

THE INTERNATIONAL PUBLIC COMMUNICATION OF SCIENCE AND TECHNOLOGY NETWORK

A BRIEF HISTORICAL OVERVIEW

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[on behalf of the PCST network Scientific Committee]

Throughout its historical development, the public communication of science has seen different ways of understanding its task. Currently, the overload of information and its increasing freedom of circulation between individuals require new ways of understanding the role of science in our society. In this new context, networking mechanisms may function as a social and cultural laboratory that makes it possible to face the challenges derived from the development of scientific knowledge. This article reviews the role played by the PCST (Public Communication of Science and Technology) Network in the debating and generation of new ideas on the relationship between science, society and culture.

La comunicación pública de la ciencia ha conocido, a lo largo de su desarrollo histórico, distintas formas de entender su tarea. En la actualidad, la sobresaturación de información y su cada vez más libre circulación entre los individuos exigen nuevas formas de entender el papel de la ciencia en nuestra sociedad. En este nuevo contexto, los mecanismos en red pueden funcionar como un laboratorio social y cultural que permita enfrentar los retos derivados del desarrollo del conocimiento científico. Este artículo repasa el rol que desde su fundación ha tenido la red PCST (Public Communication of Science and Technology) en el debate y generación de nuevas ideas sobre la relación entre ciencia, sociedad y cultura.

Introduction

A brief historical perspective

The development of modern science was accompanied almost simultaneously by the birth of practices to make specialized knowledge available for the public. Since the very beginning, various expressions were used: popularization of sciences, public understanding of science, public awareness of science, science literacy, socio-diffusion of science, cultural scientific action, public awareness of science or public communication of science and technology (PCST).

Through all over these formulas and periods, it is possible to identify a historical goal that includes three components. First of all, the *political* one. Because the produc-

tion of specialized knowledge (i.e. scientific) requires specific organization (terminology, institutions, ways of verification...) that isolates the world of scientific production from the community as a whole, PCST aims to rebuild community by recreating links between science and society. The second component is *cognitive*. In order to share specialized knowledge communication tools are adjusted to make this knowledge available and understandable by non-specialized people. The third component could be called *creative* and strives to foster the intelligence and capability of non-specialized audiences, enabling them to integrate this knowledge in their daily lives. Through history it is possible to identify several representations of this triple «political ends» of the public communication of science.

In the 18th Century (*Siècle des Lumières*), the *Encyclopedia of Denis Diderot and Jean d'Alembert* aimed at gathering all the knowledge and know-how humanity had produced to make it available for the ones able to read (the so-called *honnêtes hommes*). This first major enterprise of PCST involved hundreds of philosophers from all over Europe. In order to be widely accessible, the Encyclopedia used a vulgar language (French, that was the communication language in Europe) instead of the elite one (Latin). Printing was the technology that allowed it, mainly clandestinely. The struggle against despotism moved the philosophers.

In Europe, in late sixties and the seventies a deep and wide libertarian movement took place and made an impact also on traditional ways of popularization. Science was considered by political activists and by some scientists as the private ally of central authorities. This activist movement aimed to renew PCST from the non-specialized audiences point of view, allowing them to use scientific knowledge to promote their own interests. The traditional one-way diffusion model of popularization was denounced.

By the end of 20th century, European cities set up the construction of huge brand new science centers or renovated existing science museums. Recreating community, sharing specialized knowledge and enabling people still is the global goal of PCST.

Another interesting evolution is noticeable today in PCST outside Europe. Though modern science is international (global) by definition, when it comes to public communication of science, the local social and cultural values play a major role. Through history and all over the planet, civilizations and cultures used to produce, validate and disseminate specialized knowledge creating specific devices, ways and means. Investigating about these ways allows to renew them on a strong cultural basis in order to match them with PCST contemporary aims and issues.

Birth of networking

In this early 21st century, the role of science as a means of creating innovation, development and progress in the modern world and of improving the wealth and

well being of nations is undisputed. Yet, despite the contribution that science has and continues to make to the growth of the world's economy, a large fraction of the public and governments in most countries is still mostly uninterested, uninformed or badly informed, if not afraid, sceptical or concerned about the directions that science is taking and the possible consequences to them and future generations.

