Public communication is different work; it doesn't use the same methods which we use in the education system...And in some areas it is difficult to present interesting topics”. (CEMES, France)

“I have never tried to do it before, so I do not know how I would do it”(CEMES, France)

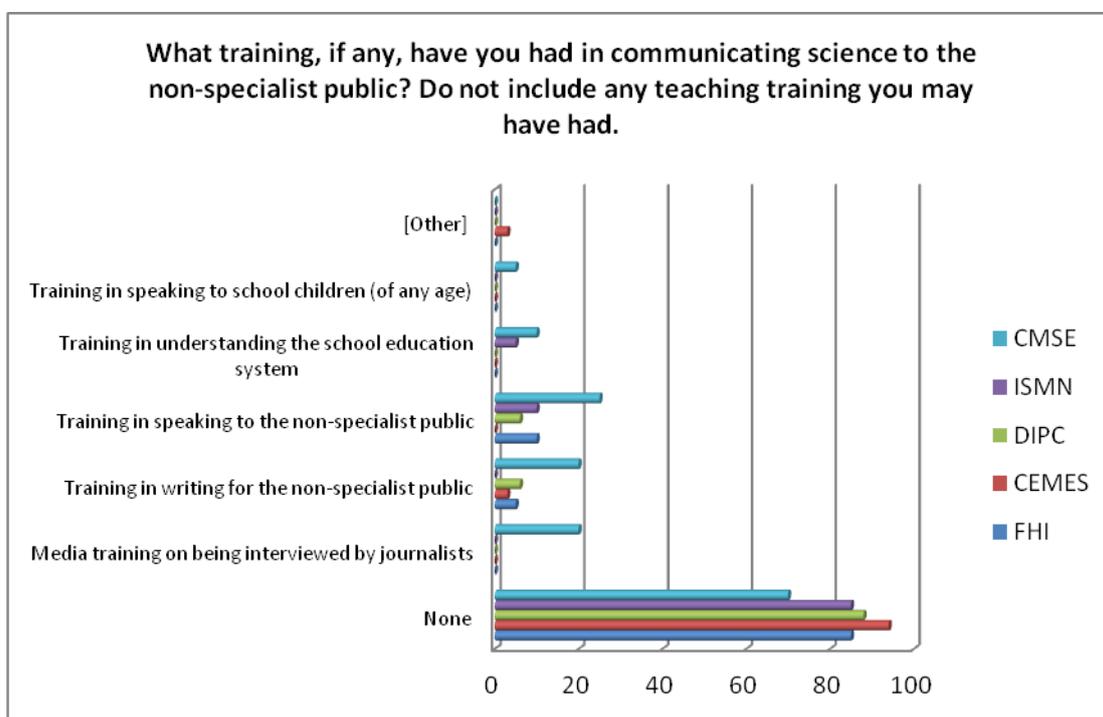
“I do not have the tools to give simple messages”(CEMES, France)

“I have never received any training before; the Institution has not provided any”.(CEMES, France)

“Sometimes it is easy to give simple explanations; however, finding an interested public is more difficult”.(CEMES, France)

Training in public communication of science

Specifically, on training in communicating science to general public, most the scientists of the institutes accepted they **do not have training** in public communication of science: 94% from CEMES, France; 88% from DIPC, Spain; 85% from FHI, Germany; 85% ISMN, Italy. However 53% of researchers from CEMSE, UK mentioned they had had training in communicating science.



Some of the researchers said that even though they did not have training they would **be able to communicate** with the general public because practical experience has given them some tools to do it. A few participants also reckoned that if they had any **training** in public communication of science it **would help** them.

“The experience of teaching helps us to communicate with the non-specialists public as well”. (FHI, Germany)

“My training is empirical; I have had contacts with journalists, and given chats and worked with kids” (CEMES, France)

“I do not have any training but I have the tools with which to communicate and have done so, I really like this activity”. (CEMES, France)

“I have not had any training but I am working on a new collection of books for the general public at the moment”. (CEMES, France)

“I have got experience working with kids and I am part of the team of a crystallography exhibition at the museum”. (CEMES, France)

“It is not necessary to have any training; it is possible to do it. In truth I believe that the specialists are not so good because they simplify too much and this can be dangerous...” (CEMES, France)

“The very good scientists can communicate well with the public because they have passion and experience in their field. I support the idea that practice is the best training.” (DIPC, Spain)

“Not having any training has been a problem because it would help.” (DIPC, Spain)

Researchers from CEMSE, UK mentioned they had taken their courses at various places such as Edinburgh University, at Australian University, at the Royal Society in London during the month of science, and as part of postgraduate courses in Germany. Also, scientists from other research institutes said they had taken training as part of their postgraduate courses.

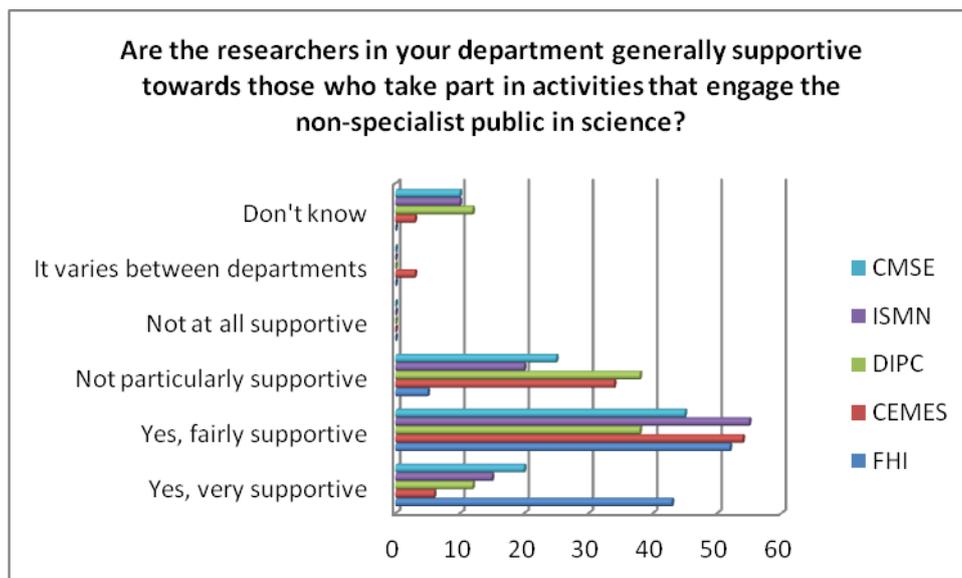
“My training was part of my postgraduate course” (FHI, Germany)

“I do not have any training, because there are no providers here.”(DIPC, Spain)

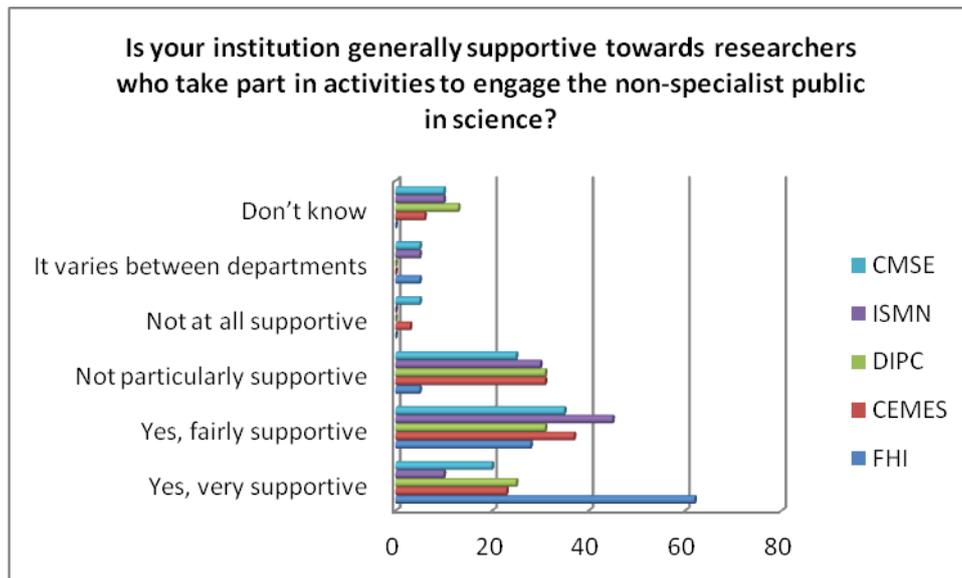
“I took these courses as part of my PhD in Liverpool” (DIPC, Spain)

Institutional Support and from colleagues

Regarding colleagues support towards those who take part in public communication activities, most of the researchers of the five institutions agreed that their fellow **scientists are fairly supportive** towards those who take part in these activities.



Likewise, concerning the support of their institutions towards researchers who are involved in these activities, most of the respondents from the five research centres agreed that their institutions are **fairly supportive**.



Nevertheless, despite positive opinions about the institutional support, scientists added that this **support** most of the time is **moral** but does not come with funds or professional recognition. Also some researchers mentioned that being involved in public communication activities **could cause difficulties** in dealing with directors or heads of departments.

“This institution is supportive, but not with funds or money...” (DIPC, Spain)

“Well, the institution doesn’t support with any money but they give moral support. Nowadays we feel the economic crisis, our situation is not good, so there are strict priorities, especially on how we can spend the money...” (ISMN, Italy)

“The institution says it is important but the fact is that these activities do not have any value.” (CMSE, UK)

“These activities are considered as third order in priority”(CMSE, UK)

“We participate in the open day in order to get funds for the university...” (CMSE, UK)

“The boss will say, yes go ahead, but when in future I want promotion those activities are not valued” (CMSE, UK)

“When I wanted to participate in the production of a book for the non-specialist public, the institution asked if I was trying to leave my scientific career”. (FHI, Germany)

“I think that my institution is fairly supportive of some participation with non-specialist groups; however if too much time is spent on outside groups there could be a reprimand”. (CEMES, France)

“The CNRS supports many initiatives that involve the non-specialist public. This can be problematic with reference to young researchers who are still developing their careers. The more mature scientists tend to have more freedom, and have already made a name for themselves, so find it easier to participate. I am at the end of my career, so have no problems”. (CEMES, France)

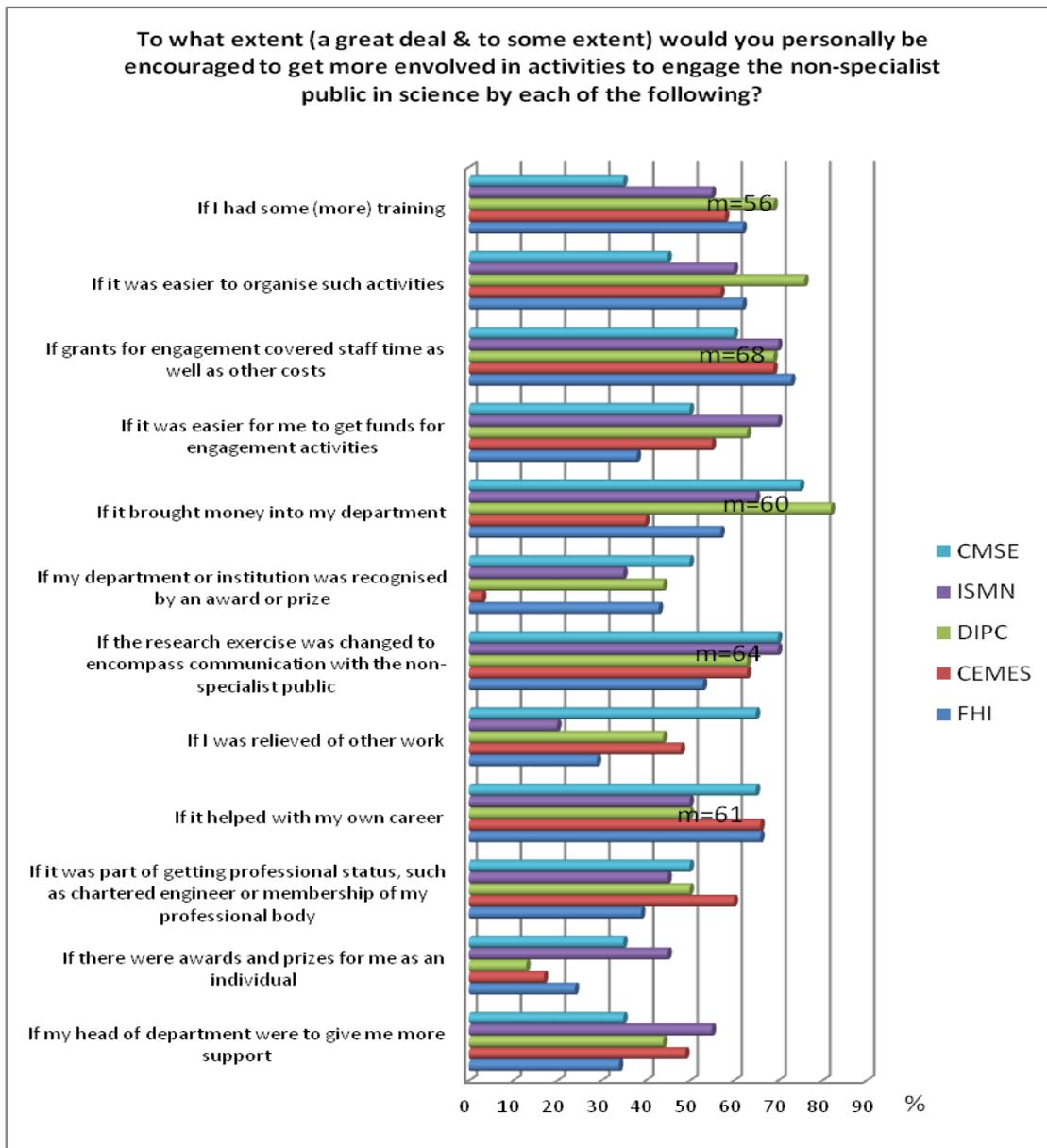
5.5. INCENTIVES FOR SCIENCE COMMUNICATION.