For many people concerned about the relationship between science and society, de-mystifying science and focussing on the benefits of education and innovation are critical to gaining public support for science. For others, better public understanding of science means better ability of citizens to shape, direct, and even criticize scientific institutions so as to keep them accountable to public concerns. No matter which view is taken, the range of people to be communicated with is wide and diverse, making collaboration and networking both desirable and necessary.

The PCST International Network

In the last decade, many formal and informal networks have been set up world-wide to collaboratively promote the public communication of science and technology. The International Network on Public Communication of Science and Technology (known by the acronym of PCST: www.pcstnetwork.org) is one of the first, most general in scope and probably the widest of the international networks operating today for the public communication of science and technology. It was born in 1989 after the first International Meeting on Public Scientific Communication that took place at Poitiers, France. The 130 participants from 14 countries decided to meet again to discuss the public's growing need for more information about scientific and technological matters and all the problems and developments concerning science communication.

The aim of the network is to multiply opportunities for exchange and co-operation among both researchers of PCST and PCST professionals who work in the many diverse but complementary fields of public communication of science and technology. It especially intends to facilitate these interactions on an international basis to foster exchanges between different cultural approaches.

PCST members include science journalists, science museum and science centre producers, science theatre directors, academic researchers who study aspects of PCST, scientists who deal with the public, public information officers working in scientific institutions, teachers and trainers, educators and lecturers, and many others interested in these issues. The PCST Network sponsors international conferences, electronic discussions, and other activities to foster dialogue among the different groups of people interested in PCST, leading to cross-fertilization across professional, cultural, international and disciplinary boundaries. The PCST Network seeks to promote new ideas, methods, intellectual and practical questions, and perspectives.

Its declared aims are:

- To foster public communication of science and technology (PCST).
- To encourage discussion of practices, methods, ethical issues, policies, conceptual frameworks, economic and social concerns, and other issues related to PCST.
- To link practitioners of PCST, researchers who study PCST, and scientific communities concerned with PCST.
- To link those from different cultures and countries world-wide, in both developed and developing parts of the world, concerned with PCST.
- To provide opportunities for meetings, electronic interactions, and collaborations among people interested in PCST.

Operation

The PCST Network operates through:

1. A Scientific Committee led by an Executive Committee
2. An electronic discussion
3. Regular international conferences
4. Other activities as the scientific committee determines.

The Scientific Committee

- a) The Scientific Committee is composed of not more than 25 people.

- b) No more than 6 new members of the Scientific Committee may be appointed at any one time.
- c) The term of the Scientific Committee members starts at the end of one PCST international conference and lasts until the end of the following conference.
- d) The Scientific Committee meets at least at each international conference to discuss items such as: selecting the host for subsequent meetings or determining the composition of the new Scientific Committee.

New members of the Scientific Committee are nominated and selected in the following way:

- Members of the Scientific Committee make nominations before each international conference to the Executive Committee.
- Any individual may request to a member of the Scientific Committee that a specific name (including his or her own) be placed in nomination.
- The Executive Committee recommends to the Scientific Committee those members whose terms should be extended, based on the active involvement of those members and the need to maintain diversity of gender, background, and geographic region.
- The Executive Committee recommends to the Scientific Committee other members from the nominations received.
- The Scientific Committee discusses the recommendations of the Executive Committee and select new members.
- The chairs of previous International Conferences of the PCST Network serve as honorary non-voting members of the Scientific Committee.

The Executive Committee

The Executive Committee consists of the following people:

The Chair of the previous conference (who will convene the Executive Committee and serve as chair of the PCST Network); the Chair of the current conference; the Chair of the next conference, and two members elected from the Scientific Committee.