Encouragement to engage

On the subject of to what extent scientists would be encouraged to get more involved in activities to engage the non-specialist public in science, the top incentives were (in order of importance):

- Grants for engagement covering staff time as well as other costs.
- Research assessment exercises being changed to encompass communication with the non-specialist public.
- It helped with their career.
- It brought money into their department.

Also, for scientists from the FHI Institute and DIPC, Spain, having some training was regarded as important.



Distribution of responses (%) by research centre, and the relevant average scores (m) obtained by item. See tables in the Appendixes (p.249) for a breakdown of responses by centre.

Some scientists pointed out that public communication of science is considered a **second priority** activity; including awards and prizes related to engagement with the general public. There is suspicion also that recognition of this activity could **damage scientific research**. Some comments included:

“My main concern is scientific research” (FHI, Germany)

“These awards are not relevant for the scientific community”. (FHI, Germany)

“Time for my research is my priority...” (CMSE, UK)

“I would like be relieved of other work but not from my research...” (CMSE, UK)

“I need people and funds to do my research mainly...” (CMSE, UK)

“The recognition of this activity is good. However, it could also be dangerous, as one researcher may have excellent communication skills and yet be a poor researcher; his final objective should always be to become a good researcher”.(CEMES, France)

“I am in that stage of my career and of an age in which I don’t win or lose anything if I am involved in these activities”. (DIPC, Spain)

“There are no real motivations for scientists to be involved. It is not true that it helps my scientific career. Taking time away from research is not helpful, it could affect scientific work. Furthermore a scientist does not have to be a great communicator. However, if there are more invitations we will participate”. (DIPC, Spain)

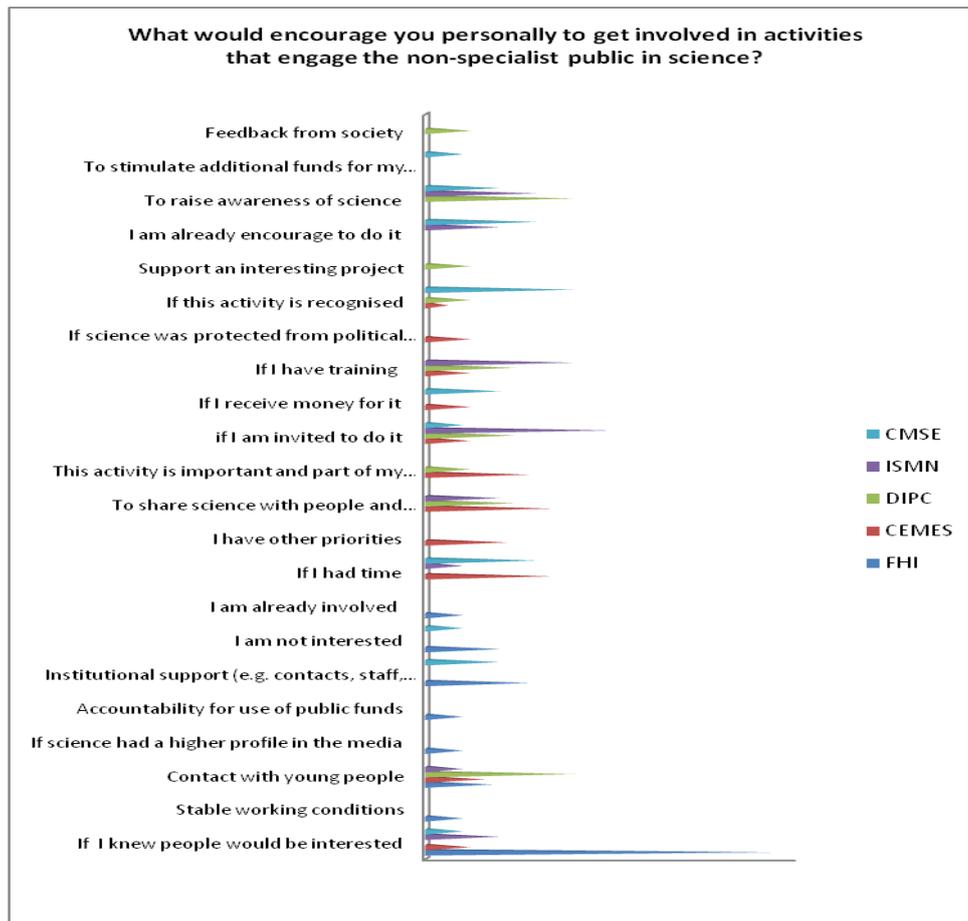
One participant remarked that interaction with society must in itself be interesting for scientists:

“The most important thing to encourage must be feedback from society, because this participation helps scientific research, this interaction must be part of our scientific work...” (CMSE, UK)

In their own terms

The following summarise the reasons that scientists expressed in their own terms of what encouraged them to get involved in activities that engage the general public in science:

1. Knowing people would be interested.
2. Sharing science with people in order to ensure they are better informed and raising awareness of science.
3. Having time
4. Having invitations to participate.
5. The activity is recognized
6. Having training
7. Contact with young people
8. Others (money, funds, staff, contacts, stable work conditions, higher profile in the media, defence of science).
9. Encouraged already



Visualizing qualitative information. Volume of answers obtained by centre.

Knowing people would be interested.

For some scientists it is encouraging to know that there are people who are interested in their research or in scientific subjects in general, if only they would come and ask them. They explained:

“I am willing to participate and give interviews to journalists but I won’t initiate contact with them. These activities are important but a lot of the time people are not really interested and it is really discouraging”. (FHI, Germany)

“If people show an interest this is encouraging and interaction becomes easier. It is just what we want”. (FHI, Germany)

“I like to see people interested and would be happy if science communicators invited me to participate”. (FHI, Germany)

“If the journalists show interest it makes the task easier.”(FHI, Germany)

*“I do not have extraordinary research results to show the public but if someone asks for them, a journalist for example, I can explain it to them”.
(CEMES, France)*

*“I like to talk with people who are interested in science as a profession;
and discuss the advantages and disadvantages of it, for example...”
(DIPC, Spain)*

*“It is encouraging if there is interest, someone who wants to talk with
you...” (ISMN, Italy)*

“If there is an interest, if there is feedback from the people...” (ISMN, Italy)

“It is simple, if someone comes and asks me...”(CMSE, UK)

Sharing science with people in order to ensure they are better informed and raising awareness of science

Concerning sharing science with people, scientists said they want mainly to ensure that people are better informed and to raise awareness of science. In their own words:

*“To give people the other faces of science, simple concepts and words,
all those they need to know”. (CEMES, France)*

*“Ensure the public is well informed about science and technology and its
benefits to society and how our research impacts on scientific
work”.(CEMES, France)*

*“I love my work and I like to share what I am doing; the public is
important because they don’t understand what we are doing...”(CEMES,
France)*

*“To explain what scientific work is... what fundamental research is...; its repercussion for the future and why it is important to invest money in it.”
(CEMES, France)*

“It is relevant to explain the real place of science in culture and society; also its limits” (DIPC, Spain)

“That people know what we are doing, and show that we are close to them...”(DIPC, Spain)

“I consider it is a scientist’s duty to show their results to society because of the social and economic implications of science.” (DIPC, Spain)

“I would like to change something inside society, in public attitudes, to inform about benefits and limits; promote awareness, about new energy resources, or environmental issues for example; the scientist can help in this...” (ISMN, Italy)

“We are living in ‘the society of knowledge’, and there are various philosophical issues to confront. We have to be informing people about scientific progress, and future possibilities, but also raise the question of what kind of society we want to be, and what roles people should play in it.”(ISMN, Italy)

“It is important for scientists to explain what we are doing with simple words and persuade them about the enjoyment and benefits of doing science.” (CMSE, UK)

Having time

Some researchers mentioned that having time would encourage them to get involved in public communication activities and also to find the balance between their research priorities and public engagement activities.

“Time... I have got a lot of things to do, it’s difficult to find time to do it; I use my time to find funds for my research...” (CEMES, France)

“I really like this activity but I am busy and worried about finding funds to do my research at the moment” (CEMES, France)

“If I only could reduce the amount of work I do, the amount of reports...” (CEMES, France)

“I think this activity is important but I don’t have time to participate”.(CEMES, France)

“I am a young researcher and it is important for professional promotion. Nowadays these activities are recognized by the University, and they help establish external contact with society, and get funds for research as well. So now the point is to find a balance between both activities.” (CMSE, UK)

Having invitations to participate

Having invitations to participate in public engagement activities was one of the issues that researchers mentioned which encouraged them to get involved because they were not looking for these kinds of events.

“If I have specific invitations to participate I may accept. I am not in the habit of looking for these opportunities”. (CEMES, France)

“If I receive invitations to participate then fine, but we will not go looking for them...” (DIPC, Spain)

“I only need to have an invitation...” (ISMN, Italy)

“I am passive, so the problem is that someone needs to come to invite me to participate and I will do it.”(DIPC,Spain)

The activity is recognized

The recognition of public communication activities was another reason that scientists expressed as an important encouragement to participation.

“I know these activities are considered in our evaluation, but this is not clear and the most important thing is the research and teaching”. (CEMES, France)

“Recognition of this “extra” activity is important, but it is taboo to ask for funding or additional payment. For us it involves a lot of extra work and effort, such as work weekends... Politicians state that the activity is very important but who is going to provide the funds to support it?” (CEMES, France)

“This activity is a challenge and I don’t know how to manage it; we do not have the tools to do it. History of science and public communication are subjects which are not taught in the scientific profession... However, if there was professional recognition, I would at least try...” (DIPC, Spain)

“Only if there is real recognition, because we need to keep the equilibrium between research and engagement activities, and justify them. Now that it is more difficult to find time to do it, we are under pressure to write papers and the competition is very intense.” (CMSE, UK)

Having training

Having training was also a subject that scientists pointed out as being an encouragement to get involved in public science engagements.

“Because it is difficult to engage with the non-specialist public we need support from our institutions to help staff with presentations and training...” (FHI, Germany)

“Barriers can exist between scientists and our target audience and some of us need assistance in understanding who the audience are and the best way to communicate with them” (FHI, Germany)

“If I received training then I would participate. I did receive invitations to attend some public debates but declined on the grounds that I did not want to be manipulated or ridiculed. Nanotechnology is a controversial area and we need skills to respond in the proper way... (CEMES, France)

“I would like to have more tools also, how to prepare a proper lecture for the public” (ISMN, Italy)

If I could have someone to help me to organize...” (CMSE, UK)

Contact with young people

Regarding having contact with young people, scientists remarked that this encouraged them because it is relevant to promote the scientific profession.

“To promote the scientific profession with young people” (ISMN, Italy)

“To make science interesting to young people because many of them do not want to undertake a career in science and participate with new ideas in political or public debates...” (CEMES, France)

Others

Scientists mentioned that having support such as **money, funds, staff, contacts**; additional funds for their research; **stable working conditions**, a **higher science profile in the media** and defence to **keeping science free** from irrational political interference (e.g. with regard to budgets) encouraged them to get involved in public communication activities.

“Of course it is important but there needs to be mechanisms and funds to help to do it” (CMSE, UK)

“We need incentives, tangible things, money, students...”(CMSE, UK)

“Promote my research in order to get funds” (CMSE, UK)

“If I had the time, the funds, the support; my priority is looking for funds for my research, this is the most important thing...” (CMSE, UK)

“I think a society with scientific culture is more able to take better decisions. Science is an essential part of modern society. If the people consider science important then scientific research will be safe from irrational policies against it.” (DIPC, Spain)

“To promote the fact that science is something real; also to try to erase that image of a mad scientists or the idea that science is only for brilliant minds. It is about putting science’s world nearer to the people...” (DIPC, Spain)

“Stable work conditions because we are under big work pressures and no permanent positions” (FHI, Germany)

“It is easier if you have contacts; if you have good relations with the media or with people involved in this activity” (ISMN, Italy)

“More space for science in magazines and newspapers would encourage interest.” (FHI, Germany)

Also some scientists indicated that they were **encouraged already** because they consider this activity as part of their work and that they were involved enough and do not need something extra to encourage participation.

“I don’t need money or any recognition, I am convinced that this activity it is part of my job”. (CEMES, France)

“I like to help; this is part of my job...to show scientific progress, be accountable and highlight the scientific profession...” (CEMES, France)

“Communicating science to the public is part of the scientific work because it is part of the culture” (CEMES, France)

“I think that the people who work in science have a feeling of duty towards sharing knowledge and about their work, although maybe the public is not interested...” (ISMN, Italy)

“I consider it is a scientist’s duty to show their results to society because of the social and economic implications of science.” (DIPC, Spain)

“Maybe I will try when I am bored of doing science... I believe that there needs to be some professional communicator because communicating science properly takes time and we need that time to do science.” (DIPC, Spain)

“In the future, with more years under my belt, when I will have things to tell... Currently I do not have interesting things to tell, I am too specialised and I do not know if my research will be useful...”(DIPC, Spain)

CONCLUSIONS

CONCLUSIONS

One of the main objectives of this work was to contribute to the study on which variables are affecting the participation of scientists in public engagement: attitudes, specific environments, contexts, national and local policies, institutional support, across countries. Thus, the results obtained in this study showed that the scientific community maintains certain common "values" to this activity, and that the difference between countries, in this respect, is minimal. However, the level of participation of scientists in public science communication activities distinctively varied by country; and, as we anticipated it was clearly associated with levels both of institutional support, such as the presence of public relation and press officers; and the national and local public policies favourable to the activity. Also, although there are similarities in governmental public policies at national level between countries to promote this activity, such as national science festivals and open door events, there are local differences that influence the level of participation of scientists, both as internal policies in the research centres and the influence of external actors (schools, journalists, civil society organizations, etc.). Therefore, the conclusions of this work are presented in three groups of argumentation: -first, about the common values of scientists; -second, about the role of public policies and external actors; -and, finally, about the institutional support of public communication of science at research centres.

I. VIEWS OF THE SCIENTISTS TO PUBLIC COMMUNICATION OF SCIENCE

(1) Public communication of science means for scientists the promotion of scientific work, the scientific process and nature of science, and its limits and implications in culture and society. They pointed towards a change in the current image of scientific work, a consequence of its promotion in the mass media which focuses mainly on results and applications. They also explained the importance of clarifying that achieved scientific findings is a long process of work which does not always have immediate applications or benefits to society. Finally, they also stressed the need of contextualising scientific research as a relevant factor in social and political aspects.

(2) Scientists highlighted that if society is better informed about science and becomes aware of it, this may support favourable funds and public policies for scientific research. Also, participants pointed out the relevance of attending to public doubts about their subject in order to gain support for their research and promote their position in society.

(3) The most important audience for those scientists surveyed were: the industry/business community or others directly concerned with funding their research; schools and school teachers; and policy makers. Participants explained that their interest in these groups was related to raising funds for scientific research and the promotion of scientific careers.

Likewise the results of other studies on scientists' attitudes to public communication of science mentioned that scientists justified the public communication of science as a means to "ensure the public is better informed about science and technology" (Royal Society, 2006, p.9; Kreimer, Levin & Jensen, 2011, p. 42) and to "increasing the public's appreciation of science" (Peters & et al; 2008a, p. 204). The qualitative European survey also reported the following as reasons for communication with the public: "public accountability; providing information to correct or avoid misconceptions of science; attracting young people to their scientific research; and the potential 'knock-on' effect of generating support for further funding" (European Commission, 2007, p. 7).

(4) Some authors concluded that for Scientists the public science communication was viewed as 'altruistic' and not a central part of academic life (Royal Society, 2006; Kreimer, Levin & Jensen, 2011). However, after examining the results I present here we may conclude that scientists' position to public communication of science is pragmatic, as they consider that promoting the scientific work and the role of scientists in society contributes to ensure funds and better resources, working conditions, staffing levels and higher student numbers.

Priorities and leadership

(5) My quantitative and qualitative findings indicate that public communication of science is considered for scientists a second priority activity. Scientists expressed the view that even when they considered engagement activity important, they had other important priorities associated with research such as finding funds and working on their professional promotion, teaching and administrative work.

(6) Furthermore, some scientists stated in the qualitative interviews that the obligation to engage with non-specialists groups should be the concern of the Directors, Heads of Departments and Public Relations and Press Officers because it is part of their responsibilities and because they are in better position to carry out such activity, having the contacts, relations and knowledge required.

Peters & et al; (2008a, p. 205) also found in their survey *Interactions with the mass media* that the scientists most involved in these interactions tended to have leadership roles, also to be scientifically productive and perceived benefits.

The qualitative results pointed out to the role that the traditional and hierarchical scientific institutional structure still leads and supports the current nature of scientists' work; which includes a respect for both the traditional model of scientific communication (scientific level → pedagogic spheres → popular level) and for leadership functions.

II. THE ROLE OF PUBLIC POLICIES AND EXTERNAL INITIATIVES IN SCIENTISTS' PUBLIC COMMUNICATION OF SCIENCE

The amount of scientists' participation and activities at the institutes

(7) The amount of scientists' participation in public engagement activity varied by country: 95% of scientists at the FHI (Germany) and 90% of scientists at CMSE (United Kingdom) had participated in some public engagement activity. Meanwhile 54% of scientists at CEMES (France); 50% of scientists at ISMN

(Italy); and 31% of scientists at DIPC (Spain) took part. Nevertheless the level of scientists' participation was clearly associated with levels of institutional support (Public relations and press officer, positive policies to the activity, and some funds).

(8) The major form of scientists' participation was in institutional open day events, engaging with policy-makers, working with teachers and schools, and secondarily writing for the general public.

The regular events

(9) The findings of this work show that most of the regular events at the institutes studied were the result of local or national government policies in education and in the development of science and technology, like national science festivals and open door events.

(10) Furthermore, other public science communication activities were generated by external contacts through different initiatives, invitations and enquiries from schools, associations related to science and technology, and the mass media. Sometimes these interactions would arise as a consequence of scientific awards, important discoveries, scientific publications and special scientific commemorations generated at the institutes.

Many institutions and local governments were involved promoting a great variety of festivities and events during the international celebration of the year of Physics in 2005, whereby the amount of public science activities at some institutes increased significantly in that year. What is more, two of the five research centres studied in this work created a public relations and press officer position (CEMES, France) and strengthen it (FHI, Germany) as a direct consequence of such involvements.

(11) My research observed that in the centres without public relations and press officers such as ISMN (Italy) or those with very limited offices and a low profile such as CEMES (France), the scientists' participation was low, and most of the scientists' participations were a consequence of some external inquiries (invitations) and scientists' personal initiatives or contacts.

Invitations to participate

(12) Scientists surveyed in this work expressed in their own terms that knowing people would be interested and having invitations to participate as reasons that would encourage them to get involved in activities that engaged the general public in science. Also they noted how easy or difficult it is to get involved in these activities when having invitations (or not having) invitations, contacts and support.

In the same way, the Royal society survey (2006, p. 11) also found that scientists stated they would be happy to take part in public engagement activity that others had organised, as incentives for science communication.

(13) The results show that scientific structure has been influenced by external bodies, which have pushed the scientific community to establish 'mechanisms or structures' in order to answer the former's regular demands for public communication of science (e.g. creation of special departments or positions, see CEMES, FHI, descriptions of the centres). In addition, these external bodies have positively influenced scientists' attitudes to public engagement through supporting and promoting regular participation (e.g. high scientists' participation in the national open day events and a declared openness to participate in these activities).

Peters & et al; (2008a, p. 204) identified, regarding the change of scientists' attitudes to public science communication, that the norms of the scientific community have influence also when scientists engage with non-specialist public; nevertheless, for scientists those norms seem to be playing a more nuanced role today. Furthermore, they noted that the impact of scientific norms seemed to be perceived inconsistently.

III. THE CURRENT INSTITUTIONAL SUPPORT OF PUBLIC COMMUNICATION OF SCIENCE AT RESEARCH CENTRES

Public Relations and Press Officer

Three of the five research centres studied had someone in charge of the functions of public relations and press Officer. The position of the public relations officers in FHI (Germany) and CEMES (France), CMSE (United Kingdom) were limited as they had to dedicate half of the time to other administrative tasks and assumed a passive profile.

These officers mainly had to deal with the external inquiries such as open doors events, visitors, interactions with the mass media, the production of press releases and other press information, and the interaction with the institutional headquarters' press offices (not included CMSE, United Kingdom, because the position of its public relations officer corresponding to a College of Science and Engineering with different and broader responsibilities).

In the absence of a public relations and press officer, the Directors of the centres took direct charge of some activities to promote the visibility of their centres and research activities to the general public, mainly through posting news on their websites (ISMN, Italy; and DIPC, Spain) and establishing direct contacts with journalists and hiring external public relation offices (DIPC, Spain) for certain public events.

(14) My findings show that the lack of internal institutional support such as the lack of budget provision or 'specific policies' to public communication activities decreased scientists' participation particularly in the open doors events. For example, the policy in the CEMES (France), was to participate in the open doors events every two years, yet only half of scientists of the centre participated in those events because of the lack of funds. In the DIPC (Spain) the Director was not interested in the centre participating in these types of events; and the ISMN (Italy) stated they had not received invitations to participate in these events. Nevertheless, 72% of scientists from CEMES (France); 65% ISMN (Italy); and 56% from DIPC (Spain), stressed the importance of finding time to engage in public communication activities.

Funds to public communication activities

(15) The quantitative research identified that there was a strong agreement between scientists from FHI, Germany (73%); CEMES, France (69%) and ISMN, Italy (70%) that grants for engagements which covered staff time as well as other costs would significantly encourage scientists to get more involved in science communication activities with the public. Meanwhile, scientists from DIPC, Spain (82%) and CMSE, United Kingdom (75%), stated that the fact that such activities brought money into their department was a major incentive.

(16) In general, scientists stated a preference that money be spent on public lectures, open houses events at institutes, publications aimed at broad public and science portals on the internet.

(17) On the subject of supporting communications departments at the Institutes, researchers recognised it is necessary for one professional to be in charge of these activities because they themselves would not be doing that work. However respondents also expressed doubts about current practice because they considered that these departments are often poorly structured and without experts in charge, who are able to understand scientists' needs. Moreover, they considered that a communication department tends to spend a lot of money and there was also a suspicion that 'recognition' of this activity could damage scientific research.

(18) Most scientists agreed that they felt well equipped to engage with the general public about their research: 90% from CMSE (United Kingdom); 75% DIPC (Spain); 70% ISMN (Italy); 57% from FHI (Germany); and 54% CEMES (France). Nevertheless, they accepted that they did not have training in public communication of science and that if they had some training it would help them (only 53% of researchers from CMSE, United Kingdom, mentioned they had had training).

(19) This study concludes that the level of scientists' participation varied in accordance with the degree of scientists' necessity (for example as a result of personal interest or the need to deal with problematic situations) and the level of the support available (for example, of government, institutional policies national and local, and of other external bodies).

(20) Also that there are three main factors which influence and determine currently scientists' participation in public science communication activities:

External initiatives → **institutional structures** (a public relations and press officer and positive policies that support these activities) ← **and funds**.

IV. PRACTICAL PROPOSALS

To organise more regular international, local and governmental initiatives in public communication of science, such as the traditional open day events, science festivals, thematic commemorations, science debates, etc; that forward the interaction and dialogue between general public and scientists.

Support and promote the civil initiatives in public communication of science activities (for example, science debates, science cafes, science shops, lectures, etc).

Support the role of a public science communicator (public relations and press officer) at research centres, in order to promote the visibility of the research centres, their research and scientists; the production of internal public communication of science initiatives (such as videos, lectures, commemorations, websites, etc). Also acting as a link with external bodies and collaborating with the scientific community in those interactions; as well as finding funds for these activities and offering creative routes to interact with the general public.

Promote in the scientific community a permanent discussion about the role that public communication of science plays in the new social challenges and the necessary communicative policies that scientific community should adopt.

Training in the public communication of science focuses more on the analysis of the public communication phenomena and its challenges than on the communicative tools.

CONCLUSIONES

Uno de los objetivos principales que este trabajo se planteo fue contribuir en el estudio sobre cuáles son las variables que afectan la participación de los científicos en el compromiso con el público: actitudes, específicos ambientes, contextos, políticas nacionales y locales, apoyos institucionales, entre otros; a través de un análisis entre países. Es así, que los resultados obtenidos en este trabajo concluyen que la comunidad científica en su conjunto mantiene ciertos “**valores**” comunes hacia esta actividad, y que la diferencia en este sentido entre países es mínimo. Sin embargo, el nivel de participación de los científicos en actividades para la comunicación pública de la ciencia si vario distintivamente por países; y tal como anticipamos estuvo claramente asociado con niveles de apoyo institucional, tales como la presencia de encargados de relaciones públicas y prensa, y políticas públicas nacionales y locales favorables hacia la actividad. Asimismo, aunque existen similitudes en las políticas públicas gubernamentales a nivel nacional entre países para la promoción de esta actividad, como los festivales nacionales de ciencia y eventos de “puertas abiertas”, observamos que existen diferencias locales que influyen el nivel de participación de los científicos, como políticas internas en los centros de investigación y las iniciativas de actores externos (escuelas, periodistas, organizaciones civiles, etc.).

Por lo tanto, hemos organizado nuestras conclusiones en tres grupos de argumentación, la primera que se refiere a los valores compartidos por los científicos, segundo al rol de las políticas públicas y los actores externos; y finalmente a los apoyos existentes en los centros de investigación para la comunicación pública de la ciencia.