The Executive Committee has the task of suggesting new members to the Scientific Committee, assisting the chair with the process of selecting the hosts of succeeding conferences, making operational decisions between the meetings of the Scientific Committee, designating other activities as provisional affiliates of the PCST Network, until the next meeting of the Scientific Committee and issuing an annual report. The Chair of the most-recently concluded International Conference serves as Chair of the PCST Network.

PCST electronic discussion

Much of the activity of the International Network on Public Communication of Science and Technology takes place via electronic discussions. The primary locale for these discussions is PCST-L, an electronic mailing list devoted to public communication of science and technology. PCST-L provides an opportunity for discussion, exchange and co-operation among practitioners, researchers, and scientists with an active professional interest in science popularization and related topics. The audience includes science journalists, public information officers at both profit and non-profit institutions and organizations, museum educators, scientific popularizers, communication researchers, journalists, educators and others. The list is explicitly intended to cross international, cultural, and professional boundaries. The list is technically-hosted at Cornell University, Ithaca, New York, USA. It is semi-moderated, meaning that contributions are routed through designated moderator(s) for approval. Messages are either accepted or rejected in their entirety, not edited. No on-topic messages are rejected unless, in the moderator(s) s judgement, they will be seen as disruptive or offensive.

PCST Conferences. Main outcomes

The International PCST Network meets approximately every two years. The International Conferences are intended to be opportunities for sharing information about best practices, current research, conceptual issues, and other matters of interest to the PCST Network. Efforts are made to hold the meetings at diverse locations

world-wide. About six months before each International Conference, a general invitation is issued calling for proposals to host the conference four years ahead. The issues to be addressed in the proposals are:

- Opportunities for culturally diverse participation (to address this issue conferences will be encouraged in countries where they have not been held before).
- Those organizations that will support the conference in the host country.
- Budget.
- How delegates from developing countries will be supported to participate in the conference.
- How the host country will support attendance of members of the PCST Scientific Committee (minimally, through complimentary conference registration and accommodation; if possible, through travel assistance).
- A suggested theme for the conference.
- The use of English as the primary language, with other languages and translation arranged as appropriate.

These proposals are put to the Scientific Committee at their meeting at the International Conference, and a representative of each bidding group is invited to make a short presentation and to answer questions. The Scientific Committee will make its decision by the end of the International Conference. During preparations for each International Conference, the Scientific Committee leads discussion on the program and acceptance of paper abstracts. The Chair of the conference appoints a local Organizing Committee. The Organizing Committee is responsible for all operations of the meeting, including issuing calls for papers, arranging meeting space and accommodation, setting up social activities, etc. The Organizing Committee is responsible for coordinating with the PCST Network Chair, who leads the work of the Scientific Committee in evaluating abstracts and planning the program (table I).

Main outcomes of most recent conferences

PCST6 AT CERN, GENEVA, FEBRUARY 2001:
«BRIDGING THE GAP BETWEEN THEORY AND PRACTICE».
 Will communication be able to bridge the gap between

Science and Society? What is the impact of science communication on the public? How do novel means of communications change the perception of science for the general public? These were the main issues addressed at the 6th Public Communication of Science and Technology meeting, held at CERN, the European Laboratory for Particle Physics, on 1-3 February 2001. Over 250 people from all over the world attended the conference, whose main focus was on the impact of science communication on the target audience. All the themes chosen for the plenary sessions of the programme as well as for the afternoon workshops reflected the need for more cross-fertilization between academia and practice in science communication. Great attention was also devoted to research and practice in science museums, particularly in terms of evaluation of their success. Another main theme of the programme was novel means of communicating science to the public, and no venue could be better chosen than CERN, the birthplace of the WWW. Locating one of the PCST conferences on the very site of one of the largest scientific laboratories in the world also reflected the need for integrating scientists into the communication process. Connected to the conference, a public debate entitled «What does Science do for Society?» was organised in a Geneva movie theatre, with the participation of scientists, politicians and communicators.