I. LOS VALORES DE LOS CIENTIFICOS HACIA LA COMUNICACION PUBLICA DE LA CIENCIA

(1) Para los científicos la comunicación pública de la ciencia significa la promoción *del trabajo científico*: del proceso científico y la naturaleza de la ciencia, y sus límites, así como sus implicaciones en la cultura y en la sociedad. Los científicos insistieron en la necesidad de un cambio en la actual imagen del

trabajo científico, que los medios de comunicación han promovido enfatizando principalmente resultados y aplicaciones. Señalaron la importancia de clarificar que el logro de resultados científicos es un proceso largo, el cual no siempre tiene inmediatas aplicaciones o beneficios para la sociedad; y la necesidad de contextualización de la investigación científica como un factor relevante en aspectos políticos y sociales.

(2) Los científicos señalaron que si la sociedad está mejor informada sobre ciencia y tecnología y es consciente en estos temas, esto apoyara favorables políticas públicas y financiamiento para la investigación científica. Los participantes mencionaron la relevancia de atender las dudas que el público pueda tener acerca de su área de investigación ya que esto también apoyara tanto su investigación, como su lugar en la sociedad.

(3) Para los científicos encuestados, las audiencias más importantes fueron: la industria, la comunidad de negocios u otros directamente relacionados con el financiamiento de su investigación; las escuelas y los maestros; y los políticos. Los participantes explicaron que su interés en estos grupos está relacionada con la recaudación de fondos para la investigación científica y la promoción de las carreras científicas.

Asimismo, los resultados de otros estudios sobre las actitudes de los científicos para la comunicación pública de la ciencia mencionan asimismo, que los científicos justifican la comunicación pública de la ciencia como un medio para "asegurar que el público esté mejor informado acerca de la ciencia y la tecnología" (Royal Society, 2006, p.9; Kreimer , Levin & Jensen, 2011, p 42) o como vía para "incrementar la apreciación del público hacia la ciencia" (Peters y col,.. 2008a, p 204). La encuesta cualitativa europea menciona también como razones para la comunicación con el público: la responsabilidad pública, el suministro de información para corregir o evitar errores de interpretación de la ciencia; el atraer a los jóvenes a la investigación científica y el potencial de efecto "dominó" para generar apoyo y obtener más fondos "(Comisión Europea, 2007, p. 7).

(4) Algunos autores concluyen que para los científicos la comunicación pública de la ciencia es vista como "altruista" y no como una parte central de la vida académica (Royal Society, 2006; Kreimer, Levin & Jensen, 2011). Sin embargo, después de examinar los resultados que presento aquí, la conclusión es que la posición de los científicos de la comunicación pública de la ciencia es más bien **pragmático**, ya que ellos consideran que la promoción del trabajo científico y del papel de los científicos en la sociedad contribuyen al aseguramiento de fondos y mejores recursos, condiciones de trabajo, dotación de personal y al aumento en el número de estudiantes.

Prioridades y el liderazgo

(5) Mis resultados cuantitativos y cualitativos indican que la comunicación pública de la ciencia es considerada por los científicos una actividad secundaria. Los científicos opinaron que aun cuando se considera esta actividad importante, ellos que tienen otras prioridades asociadas con la investigación, tales como la búsqueda de financiamiento, su promoción profesional, la enseñanza y trabajo administrativo.

(6) En las entrevistas cualitativas algunos científicos declararon que la obligación de colaborar con grupos de no especialistas debe ser competencia de los directores, jefes de departamentos y de relaciones públicas y encargados de prensa, ya que es parte de sus responsabilidades, principalmente porque están en una mejor posición para llevar a cabo dicha actividad, como es tener los contactos, las relaciones y los conocimientos necesarios.

Peters y colaboradores (2008a, p. 205) observaron en su encuesta "Interacciones con los medios de comunicación", que los científicos más involucrados con los medios de comunicación tienen roles de liderazgo, asimismo aquellos que tienden a ser científicamente más productivos y perciben beneficios.

Los resultados cualitativos apuntan a que la estructura tradicional y jerárquica de la institución científica todavía dirige y sustenta la naturaleza actual del

trabajo de los científicos; la cual incluye el respeto tanto del modelo tradicional de comunicación científica (nivel científico → ámbitos pedagógicos o docentes → nivel popular); como las funciones de liderazgo.

II. EL ROL DE LAS POLITICAS PUBLICAS Y LAS INICIATIVAS EXTERNAS EN LA COMUNICACION PUBLICA DE LA CIENCIA.

Participación de los científicos y actividades en los institutos.

(7) El número de científicos que participaron en actividades de comunicación pública de la ciencia tuvo variación según el país: mientras 95% de los científicos de la FHI (Alemania) y 90% de los científicos en CMSE (Reino Unido) participaron en alguna actividad; solo 54% de los científicos de CEMES (Francia), 50% de los científicos en ISMN (Italia), y 31% de los científicos del DIPC (España) lo hicieron. Sin embargo, el nivel de participación de los científicos claramente estuvo asociado con niveles de apoyo institucional, como contar con responsable de relaciones públicas y prensa, políticas institucionales positivas para la actividad, y tener algún financiamiento.

(8) Las principales formas de participación de los científicos fueron en los eventos institucionales conocidos como “día de puertas abiertas”; el diálogo con responsables políticos; la interacción con maestros y escuelas; y en segundo lugar, escribir para el público en general.

Acerca de los eventos regulares

(9) Los resultados de este trabajo muestran que la mayoría de los eventos regulares en los institutos estudiados han sido el resultado de las políticas que los gobiernos nacionales o locales han impulsado en materia de educación y en el desarrollo de la ciencia y la tecnología, como son los festivales nacionales de ciencia y tecnología y los eventos de puertas abiertas.

(10) Otras actividades de comunicación pública de ciencia en los Centros fueron generadas por contactos externos a través de diferentes iniciativas: invitaciones y solicitudes de escuelas, de asociaciones relacionadas con la

ciencia y la tecnología y los medios de comunicación. A veces, estas interacciones se originaron como consecuencia de premios científicos, descubrimientos importantes, publicaciones científicas y especiales conmemoraciones científicas generadas en los institutos.

Diversas Instituciones y Gobiernos locales estuvieron involucrados en la promoción de una gran variedad de eventos y festividades durante la celebración internacional del Año de Física en 2005, por lo cual la participación en actividades dedicadas a la comunicación pública de la ciencia se incrementó significativamente en ese año en algunos institutos. Lo que es más, dos de los cinco centros de investigación estudiados en este trabajo, crearon la posición de jefe de relaciones pública y prensa (CEMES, Francia) o la fortalecieron (FHI, Alemania) como consecuencia directa de tales implicaciones.

(11) Mi investigación observó que en los centros sin oficinas de relaciones públicas y prensa (internas) como el ISMN (Italia) o aquellos con oficinas muy limitadas y un perfil bajo, como CEMES (Francia), la participación de los científicos era baja, y la mayor parte de las participaciones de los científicos eran una consecuencia de algunos requerimientos externos (invitaciones), así como iniciativas personales de los científicos o a través de sus contactos.

Invitaciones para participar

(12) Los científicos entrevistados expresaron en sus propios términos que el saber que hay gente interesada y el tener invitaciones para participar les anima a participar en actividades de comunicación pública. Asimismo, relacionaron que tan fácil o difícil es participar en estas actividades, con tener (o no tener) invitaciones, contactos y apoyo.

De la misma manera, la encuesta de la Royal Society (2006, p. 11) señala que los científicos afirmaron que estarían encantados de participar en actividades de comunicación pública que otros organicen como incentivos para la comunicación de la ciencia.

(13) Nuestros resultados muestran que la estructura científica se ha visto influida por organismos externos, que han “empujado” a la comunidad científica para establecer los mecanismos o estructuras que respondan a las demandas regulares de comunicación pública de la ciencia (por ejemplo, la creación de departamentos especializados o puestos, ver el caso de CEMES y FHI). Además, estos organismos externos han influido positivamente en las actitudes de los científicos hacia la actividad, a través de apoyar y promover su regular participación (ver como ejemplo, la gran participación de científicos en los eventos de puertas abiertas, así como una declarada apertura a participar en este tipo de actividades).

Peters y colaboradores (2008a, p. 204) identificaron en relación con el cambio de las actitudes de los científicos hacia la comunicación científica pública, que las normas de la comunidad científica tienen influencia también cuando los científicos colaboran en actividades con el público. Sin embargo, actualmente para los científicos esas normas parecen estar teniendo un papel más matizado. Incluso, señalan los autores, el impacto de las normas científicas está siendo percibido de manera inconsistente.

III. EL ACTUAL APOYO INSTITUCIONAL EN CENTROS DE INVESTIGACION PARA LA COMUNICACION PUBLICA DE LA CIENCIA

Responsables de Relaciones Públicas y Prensa

Tres de los cinco centros de investigación estudiados tenían alguna persona a cargo de las funciones de relaciones públicas y de prensa. Además, la posición de los responsables de relaciones públicas tanto en FHI (Alemania), CEMES (Francia) y CMSE (Reino Unido) estaban de alguna manera limitados, ya que tenían que dedicar la mitad del tiempo a otras tareas administrativas o en algunos casos bajo la política institucional de asumir un perfil pasivo. Estos responsables, principalmente estaban a cargo de direccionar y atender los requerimientos externos, tales como los eventos de puertas abiertas; visitantes; las interacciones con los medios de comunicación; la producción de comunicados de prensa y otras informaciones de prensa; y la interacción con la

oficina de prensa central de la institución "(no incluido CMSE, Reino Unido, debido a la posición de su encargado de relaciones públicas que corresponde a un Colegio de Ciencias e Ingeniería con responsabilidades diferentes y más amplias).

En ausencia de un encargado de relaciones públicas y prensa, los directores de los centros se hacían cargo directo de algunas de las actividades, como las de promover la visibilidad de sus centros y sus actividades de investigación al público en general, principalmente a través de publicación de noticias en sus sitios web (ISMN, Italia, y DIPC, España); el establecimiento de contactos directos con los periodistas e incluso la contratación de oficinas externas de relaciones públicas (DIPC, España) para apoyo en determinados actos públicos.

(14) Mis resultados muestran también que la falta de apoyo institucional interno como: la falta de presupuesto o de las políticas específicas para la comunicación pública de la ciencia influyo en la disminución de la participación de los científicos, de forma particular en los eventos de puertas abiertas. Por ejemplo, la política en CEMES (Francia), era participar en los eventos de puertas abiertas cada dos años, sin embargo, sólo la mitad de los científicos del centro participaron en estos eventos, por la falta de fondos. En el DIPC (España), el Director no estaba interesado en que el centro participara en este tipo de eventos; y ISMN (Italia), los científicos declararon no haber recibido invitaciones para participar en estos eventos. Sin embargo, el 72% de los científicos de CEMES (Francia), 65% ISMN (Italia), y el 56% de la DIPC (España), destacó la importancia de encontrar tiempo para participar en actividades de comunicación pública.

Fondos para actividades de comunicación pública

(15) La investigación cuantitativa respecto a los incentivos para la comunicación pública de la ciencia, identificó que hay un acuerdo significativo entre los científicos de FHI, Alemania (73%); CEMES, Francia (69%) y el ISMN, Italia (70%) respecto a que el tener financiamiento que cubra personal, así como otros costos significativamente alentaría a los científicos a involucrarse

más en las actividades de comunicación de la ciencia con el público. Mientras tanto, los científicos del DIPC, España (82%) y CMSE, Reino Unido (75%), consideraron el hecho de que es mejor incentivo el que estas actividades generen dinero para su departamento.

(16) En general, los científicos se pronunciaron a favor de que los presupuestos para la comunicación pública de la ciencia se inviertan principalmente en conferencias públicas; eventos de puertas abiertas en los institutos; publicaciones destinadas a público en general y portales de ciencia en Internet.

(17) Sobre el tema de apoyar departamentos de comunicación pública en los Institutos, los investigadores reconocen que es necesario contar con un profesional a cargo de estas actividades, porque ellos no se encargaran de este tipo de trabajo. Sin embargo, los encuestados también expresaron dudas sobre la práctica actual de estos departamentos, ya que considera que estos departamentos están a menudo, mal estructurados y sin expertos a cargo capaces de entender las necesidades de los científicos. Por otra parte, consideraron que un departamento de comunicación tiende a gastar mucho dinero y manifestaron también la sospecha de que el "reconocimiento" de esta actividad podría dañar la investigación científica.

(18) La mayoría de los científicos manifestaron sentirse bien preparados para interactuar con el público en general acerca de su investigación: 90% de los científicos de CMSE (Reino Unido), 75% del DIPC (España), 70% ISMN (Italia), 57% de FHI (Alemania), y 54% CEMES (Francia). Sin embargo, reconocieron que no tenían formación en comunicación pública de la ciencia, pero que si la tuvieran esto les ayudaría (sólo el 53% de los investigadores de CMSE, Reino Unido, se mencionó que había tenido un entrenamiento).

(19) Por lo tanto, este trabajo concluye que el nivel de participación de los científicos varía de acuerdo con el grado de necesidad de los científicos (por ejemplo, como resultado de interés personal o la necesidad de intervenir en ciertas situaciones problemáticas) y el nivel de apoyo disponible (por ejemplo,

del gobierno, políticas institucionales nacionales y locales y de otros organismos externos).

(18) Asimismo, que hay tres factores principales que influyen y determinan actualmente la participación de los científicos en las actividades públicas de comunicación de la ciencia:

Iniciativas externas → **estructuras institucionales** (responsables de relaciones públicas y prensa; y políticas positivas para la actividad) ← **y fondos o presupuestos.**

PROPUESTAS PRACTICAS

Promover la organización de más iniciativas regulares, internacionales, locales y gubernamentales para la comunicación pública de la ciencia, tales como los tradicionales eventos de puertas abiertas, festivales, conmemoraciones científicas temáticas, debates sobre ciencia, etc. Y que apoyen la interacción y el diálogo entre el público en general y los científicos.

Apoyar y promover las iniciativas civiles para la comunicación pública de la ciencia (por ejemplo, debates de las ciencias, cafés, tiendas de la ciencia de ciencias, conferencias, etc.)

Apoyar el papel del comunicador de la ciencia pública (encargado de relaciones públicas y prensa) en centros de investigación, a fin de promover: la visibilidad de los centros de investigación, su investigación y sus científicos; la generación de iniciativas internas para la comunicación pública (tales como vídeos, conferencias, conmemoraciones, sitios web, etc.). Además de coadyuvar en el enlace con organismos externos y colaborar con la comunidad científica en esas interacciones, así como la búsqueda de fondos para estas actividades y ofrecer rutas creativas para la interacción con el público en general.

Promover en la comunidad científica un debate permanente sobre el papel que la comunicación pública de la ciencia desempeña de cara a los nuevos retos

sociales y las políticas necesarias de comunicación que la comunidad científica debe adoptar.

Entrenamiento y formación en comunicación pública de la ciencia pero centrada más en el análisis de los fenómenos de comunicación públicos y sus desafíos que en las herramientas de comunicación.

APPENDIX

Overall Quantitative Responses

FRITZ HABER INSTITUTE – BERLIN, GERMANY

1F.

How important do you feel it is that you personally, in your current post, directly engage with each of the following groups about your research?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important				Very Important
	1	2	3	4	5
General journalists	29%	29%	23%		19%
Popular science journalists	14%	19%	29%	19%	19%
Others in the media such as writers	29%	43%	18%	5%	5%
Documentary and other programme makers	24%	33%	29%	9%	5%
Schools and school teachers	10%	10%	38%	28%	14%
Young people outside school	14%	14%	29%	33%	10%
Policy-makers	19%	29%	19%	23%	10%
Industry / business community	4%	24%	24%	24%	24%
The non-specialist public		24%	52%	14%	10%
Non-Governmental organisations (NGOs)	9%	38%	43%	5%	5%

2F.

Thinking about public engagement with, and communication about, science, roughly how many times in the past 12 months have you done each of the following?

	None	Once	2 or 3 times	4 or 5 times	More than 5 times
Worked with teachers / schools	62%	19%	14%		5%
Participated in an institutional open day	5%	67%	28%		
Given a public lecture, including being part of a panel	76%	19%	5%		
Taken part in a public dialogue event / debate	86%	9%	5%		
Been interviewed on radio	86%	9%	5%		
Been interviewed by a newspaper journalist	71%	24%		5%	
Written for the non-specialist public	57%	33%	10%		
Engaged with policy-makers	90%	10%			
Engaged with non-Governmental	90%	5%	5%		
Worked with science centres / museums	80%	10%	10%		
Judged competitions	95%	5%			

3F.

How important do you think it is that you personally, in your current post, engage directly with the non-specialist adult public on each of the following?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important				Very Important
	1	2	3	4	5
The scientific findings of your research	5%	24%	5%	42%	24%
Areas for further research	10%	10%	18%	48%	14%
Policy and regulatory issues	24%	19%	28%	19%	10%
The wider social and ethical implications	24%	19%	24%	19%	14%
Of your research findings for society	5%	14%	24%	38%	19%
The potential benefits of your work to individuals	10%	24%	38%	10%	18%
The scientific process / the nature of science		10%	14%	43%	33%
Scientific uncertainty		33%	19%	24%	24%
The enjoyment and excitement of doing science		5%	19%	24%	52%
The relevance of science to everyday life		10%	10%	38%	42%
To raise awareness of career options in science		14%	24%	52%	10%

4F.

Looking at the list below, what do you think is the main reason for scientists generally to engage with the non-specialist public?

- 4% To be accountable for the use of public funds
- 10% To contribute to public debates about science and scientific issues
- To contribute to discussions about the social and ethical issues science can raise
- 10% To generate / stimulate additional funds for universities and colleges
- 4% To recruit students to your subject
- 38% To ensure the public is better informed about science and technology
- 10% To raise awareness about your subject
- 24% To raise awareness of science generally
- There are no reasons to engage with this group
- Other, PLEASE SPECIFY

5F.

Looking at the list below, what do you think is the second most important reason for scientists generally to engage with the non-specialist public?

- 29% To be accountable for the use of public funds

- 19% To contribute to public debates about science and scientific issues

- To contribute to discussions about the social and ethical issues science can raise

- 5% To generate / stimulate additional funds for universities and colleges

- 9% To recruit students to your subject

- 9% To ensure the public is better informed about science and technology

- 19% To raise awareness about your subject

- 5% To raise awareness of science generally

- There are no reasons to engage with this group

- 5% Other, PLEASE SPECIFY

6F.

Looking at the list below, what do you think is the main drawback to scientists generally engaging with the non-specialist public?

- 8% It makes them look bad in front of their peers
- It makes them a target
- 24% It can send out the wrong messages
- It diverts money from research projects
- It diverts money from other, non-research, activities
- 28% It takes up time that is better used on research
- 8% It takes up time that is better used on other, non-research, activities
- 28% There are no drawbacks to engaging with any of these groups
- 4% Other, PLEASE SPECIFY

7F.

In relation to the other things you have to do in your working life, how important is it to you that you find time to engage with the non-specialist public?

- 5% Not at all important
- 52% Not very important
- 10% Equally important
- 19% Fairly important
- 14% Very important

8F.

Would you like to spend more time, less time or about the same amount of time as you do now engaging with the non-specialist public about science?

43% I would like to spend more time

57% I am content with the amount of time I spend on this now

I would like to spend less time

Don't know

9F.

Why do you say that?

43% Scientists should engage more with the community

10% I work in a topical area of science

There is a need to recruit more students

4% Scientists need to be more accountable

I work in a controversial area of science

43% Other, PLEASE SPECIFY

10F.

How easy or difficult do you think it is to get involved in science engagement activities for those who want to do so?

29% Very easy

14% Very difficult

19% Don't know / can't say

33% Fairly easy

5% Fairly difficult

11F.

How well equipped do you personally feel you are to engage with the non-specialist public about your research?

5% Very well equipped

52% Fairly well equipped

38% Not very well equipped

5% Not at all equipped

Don't know

12F.

What training, if any, have you had in communicating science to the non-specialist public? Do not include any teaching training you may have had.

85% None

Media training on being interviewed by journalists

5% Training in writing for the non-specialist public

10% Training in speaking to the non-specialist public

Training in understanding the school education system

Training in speaking to school children (of any age)

[Other]

13F.

What would encourage you personally to get involved in activities that engage the non-specialist public in science?

- 47% If I knew people would be interested
- 14% If there was Institutional support (e.g. contacts, staff, training)
- 10% I am not interested in getting involved
- 9% Contact with young people
- 5% If science had a higher profile in the media
- 5% Accountability for use of public funds
- 5% Stable working conditions
- 5% I am already involved

14F.

To what extent would you personally be encouraged to get more involved in activities to engage the non-specialist public in science by each of the following?

	A great deal	To some extent	Not very much	Not at all	Don't know
If my head of department were to give me more support	10%	24%	43%	14%	9%
If there were awards and prizes for me as an individual		24%	57%	14%	5%
If it was part of getting professional status, such as chartered engineer or membership of my professional body	10%	29%	29%	19%	13%
If it helped with my own career	14%	52%	19%	5%	10%
If I was relieved of other work	5%	24%	43%	19%	9%
If the research exercise was changed to encompass communication with the non-specialist public	5%	48%	24%	10%	13%
If my department or institution was recognised by an award or prize	14%	29%	38%	14%	5%
If it brought money into my department	19%	38%	33%	5%	5%
If it was easier for me to get funds for engagement activities	14%	24%	52%	5%	5%
If grants for engagement covered staff time as well as other costs	14%	57%	19%	5%	5%
If it was easier to organise such activities	24%	38%	19%	10%	9%
If I had some (more) training	19%	43%	10%	24%	4%

15F.

What is stopping you from getting (more) involved in activities that engage the non-specialist public in science? Please mark all that apply

- 9% I am already involved enough
- I just don't want to
- I am too junior
- 9% I don't know how
- I feel that I am encroaching on Press Office work
- 3% Peer pressure
- There is not enough funding
- 35% I need to spend more time on my research
- 9% I need to spend more time teaching
- 9% I need to spend more time on administration
- 3% I need to spend more time getting funding for my research
- 16% I would have to do it in my own time
- 7% Other, PLEASE SPECIFY

16F.

Do other members of your department take part in activities that engage the non-specialist public in science?

5% Yes, most of them

47% Yes, some of them

43% Yes, one or two of them

None of them

5% Don't know

17F.

Are the researchers in your department generally supportive towards those who take part in activities that engage the non-specialist public in science?

43% Yes, very supportive

52% Yes, fairly supportive

5% Not particularly supportive

Not at all supportive

It varies between departments

Don't know

18F.

Is your institution generally supportive towards researchers who take part in activities to engage the non-specialist public in science?

62% Yes, very supportive

28% Yes, fairly supportive

5% Not particularly supportive

Not at all supportive

5% It varies between departments

Don't know

19F.

If you were to administer of the research budget for science communication, what would you spend the money on? Please 3 answers.

- 7% Communications departments at the institutes
- 13% Publications aimed at the broad public
- 18% Public lectures
- 3% Release of scientists for science communication
- 10% Science portals on internet
- 25% Open houses events at institutes
- 13% Communications courses for scientist
- 5% Communications course for PhD students
- 2% Science cafes and other debate events
- External communications services
- Science shops at institutes
- 2% Annual reports
- 2% Other

CEMES – TOULOUSE, FRANCE

1C.

How important do you feel it is that you personally, in your current post, directly engage with each of the following groups about your research?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important				Very Important
	1	2	3	4	5
General journalists	17%	26%	29%	17%	11%
Popular science journalists	3%	17%	40%	20%	20%
Others in the media such as writers	11%	26%	49%	11%	3%
Documentary and other programme makers	11%	12%	34%	26%	17%
Schools and school teachers	3%	9%	9%	46%	33%
Young people outside school	12%	14%	14%	26%	34%
Policy-makers	3%	6%	16%	46%	29%
Industry / business community	3%	11%	26%	29%	31%
The non-specialist public	6%	3%	31%	43%	17%
Non-Governmental organisations (NGOs)	26%	16%	46%	9%	3 %

2C.

Thinking about public engagement with, and communication about, science, roughly how many times in the past 12 months have you done each of the following?

	None	Once	2 or 3 times	4 or 5 times	More than 5 times
Worked with teachers / schools	51%	17%	23%	3%	6%
Participated in an institutional open day	46%	37%	17%		
Given a public lecture, including being part of a panel	63%	11%	23%	3%	
Taken part in a public dialogue event / debate	63%	23%	11%	3%	
Been interviewed on radio	94%	3%		3%	
Been interviewed by a newspaper journalist	66%	14%	14%	3%	3%
Written for the non-specialist public	57%	29%	11%	3%	
Engaged with policy-makers	46%	28%	23%		3%
Engaged with non-Governmental	97%	3%			
Worked with science centres / museums	77%	17%	6%		
Judged competitions	100%				

3C.

How important do you think it is that you personally, in your current post, engage directly with the non-specialist adult public on each of the following?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important				Very Important
	1	2	3	4	5
The scientific findings of your research	8%	23%	23%	26%	20%
Areas for further research	9%	11%	37%	37%	6%
Policy and regulatory issues	17%	23%	31%	23%	6%
The wider social and ethical implications	17%	11%	26%	37%	9%
Of your research findings for society	3%	20%	29%	37%	11%
The potential benefits of your work to individuals	11%	23%	26%	34%	6%
The scientific process / the nature of science	3%		14%	43%	40%
Scientific uncertainty	3%	5%	23%	43%	26%
The enjoyment and excitement of doing science	3%	9%	14%	20%	54%
The relevance of science to everyday life	9%	11%	17%	40%	23%
To raise awareness of career options in science	14%	11%	23%	29%	23%

4C.

Looking at the list below, what do you think is the main reason for scientists generally to engage with the non-specialist public?