PCST 7 IN DECEMBER 2002, CAPE TOWN: «SCIENCE COMMUNICATION IN A DIVERSE WORLD». The meeting was organized by the South African Foundation

for Education, Science and Technology with the primary sponsorship by the Department of Science and Technology and was headed by Marina Joubert. The venue was the University of Cape Town campus, on the slopes of Table Mountain. Over 300 participants represented more than 30 countries from around the globe. The conference main aim was to explore novel ways of communicating science and engaging new audiences, and to promote networking and linkages between science communication theory and practice in developed and developing countries. Three plenaries, 47 parallel sessions (with a final one entitled «Communicating in the savannas») and three poster sessions took place. From among numerous interesting sections, one can mention the following ones: Science on the road; Environmental communication; Public perceptions and knowledge of science; Reaching out to rural communities; Celebrating science; Inspiring the young; Scientific uncertainty and science communication; Visualizing communication; Science theatre; Science-media interfaces; Showtime at science centers. During the event it turned out that the public communication of science and technology is a fast-developing field in Southern Africa, and the conference was a catalyst to this process for the entire region. The meeting provided an opportunity for intensive interaction between science communicators and science communication researchers from around the world. The conference did emphasize sharing of experiences, ideas and best practices between developed and developing states.

The development aspect was dominant at PCST-7. The conference was followed by a specialized workshop

Table I	list of past and currently scheduled conferences
1989, May	Poitiers (France)
1991, May	Madrid (Spain)
1994, April	Montreal (Quebec, Canada)
1996, November	Melbourne (Australia)
1998, 17-19 September	Berlin (Germany) – Science Without Frontiers (http://www.fu-berlin.de/pcst98)
2001, 1-3 February	CERN, Geneva (Switzerland) – Trends in Science Communication Today: Bridging the Gap between Theory and Practice (http://www.cern.ch/PCST2001)
2002, 5-7 December	Cape Town (South Africa) – Science Communication in a Diverse World (http://www.PCSTNetwork.org/PCST7.html)
2004, June	Barcelona (Catalonia, Spain) – Scientific Knowledge and Cultural Diversity (http://www.pcst2004.org)
2006, August	Seoul (Korea)

organized by the convenor Marina Joubert of the South African Foundation for Education, Science and Technology (FEST) and Bruce Lewenstein of Cornell University, USA, with the support of the US National Science Foundation. The goal of the workshop was to explore differences between how «public understanding of science» is perceived in the developed world and how it might be perceived and defined in the developing world. It brought together over 50 individuals from 16 countries and six continents –journalists, scientists, museum and science centre staff, policy analysts, community outreach coordinators and academic researchers. One of the main results of the two-day workshop was that new definitions of science literacy are needed to ensure that public communication of science and technology addresses the real needs of people and societies in the developing world. In the developed part of the world, which is infused with science and technology, it seems obvious that it is desirable that more people understand scientific research and how it can be used to improve life. In developing countries, modern science and technology offer hope for addressing the pressing needs of improved nutrition, public health, safety, and shelter. Although the «public understanding of research» –understanding the scientific process and the results of cutting edge work– is essential for any modern society, whether in the North or South, our vision of what makes a good public understanding programme in developed countries does not obviously have any relevance in the developing world. In the developed world, debates about topics such as nuclear power or genetically modified foods take it for granted that access to energy or nutritious meals is not at stake, and that individuals are free to make meaningful choices. Moreover, developed-world scientists take as a given fact that science is as fundamental a part of modern culture as music or art. Even the definition of science in the developed world often seems unproblematic: science is the product of cutting-edge research conducted by methods and techniques that have emerged from Europe since the 17th century. But for much of the developing world, public understanding of research is about much more basic issues: providing clean water for drinking and cooking, learning the essential link between unprotected sexual intercourse and HIV infection, and so on. In this developing-world context, it is not clear that

museum exhibits about electricity or magazine articles about in-vitro fertilisation are relevant in addressing the needs of most of the population. Public understanding of science in this community is not about the latest immunological results, nor about acquiring greater political power, or improved use of scientific instruments; it is about addressing fundamental barriers to scientific information. These barriers are not caused by ignorance or hostility, but by the core conditions of the developing world –local languages, poverty, lack of public health, lack of economic infrastructure and lack of education.