- 9% To be accountable for the use of public funds
- 14% To contribute to public debates about science and scientific issues
- 6% To contribute to discussions about the social and ethical issues science can raise
- 14% To generate / stimulate additional funds for universities and colleges
- 3% To recruit students to your subject
- 34% To ensure the public is better informed about science and technology
- 3% To raise awareness about your subject
- 17% To raise awareness of science generally
- There are no reasons to engage with this group
- Other, PLEASE SPECIFY

5C.

Looking at the list below, what do you think is the second most important reason for scientists generally to engage with the non-specialist public?

- 6% To be accountable for the use of public funds
- 37% To contribute to public debates about science and scientific issues
- 2% To contribute to discussions about the social and ethical issues science can raise
- 9% To generate / stimulate additional funds for universities and colleges
- 9% To recruit students to your subject
- 20% To ensure the public is better informed about science and technology
- 11% To raise awareness about your subject
- 6% To raise awareness of science generally

There are no reasons to engage with this group

Other, PLEASE SPECIFY

6C.

Looking at the list below, what do you think is the main drawback to scientists generally engaging with the non-specialist public?

- 6% It makes them look bad in front of their peers
- 3% It makes them a target
- 20% It can send out the wrong messages
- It diverts money from research projects
- It diverts money from other, non-research, activities
- 40% It takes up time that is better used on research
- 6% It takes up time that is better used on other, non-research, activities
- 17% There are no drawbacks to engaging with any of these groups
- 9% Other, PLEASE SPECIFY

7C.

In relation to the other things you have to do in your working life, how important is it to you that you find time to engage with the non-specialist public?

- 2% Not at all important
- 26% Not very important
- 29% Equally important
- 37% Fairly important
- 6% Very important

8C.

Would you like to spend more time, less time or about the same amount of time as you do now engaging with the non-specialist public about science?

- 60% I would like to spend more time
- 29% I am content with the amount of time I spend on this now
- 2% I would like to spend less time
- 9% Don't know

9C.

Why do you say that?

- 52% Scientists should engage more with the community
- I work in a topical area of science
- 3% There is a need to recruit more students
- 3% Scientists need to be more accountable
- 5% I work in a controversial area of science
- 37% Other, PLEASE SPECIFY

10C.

How easy or difficult do you think it is to get involved in science engagement activities for those who want to do so?

- 14% Very easy
- 9% Very difficult
- 11% Don't know / can't say
- 43% Fairly easy
- 23% Fairly difficult

11C.

How well equipped do you personally feel you are to engage with the non-specialist public about your research?

- 20% Very well equipped
- 34% Fairly well equipped
- 37% Not very well equipped
- 6% Not at all equipped
- 3% Don't know

12C.

What training, if any, have you had in communicating science to the non-specialist public? Do not include any teaching training you may have had.

- 94% None
 - Media training on being interviewed by journalists
- 3% Training in writing for the non-specialist public
- 3% Training in speaking to the non-specialist public
 - Training in understanding the school education system
 - Training in speaking to school children (of any age)
 - [Other]

13C.

What would encourage you personally to get involved in activities that engage the non-specialist public in science?

- 17% If I had time
- 17% To share science with people and ensure they are better informed
- 14% This activity is important and part of my work
- 11% I have other priorities
- 8% Contact with young people
- 6% if I am invited to do it
- 6% If I receive money for it
- 6% If I have training
- 6% If I knew people would be interested
- 6% If science was protected from political interference (e.g. with regard to budgets)
- 3% If this activity is recognised

14C.

To what extent would you personally be encouraged to get more involved in activities to engage the non-specialist public in science by each of the following?

	A great deal	To some extent	Not very much	Not at all	Don't know
If my head of department were to give me more support	6%	43%	31%	20%	
If there were awards and prizes for me as an individual		17%	34%	49%	
If it was part of getting professional status, such as chartered engineer or membership of my professional body	9%	51%	17%	20%	3%
If it helped with my own career	6%	60%	11%	23%	
If I was relieved of other work	17%	31%	37%	15%	
If the research exercise was changed to encompass communication with the non-specialist public	9%	54%	29%	5%	3%
If my department or institution was recognised by an award or prize		3%	23%	71%	3%
If it brought money into my department	6%	34%	40%	20%	
If it was easier for me to get funds for engagement activities	9%	46%	29%	16%	
If grants for engagement covered staff time as well as other costs	20%	49%	23%	5%	3%
If it was easier to organise such activities	14%	43%	26%	17%	
If I had some (more) training	9%	49%	20%	22%	

15C.

What is stopping you from getting (more) involved in activities that engage the non-specialist public in science? Please mark all that apply

- 10% I am already involved enough
- I just don't want to
- 1% I am too junior
- 3% I don't know how
- I feel that I am encroaching on Press Office work
- 2% Peer pressure
- 2% There is not enough funding
- 25% I need to spend more time on my research
- 8% I need to spend more time teaching
- 11% I need to spend more time on administration
- 20% I need to spend more time getting funding for my research
- 11% I would have to do it in my own time
- 7% Other, PLEASE SPECIFY

16C.

Do other members of your department take part in activities that engage the non-specialist public in science?

- Yes, most of them
- 86% Yes, some of them
- 14% Yes, one or two of them
- None of them
- Don't know

17C.

Are the researchers in your department generally supportive towards those who take part in activities that engage the non-specialist public in science?

- 6% Yes, very supportive
- 54% Yes, fairly supportive
- 34% Not particularly supportive
- Not at all supportive
- 3% It varies between departments
- 3% Don't know

18C.

Is your institution generally supportive towards researchers who take part in activities to engage the non-specialist public in science?

- 23% Yes, very supportive
- 37% Yes, fairly supportive
- 31% Not particularly supportive
- 3% Not at all supportive
- It varies between departments
- 6% Don't know

19C.

If you were to administer of the research budget for science communication, what would you spend the money on? Please 3 answers.

- 4% Communications departments at the institutes
- 15% Publications aimed at the broad public
- 16% Public lectures
- 4% Release of scientists for science communication
- 10% Science portals on internet
- 17% Open houses events at institutes
- 4% Communications courses for scientist
- 4% Communications course for PhD students
- 15% Science cafes and other debate events
- 1% External communications services
- 7% Science shops at institutes
- Annual reports
- 3% Other

DIPC – SAN SEBASTIAN, SPAIN

1D.

How important do you feel it is that you personally, in your current post, directly engage with each of the following groups about your research?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important				Very Important
	1	2	3	4	5
General journalists	13%	31%	12%	25%	19%
Popular science journalists		19%	19%	50%	13%
Others in the media such as writers	6%	19%	31%	25%	19%
Documentary and other programme makers		19%	6%	56%	19%
Schools and school teachers		25%	12%	25%	38%
Young people outside school		44%	25%	25%	6%
Policy-makers	6%	19%	13%	31%	31%
Industry / business community	6%	12%	19%	38%	25%
The non-specialist public	6%	25%	38%	25%	6%
Non-Governmental organisations (NGOs)	25%	6%	56%	13%	

2D.

Thinking about public engagement with, and communication about, science, roughly how many times in the past 12 months have you done each of the following?

	None	Once	2 or 3 times	4 or 5 times	More than 5 times
Worked with teachers / schools	69%	19%	12%		
Participated in an institutional open day	75%	25%			
Given a public lecture, including being part of a panel	88%	6%			6%
Taken part in a public dialogue event / debate	81%	13%			6%
Been interviewed on radio	81%	13%			6%
Been interviewed by a newspaper journalist	81%	13%			6%
Written for the non-specialist public	88%		12%		
Engaged with policy-makers	50%	38%			13%
Engaged with non-Governmental	94%			6%	
Worked with science centres / museums	94%	6%			
Judged competitions	100%				

3D.

How important do you think it is that you personally, in your current post, engage directly with the non-specialist adult public on each of the following?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important				Very Important
	1	2	3	4	5
The scientific findings of your research	6%	19%	25%	25%	25%
Areas for further research	13%	13%	18%	31%	25%
Policy and regulatory issues	13%	6%	50%	25%	6%
The wider social and ethical implications	13%	12%	31%	31%	13%
Of your research findings for society		13%	63%	25%	
The potential benefits of your work to individuals	13%	5%	44%	38%	
The scientific process / the nature of science		6%	19%	25%	50%
Scientific uncertainty	6%	13%	25%	31%	25%
The enjoyment and excitement of doing science		5%	13%	44%	38%
The relevance of science to everyday life			19%	44%	38%
To raise awareness of career options in science	6%	7%	6%	56%	25%

4D.

Looking at the list below, what do you think is the main reason for scientists generally to engage with the non-specialist public?

- To be accountable for the use of public funds
- 6% To contribute to public debates about science and scientific issues
- To contribute to discussions about the social and ethical issues science can raise
- 38% To generate / stimulate additional funds for universities and colleges
- To recruit students to your subject
- 44% To ensure the public is better informed about science and technology
- To raise awareness about your subject
- 13% To raise awareness of science generally
- There are no reasons to engage with this group
- Other, PLEASE SPECIFY

5D.

Looking at the list below, what do you think is the second most important reason for scientists generally to engage with the non-specialist public?

- 19% To be accountable for the use of public funds
- 12% To contribute to public debates about science and scientific issues
- 6% To contribute to discussions about the social and ethical issues science can raise
- To generate / stimulate additional funds for universities and colleges
- 19% To recruit students to your subject
- To ensure the public is better informed about science and technology
- 19% To raise awareness about your subject
- 25% To raise awareness of science generally
- There are no reasons to engage with this group
- Other, PLEASE SPECIFY

6D.

Looking at the list below, what do you think is the main drawback to scientists generally engaging with the non-specialist public?

- 6% It makes them look bad in front of their peers
- 6% It makes them a target
- 13% It can send out the wrong messages
- It diverts money from research projects
- 6% It diverts money from other, non-research, activities
- 57% It takes up time that is better used on research
- It takes up time that is better used on other, non-research, activities
- 12% There are no drawbacks to engaging with any of these groups
- Other, PLEASE SPECIFY

7D.

In relation to the other things you have to do in your working life, how important is it to you that you find time to engage with the non-specialist public?

- Not at all important
- 44% Not very important
- 12% Equally important
- 38% Fairly important
- 6% Very important

8D.

Would you like to spend more time, less time or about the same amount of time as you do now engaging with the non-specialist public about science?

63% I would like to spend more time

19% I am content with the amount of time I spend on this now

I would like to spend less time

18% Don't know

9D.

Why do you say that?

56% Scientists should engage more with the community

I work in a topical area of science

There is a need to recruit more students

Scientists need to be more accountable

6% I work in a controversial area of science

38% Other, PLEASE SPECIFY

10D.

How easy or difficult do you think it is to get involved in science engagement activities for those who want to do so?

Very easy

19% Very difficult

24% Don't know / can't say

38% Fairly easy

19% Fairly difficult

11D.

How well equipped do you personally feel you are to engage with the non-specialist public about your research?

12% Very well equipped

63% Fairly well equipped

25% Not very well equipped

Not at all equipped

Don't know

12D.

What training, if any, have you had in communicating science to the non-specialist public? Do not include any teaching training you may have had.

88% None

Media training on being interviewed by journalists

6% Training in writing for the non-specialist public

6% Training in speaking to the non-specialist public

Training in understanding the school education system

Training in speaking to school children (of any age)

[Other]

13D.

What would encourage you personally to get involved in activities that engage the non-specialist public in science?

- 20% To raise awareness of science
- 20% Contact with young people
- 12% To share science with people and promote they are better informed
- 12% If I am invited to participate to do it
- 12% If I had training
- 6% Support an interesting project
- 6% If this activity is recognised
- 6% This activity is important and part of my work
- 6% Feedback from society

14D.

To what extent would you personally be encouraged to get more involved in activities to engage the non-specialist public in science by each of the following?

	A great deal	To some extent	Not very much	Not at all	Don't know
If my head of department were to give me more support	6%	38%	25%	31%	
If there were awards and prizes for me as an individual		13%	25%	63%	
If it was part of getting professional status, such as chartered engineer or membership of my professional body	19%	31%	19%	25%	6%
If it helped with my own career	19%	31%	25%	25%	%
If I was relieved of other work	13%	31%	25%	31%	
If the research exercise was changed to encompass communication with the non-specialist public	25%	38%	25%	13%	
If my department or institution was recognised by an award or prize	6%	38%	31%	25%	
If it brought money into my department	13%	69%	13%	6%	
If it was easier for me to get funds for engagement activities	13%	50%	25%	12%	
If grants for engagement covered staff time as well as other costs	19%	50%	13%	19%	
If it was easier to organise such activities	13%	63%	25%		
If I had some (more) training	19%	50%	19%	13%	

15D.

What is stopping you from getting (more) involved in activities that engage the non-specialist public in science? Please mark all that apply

- 2% I am already involved enough
- I just don't want to
- 9% I am too junior
- 11% I don't know how
- I feel that I am encroaching on Press Office work
- Peer pressure
- 4% There is not enough funding
- 30% I need to spend more time on my research
- 9% I need to spend more time teaching
- 2% I need to spend more time on administration
- 9% I need to spend more time getting funding for my research
- 12% I would have to do it in my own time
- 12% Other, PLEASE SPECIFY

16D.

Do other members of your department take part in activities that engage the non-specialist public in science?

- Yes, most of them
- 63% Yes, some of them
- 25% Yes, one or two of them
- 12% None of them
- Don't know

17D.

Are the researchers in your department generally supportive towards those who take part in activities that engage the non-specialist public in science?

- 12% Yes, very supportive
- 38% Yes, fairly supportive
- 38% Not particularly supportive
- Not at all supportive
- It varies between departments
- 12% Don't know

18D.

Is your institution generally supportive towards researchers who take part in activities to engage the non-specialist public in science?

- 25% Yes, very supportive
- 31% Yes, fairly supportive
- 31% Not particularly supportive
- Not at all supportive
- It varies between departments
- 13% Don't know

19D.

If you were to administer of the research budget for science communication, what would you spend the money on? Please 3 answers

- 9% Communications departments at the institutes
- 13% Publications aimed at the broad public
- 21% Public lectures
- 4% Release of scientists for science communication
- 17% Science portals on internet
- 6% Open houses events at institutes
- 6% Communications courses for scientist
- 6% Communications course for PhD students
- 8% Science cafes and other debate events
- 2% External communications services
- 2% Science shops at institutes
- 2% Annual reports
- 4% Other

ISMN –BOLOGNA, ITALY

1S.

How important do you feel it is that you personally, in your current post, directly engage with each of the following groups about your research?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important				Very Important
	1	2	3	4	5
General journalists	15%	5%	30%	20%	30%
Popular science journalists		15%	15%	55%	15%
Others in the media such as writers	15%	25%	30%	25%	5%
Documentary and other programme makers	5%	10%	10%	35%	40%
Schools and school teachers		5%	15%	15%	65%
Young people outside school		15%	15%	20%	50%
Policy-makers	10%	10%	15%	15%	50%
Industry / business community	5%		10%	15%	70%
The non-specialist public	15%	10%	30%	25%	20%
Non-Governmental organisations (NGOs)	25%	10%	35%	25%	5 %

2S.

Thinking about public engagement with, and communication about, science, roughly how many times in the past 12 months have you done each of the following?

	None	Once	2 or 3 times	4 or 5 times	More than 5 times
Worked with teachers / schools	50%	20%	25%	5%	
Participated in an institutional open day	55%	30%	5%	5%	5%
Given a public lecture, including being part of a panel	55%	25%	5%	5%	10%
Taken part in a public dialogue event / debate	50%	30%	15%		5%
Been interviewed on radio	80%	5%	15%		
Been interviewed by a newspaper journalist	55%	15%	20%	5%	5%
Written for the non-specialist public	50%	25%	20%	5%	
Engaged with policy-makers	55%		25%	5%	15%
Engaged with non-Governmental	65%	15%	15%		5%
Worked with science centres / museums	75%	15%			10
Judged competitions	100%				

3S.

How important do you think it is that you personally, in your current post, engage directly with the non-specialist adult public on each of the following?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important		Very Important		
	1	2	3	4	5
The scientific findings of your research		10%	10%	40%	40%
Areas for further research	5%	20%	20%	20%	35%
Policy and regulatory issues	5%	20%	20%	30%	25%
The wider social and ethical implications	10%		10%	10%	70%
Of your research findings for society	5%	10%	10%	35%	40%
The potential benefits of your work to individuals	5%	15%	20%	25%	35%
The scientific process / the nature of science		10%	15%	25%	50%
Scientific uncertainty	5%	15%	15%	25%	40%
The enjoyment and excitement of doing science		10%	10%	30%	50%
The relevance of science to everyday life			25%	30%	45%
To raise awareness of career options in science	10%	15%	25%	20%	30%

4S.

Looking at the list below, what do you think is the main reason for scientists generally to engage with the non-specialist public?

- 20% To be accountable for the use of public funds
- 5% To contribute to public debates about science and scientific issues
- 5% To contribute to discussions about the social and ethical issues science can raise
- 15% To generate / stimulate additional funds for universities and colleges
- To recruit students to your subject
- 15% To ensure the public is better informed about science and technology
- 10% To raise awareness about your subject
- 25% To raise awareness of science generally
- There are no reasons to engage with this group
- 5% Other, PLEASE SPECIFY

5S.

Looking at the list below, what do you think is the second most important reason for scientists generally to engage with the non-specialist public?

- 5% To be accountable for the use of public funds
- 10% To contribute to public debates about science and scientific issues
- 15% To contribute to discussions about the social and ethical issues science can raise
- 10% To generate / stimulate additional funds for universities and colleges
- 10% To recruit students to your subject
- 25% To ensure the public is better informed about science and technology
- 15% To raise awareness about your subject
- 5% To raise awareness of science generally
- There are no reasons to engage with this group
- 5% Other, PLEASE SPECIFY

6S.

Looking at the list below, what do you think is the main drawback to scientists generally engaging with the non-specialist public?

- 5% It makes them look bad in front of their peers
- It makes them a target
- 45% It can send out the wrong messages
- It diverts money from research projects
- It diverts money from other, non-research, activities
- 10% It takes up time that is better used on research
- 5% It takes up time that is better used on other, non-research, activities
- 25% There are no drawbacks to engaging with any of these groups
- 10% Other, PLEASE SPECIFY

7S.

In relation to the other things you have to do in your working life, how important is it to you that you find time to engage with the non-specialist public?

- 5% Not at all important
- 30% Not very important
- 15% Equally important
- 25% Fairly important
- 25% Very important

8S.

Would you like to spend more time, less time or about the same amount of time as you do now engaging with the non-specialist public about science?

55% I would like to spend more time

45% I am content with the amount of time I spend on this now

I would like to spend less time

Don't know

9S.

Why do you say that?

47% Scientists should engage more with the community

14% I work in a topical area of science

5% There is a need to recruit more students

10% Scientists need to be more accountable

5% I work in a controversial area of science

19% Other, PLEASE SPECIFY

10S.

How easy or difficult do you think it is to get involved in science engagement activities for those who want to do so?

5% Very easy

20% Very difficult

20% Don't know / can't say

25% Fairly easy

30% Fairly difficult

11S.

How well equipped do you personally feel you are to engage with the non-specialist public about your research?

5% Very well equipped

65% Fairly well equipped

25% Not very well equipped

5% Not at all equipped

Don't know

12S.

What training, if any, have you had in communicating science to the non-specialist public? Do not include any teaching training you may have had.

85% None

Media training on being interviewed by journalists

10% Training in writing for the non-specialist public

5% Training in speaking to the non-specialist public

Training in understanding the school education system

Training in speaking to school children (of any age)

[Other]

13S.

What would encourage you personally to get involved in activities that engage the non-specialist public in science?

25%	If I am invited to do it
15%	To raise awareness of science
10%	To share science and raise awareness of science
20%	If I had training
10%	I am already encouraged to do it
10%	If I knew people would be interested
5%	Contact with young people
5%	If I had time

14S.

To what extent would you personally be encouraged to get more involved in activities to engage the non-specialist public in science by each of the following?

	A great deal	To some extent	Not very much	Not at all	Don't know
If my head of department were to give me more support	15%	40%	25%	15%	5%
If there were awards and prizes for me as an individual	15%	30%	10%	45%	
If it was part of getting professional status, such as chartered engineer or membership of my professional body	5%	40%	25%	30%	
If it helped with my own career	20%	30%	25%	25%	
If I was relieved of other work		20%	50%	25%	5%
If the research exercise was changed to encompass communication with the non-specialist public	30%	40%	10%	15%	5%
If my department or institution was recognised by an award or prize	10%	25%	30%	35%	
If it brought money into my department	25%	40%	15%	20%	
If it was easier for me to get funds for engagement activities	25%	45%	25%	5%	
If grants for engagement covered staff time as well as other costs	30%	40%	25%	5%	
If it was easier to organise such activities	35%	25%	25%	5%	10%
If I had some (more) training	25%	30%	20%	25%	

15S.

What is stopping you from getting (more) involved in activities that engage the non-specialist public in science? Please mark all that apply

- 13% I am already involved enough
- 4% I just don't want to
- 2% I am too junior
- 6% I don't know how
- I feel that I am encroaching on Press Office work
- 2% Peer pressure
- 4% There is not enough funding
- 26% I need to spend more time on my research
- 2% I need to spend more time teaching
- 4% I need to spend more time on administration
- 20% I need to spend more time getting funding for my research
- 7% I would have to do it in my own time
- 11% Other, PLEASE SPECIFY

16S.

Do other members of your department take part in activities that engage the non-specialist public in science?

- 70% Yes, most of them
- 25% Yes, some of them
- 5% Yes, one or two of them
- None of them
- Don't know

17S.

Are the researchers in your department generally supportive towards those who take part in activities that engage the non-specialist public in science?

- 15% Yes, very supportive
- 55% Yes, fairly supportive
- 20% Not particularly supportive
- Not at all supportive
- It varies between departments
- 10% Don't know

18S.

Is your institution generally supportive towards researchers who take part in activities to engage the non-specialist public in science?

- 10% Yes, very supportive
- 45% Yes, fairly supportive
- 30% Not particularly supportive
- Not at all supportive
- 5% It varies between departments
- 10% Don't know

19S.

If you were to administer of the research budget for science communication, what would you spend the money on? Please 3 answers.

- 5% Communications departments at the institutes
- 17% Publications aimed at the broad public
- 13% Public lectures
- 5% Release of scientists for science communication
- 17% Science portals on internet
- 20% Open houses events at institutes
- 2% Communications courses for scientist
- 3% Communications course for PhD students
- 10% Science cafes and other debate events
- 3% External communications services
- 3% Science shops at institutes
- Annual reports
- 2% Other

CMSE – EDINBURGH, UNITED KINGDOM

1M.

How important do you feel it is that you personally, in your current post, directly engage with each of the following groups about your research?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important				Very Important
	1	2	3	4	5
General journalists	20%	5%	15%	45%	15%
Popular science journalists		5%	40%	35%	20%
Others in the media such as writers	15%	30%	35%	10%	10%
Documentary and other programme makers	5%	15%	35%	20%	25%
Schools and school teachers		10%	35%	25%	30%
Young people outside school	10%	15%	30%	25%	20%
Policy-makers	5%	15%	10%	20%	50%
Industry / business community		10%	25%	10%	55%
The non-specialist public	10%	20%	35%	15%	20%
Non-Governmental organisations (NGOs)	10%	15%	35%	20%	20 %

2M.

Thinking about public engagement with, and communication about, science, roughly how many times in the past 12 months have you done each of the following?

	None	Once	2 or 3 times	4 or 5 times	More than 5 times
Worked with teachers / schools	75%	5%		2%	2%
Participated in an institutional open day	10%	15%	30%	25%	20%
Given a public lecture, including being part of a panel	65%	5%	15%	5%	10%
Taken part in a public dialogue event / debate	80%	10%	5%		5%
Been interviewed on radio	65%	20%	10%	5%	
Been interviewed by a newspaper journalist	55%	20%	10%	10%	5%
Written for the non-specialist public	65%	30%			5%
Engaged with policy-makers	30%	25%	20%	10%	15%
Engaged with non-Governmental	65%	10%	10%		15%
Worked with science centres / museums	65%	20%	10%		5%
Judged competitions	100%				

3M.

How important do you think it is that you personally, in your current post, engage directly with the non-specialist adult public on each of the following?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important			Very Important	
	1	2	3	4	5
The scientific findings of your research	5%	10%	40%	25%	20%
Areas for further research	5%	10%	45%	25%	15%
Policy and regulatory issues	10%	15%	15%	35%	25%
The wider social and ethical implications	10%	20%	20%	10%	40%
Of your research findings for society	5%	15%	30%	30%	20%
The potential benefits of your work to individuals	10%	15%	30%	25%	20%
The scientific process / the nature of science		10%	35%	15%	40%
Scientific uncertainty	5%	25%	20%	25%	25%
The enjoyment and excitement of doing science		10%	25%	30%	35%
The relevance of science to everyday life		10%	35%	20%	35%
To raise awareness of career options in science	5%	25%	15%	35%	20%

4M.

Looking at the list below, what do you think is the main reason for scientists generally to engage with the non-specialist public?

- 10% To be accountable for the use of public funds
- 10% To contribute to public debates about science and scientific issues
- To contribute to discussions about the social and ethical issues science can raise
- 10% To generate / stimulate additional funds for universities and colleges
- 15% To recruit students to your subject
- 20% To ensure the public is better informed about science and technology
- 10% To raise awareness about your subject
- 20% To raise awareness of science generally
- There are no reasons to engage with this group
- 5% Other, PLEASE SPECIFY

5M.

Looking at the list below, what do you think is the second most important reason for scientists generally to engage with the non-specialist public?

- 15% To be accountable for the use of public funds
- To contribute to public debates about science and scientific issues
- To contribute to discussions about the social and ethical issues science can raise
- To generate / stimulate additional funds for universities and colleges
- 10% To recruit students to your subject
- 20% To ensure the public is better informed about science and technology
- 30% To raise awareness about your subject
- 20% To raise awareness of science generally
- There are no reasons to engage with this group
- 5% Other, PLEASE SPECIFY

6M.

Looking at the list below, what do you think is the main drawback to scientists generally engaging with the non-specialist public?

- It makes them look bad in front of their peers
- It makes them a target
- 5% It can send out the wrong messages
- It diverts money from research projects
- It diverts money from other, non-research, activities
- 50% It takes up time that is better used on research
- It takes up time that is better used on other, non-research, activities
- 20% There are no drawbacks to engaging with any of these groups
- 25% Other, PLEASE SPECIFY

7M.

In relation to the other things you have to do in your working life, how important is it to you that you find time to engage with the non-specialist public?

- Not at all important
- 55% Not very important
- 5% Equally important
- 20% Fairly important
- 20% Very important

8M.

Would you like to spend more time, less time or about the same amount of time as you do now engaging with the non-specialist public about science?

45% I would like to spend more time

50% I am content with the amount of time I spend on this now

5% I would like to spend less time

Don't know

9M.

Why do you say that?

30% Scientists should engage more with the community

10% I work in a topical area of science

There is a need to recruit more students

5% Scientists need to be more accountable

I work in a controversial area of science

11% Other, PLEASE SPECIFY

10M.

How easy or difficult do you think it is to get involved in science engagement activities for those who want to do so?

30% Very easy

15% Very difficult

5% Don't know / can't say

35% Fairly easy

15% Fairly difficult

11M.

How well equipped do you personally feel you are to engage with the non-specialist public about your research?

5% Very well equipped

85% Fairly well equipped

10% Not very well equipped

Not at all equipped

Don't know

12M.

What training, if any, have you had in communicating science to the non-specialist public? Do not include any teaching training you may have had.

47% None

13% Media training on being interviewed by journalists

13% Training in writing for the non-specialist public

17% Training in speaking to the non-specialist public

7% Training in understanding the school education system

3% Training in speaking to school children (of any age)

[Other]

13M.

What would encourage you personally to get involved in activities that engage the non-specialist public in science?

- 15% If I had time
- 20% If this activity is recognised
- 10% if there is support (staff, training)
- 15% I am already encouraged
- 10% If I receive money for it
- 5% If I knew people would be interested and I am invited to do it
- 10% To raise awareness of science
- 5% If I am invited to do it
- 5% I am not interested in getting involved
- 5% To stimulate additional funds for my research

14M.

To what extent would you personally be encouraged to get more involved in activities to engage the non-specialist public in science by each of the following?

	A great deal	To some extent	Not very much	Not at all	Don't know
If my head of department were to give me more support	10%	25%	30%	35%	
If there were awards and prizes for me as an individual	10%	25%	25%	40%	
If it was part of getting professional status, such as chartered engineer or membership of my professional body	20%	30%	20%	30%	
If it helped with my own career	20%	45%	15%	20%	
If I was relieved of other work	35%	30%	45%	20%	
If the research exercise was changed to encompass communication with the non-specialist public	20%	50%	15%	15%	
If my department or institution was recognised by an award or prize	5%	45%	20%	30%	
If it brought money into my department	36%	40%	20%	5%	
If it was easier for me to get funds for engagement activities	20%	30%	30%	15%	5%
If grants for engagement covered staff time as well as other costs	20%	40%	30%	10%	
If it was easier to organise such activities	40%	35%	40%	15%	
If I had some (more) training	10%	25%	20%	40%	5%

15M.

What is stopping you from getting (more) involved in activities that engage the non-specialist public in science? Please mark all that apply

- 8% I am already involved enough
- 3% I just don't want to
 - I am too junior
- 4% I don't know how
 - I feel that I am encroaching on Press Office work
- 3% Peer pressure
- 7% There is not enough funding
- 18% I need to spend more time on my research
- 13% I need to spend more time teaching
- 15% I need to spend more time on administration
- 17% I need to spend more time getting funding for my research
- 6% I would have to do it in my own time
- 7% Other, PLEASE SPECIFY

16M.

Do other members of your department take part in activities that engage the non-specialist public in science?

- Yes, most of them
- 70% Yes, some of them
- 25% Yes, one or two of them
- None of them
- 5% Don't know

17M.

Are the researchers in your department generally supportive towards those who take part in activities that engage the non-specialist public in science?

- 20% Yes, very supportive
- 45% Yes, fairly supportive
- 25% Not particularly supportive
- Not at all supportive
- It varies between departments
- 10% Don't know

18M.

Is your institution generally supportive towards researchers who take part in activities to engage the non-specialist public in science?

- 20% Yes, very supportive
- 35% Yes, fairly supportive
- 25% Not particularly supportive
- 5% Not at all supportive
- 5% It varies between departments
- 10% Don't know

19M.

If you were to administer of the research budget for science communication, what would you spend the money on? Please 3 answers.

- 5% Communications departments at the institutes
- 7% Publications aimed at the broad public
- 17% Public lectures
- 12% Release of scientists for science communication
- 2% Science portals on internet
- 12% Open houses events at institutes
- 5% Communications courses for scientist
- 14% Communications course for PhD students
- 12% Science cafes and other debate events
- 3% External communications services
- 3% Science shops at institutes
- Annual reports
- 8% Other

QUESTIONNAIRE

THE QUESTIONNAIRE

The Royal Society *Survey of Factors affecting science communication by scientists and engineers, 2006*, (<http://royalsociety.org/policy/publications/2006/science-communication/>), has been an obligatory reference point when comparing studies on the views and attitudes of scientists to public communication of science.

The study was carried out in 2006 in the UK and was jointly funded by the Royal Society, Research Councils UK and the Wellcome Trust. It involved a web-survey with 39 item questionnaire, aimed at examining:

- **the importance of science communication to researchers**
- **the amount and type of science communication activities undertaken by researchers**
- **the factors that may facilitate or inhibit science communication**

The empirical research I present here seeks to contribute to the analysis of these particular objectives. Therefore the questionnaire I applied was a personal selection of some of the items included in the Royal Society's survey (2006) in order that its results also could be contrasted with similar others.

Other surveys such as *European Research in the Media: the Researcher's point of view* (European Commission, 2007) and *Interactions with the mass media* (Peters & et al; 2008) guided their interviewees to assess the degree and types of initiatives taken by researchers particularly in their relation with the media. This however is not included as a subject of study in the present empirical research.

The Royal Society Questionnaire dedicated 14 items to get personal information of the participants (position, working status, research area, age, gender, ethnic origin, etc). Again, these were not considered for selection in this research. However, the remaining 25 items were considered because they explore the following five categories of information:

- I. What public engagement means to scientists and why it is important
- II. Audiences and activities
- III. Barriers to science communication
- IV. Training and demand
- V. Incentives for science communication

The questionnaire which I have applied selected 18 questions from these 25 groups of items. Those items that were selected followed my own personal criteria - basically those that could be considered suitable for a face to face interview- and each interview lasted about 40 minutes. Furthermore, the items selected were not modified in any way and were presented in their original format.

The complete questionnaire applied in this empirical research is included as follows;

1. How important do you feel it is that you personally, in your current post, directly engage with each of the following groups about your research?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important 1	2	3	4	Very Important 5
General journalists (i.e. in press, TV and radio)					
Popular science journalists (e.g. on New Scientist)					
Others in the media such as writers					
Documentary and other programme makers					
Schools and school teachers					
Young people outside school					
Policy-makers					
Industry / business community (other than where directly concerned with funding your research)					
The non-specialist public					
Non-Governmental organisations (NGOs)					

2. Thinking about public engagement with, and communication about, science, roughly how many times in the past 12 months have you done each of the following?

	None	Once	2-3 times	4-5 times	More than 5 times
Worked with teachers / schools (including writing educational materials)					
Participated in an institutional open day					
Given a public lecture, including being part of a panel					
Taken part in a public dialogue event / debate					
Been interviewed on radio					
Been interviewed by a newspaper journalist					
Written for the non-specialist public (including for the media, articles and books)					
Engaged with policy-makers					
Engaged with non-Governmental					
Worked with science centres / museums					
Judged competitions					

3. How important do you think it is that you personally, in your current post, engage directly with the non-specialist adult public on each of the following?

Please rate importance on a scale of 1 to 5, where 1 is not important and 5 is very important.

	Not important 1	2	3	4	Very Important 5
The scientific findings of your research					
Areas for further research					
Policy and regulatory issues					
The wider social and ethical implications					
Of your research findings for society					
The potential benefits of your work to individuals					
The scientific process / the nature of science					
Scientific uncertainty					
The enjoyment and excitement of doing science					
The relevance of science to everyday life					
To raise awareness of career options in science					

4. Looking at the list below, what do you think is the main reason for scientists generally to engage with the non-specialist public?

To be accountable for the use of public funds	
To contribute to public debates about science and scientific issues	
To contribute to discussions about the social and ethical issues science can raise	
To generate / stimulate additional funds for universities and colleges	
To recruit students to your subject	
To ensure the public is better informed about science and technology	
To raise awareness about your subject	
To raise awareness of science generally	
There are no reasons to engage with this group	
Other, PLEASE SPECIFY	

5. Looking at the list below, what do you think is the second most important reason for scientists generally to engage with the non-specialist public?

To be accountable for the use of public funds	
To contribute to public debates about science and scientific issues	
To contribute to discussions about the social and ethical issues science can raise	
To generate / stimulate additional funds for universities and colleges	
To recruit students to your subject	
To ensure the public is better informed about science and technology	
To raise awareness about your subject	
To raise awareness of science generally	
There are no reasons to engage with this group	
Other, PLEASE SPECIFY	

6. Looking at the list below, what do you think is the main drawback to scientists generally engaging with the non-specialist public?

It makes them look bad in front of their peers	
It makes them a target	
It can send out the wrong messages	
It diverts money from research projects	
It diverts money from other, non-research, activities	
It takes up time that is better used on research	
It takes up time that is better used on other, non-research, activities	
There are no drawbacks to engaging with any of these groups	
Other, PLEASE SPECIFY	

7. In relation to the other things you have to do in your working life, how important is it to you that you find time to engage with the non-specialist public?

Not at all important	
Not very important	
Equally important	
Fairly important	
Very important	

8. Would you like to spend more time, less time or about the same amount of time as you do now engaging with the non-specialist public about science?

I would like to spend more time	
I am content with the amount of time I spend on this now	
I would like to spend less time	
Don't know	

9. Why do you say that?

Scientists should engage more with the community	
I work in a topical area of science	
There is a need to recruit more students	
Scientists need to be more accountable	
I work in a controversial area of science	
Other, PLEASE SPECIFY	

10. How easy or difficult do you think it is to get involved in science engagement activities for those who want to do so?

Very easy	
Very difficult	
Don't know / can't say	
Fairly easy	
Fairly difficult	

11. How well equipped do you personally feel you are to engage with the non-specialist public about your research?

Very well equipped	
Fairly well equipped	
Not very well equipped	
Not at all equipped	
Don't know	

12. What training, if any, have you had in communicating science to the non-specialist public? Do not include any teaching training you may have had.

None	
Media training on being interviewed by journalists	
Training in writing for the non-specialist public	
Training in speaking to the non-specialist public	
Training in understanding the school education system	
Training in speaking to school children (of any age)	
[Other]	

13. What would encourage you personally to get involved in activities that engage the non-specialist public in science?

14. To what extent would you personally be encouraged to get more involved in activities to engage the non-specialist public in science by each of the following?

	A great deal	To some extent	Not very much	Not at all	Don't know
If my head of department / line manager were to give me more support and encouragement					
If there were awards and prizes for me as an individual					
If it was part of getting professional status, such as chartered engineer or membership of my professional body					
If it helped with my own career					
If I was relieved of other work					
If the research exercise was changed to encompass communication with the non-specialist public					
If my department or institution was recognised by an award or prize					
If it brought money into my department					
If it was easier for me to get funds for engagement activities					
If grants for engagement covered staff time as well as other costs					
If it was easier to organise such activities					
If I had some (more) training					

15. What is stopping you from getting (more) involved in activities that engage the non-specialist public in science? Please mark all that apply

I am already involved enough	
I just don't want to	
I am too junior	
I don't know how	
I feel that I am encroaching on Press Office work	
Peer pressure	
There is not enough funding	
I need to spend more time on my research	
I need to spend more time teaching	
I need to spend more time on administration	
I need to spend more time getting funding for my research	
I would have to do it in my own time	
Other, PLEASE SPECIFY	

16. Do other members of your department take part in activities that engage the non-specialist public in science?

Yes, most of them	
Yes, some of them	
Yes, one or two of them	
None of them	
Don't know	

17. Are the researchers in your department generally supportive towards those who take part in activities that engage the non-specialist public in science?

Yes, very supportive	
Yes, fairly supportive	
Not particularly supportive	
Not at all supportive	
It varies between departments	
Don't know	

18. Is your institution generally supportive towards researchers who take part in activities to engage the non-specialist public in science?

Yes, very supportive	
Yes, fairly supportive	
Not particularly supportive	
Not at all supportive	
It varies between departments	
Don't know	

19. If you were to administer of the research budget for science communication, what would you spend the money on? Please Maximum 3 answers.

Communications departments at the institutes	
Publications aimed at the broad public	
Public lectures	
Release of scientists for science communication	
Science portals on internet	
Open houses events at institutes	
Communications courses for scientist	
Communications course for PhD students	
Science cafes and other debate events	
External communications services	
Science shops at institutes	
Annual reports	
Other	

20. What kinds of knowledge about Nanosciences do you think ought to be communicated to the general public?

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