One of the main conclusions of the workshop was that it is necessary to redefine our terms of reference. The developed world has the luxury of detached interest in reliable knowledge about the natural world. In contrast, public understanding in the developing world must focus on knowledge upon which one can act immediately. Some of the more practical conclusions were: create databases of successful projects and opportunities for training, improve access to web-based materials and provide ongoing support to people and projects. Some reinforced the continuing need to evaluate the effectiveness of particular programmes and to recognize that there is no one «best» practice, as all projects need to be adapted and used in particular local contexts. The more far-reaching conclusions forced the workshop to redefine science literacy itself. Instead of «practical» science literacy, Nalaka Gunawardene, a veteran science and environment journalist from Sri Lanka, talked about defining public understanding as «the minimum knowledge to make life better». He advocated thinking in terms of survival: of preventing dehydration of babies, of campaigning for better road safety, of promoting the safe use of pesticides. Similarly, «civic» science literacy looks different in the developing world. Carlos Setti, a Brazilian science writer, reminded the participants of the gaps between rich and poor in developing countries and urged to always put public understanding programmes «at the service of overcoming social and regional inequalities» –a reminder that choices about how to allocate scientific and technological resources are not politically neutral.

The final conclusion was still that research –including open and honest appraisal of the reliable know-

ledge embodied by indigenous systems— offers tools of great value to the developing world and that public understanding of research is necessary to convey the excitement of research, especially to children. After all, recruiting the next generation of scientists is as critical, perhaps more critical, to the culture of the developing world than to the developed world.

Presentations at PCST-7 are available on the conference website: <http://www.fest.org.za/pcst>

PCST-8 IN BARCELONA, JUNE 2004: «SCIENTIFIC KNOWLEDGE AND CULTURAL DIVERSITY». The 8th International Conference on Public Communication of Science & Technology will take place in Barcelona, Spain and will include electronic links with Latin America. Its main theme will be «Scientific Knowledge and Cultural Diversity».

Under the motto Scientific Knowledge and Cultural Diversity, the 8th PCST Conference opens up a field to debate about the global discourse of science in a range of local culture and knowledge environments. In a time in which the world is convulsed by ideological and economic power conflicts, the universality of science may be one of the possible ways to allow for developing a dialog among cultures. The different ways in which science is conceived, interpreted, communicated and applied, depending on the cultural view of each person and each community will be addressed at the Conference. In the year 2004, Barcelona will be the capital city of cultural diversity. The 8th PCST Conference is included into the framework of the Universal Forum of Cultures 2004 The Universal Forum of Cultures is a new type of world event, of spirit and scale similar to the Olympic Games and International Exhibitions, but based on the cultures of the world. It is, in other words, the premiere adventure in a new sort of international encounter for the Knowledge Era. Barcelona is, then, currently engaged in a process of dialogue and exchange to define the conditions that will allow the 21st century to be a century of peace instead of a period of wars. A century in which ethics is paramount, while selfishness is disregarded. A century in which pacific co-existence between different ways of looking at the world goes over the intolerance between ideologies. Details: www.pcst2004.org

The 9th International Conference on Public Communication of Science & Technology will take place in Seoul, South Korea in August 2006.

The challenges still ahead in the Public Communication of Science and Technology

Because of humanistic, democratic and educational motivations, governments, scientific institutions and diverse associations advocate for broad persuasive campaigns in favor of scientific literacy or public awareness of science. Such an aim sounds so great and so generous by itself! People may declare «science is very important», visitors of science centers and readers of science magazines are still too limited to scientific literate ones, school children, students or «science addicted ones». How to reach also the wider non-specialized audiences that represent the core historical target public of PCST? Defining a fantastic and generous goal (end) is one thing. Achieving it is another one. To tackle PCST issues in the knowledge-based society, one has to consider the characteristics and challenges of the so-called society, the technologies involved and the role of scientific knowledge, workers and institutions inside it.

During the age of agriculture, specialized knowledge was coming from the past. One had to use it in order to reproduce what made survival possible. The age of industry used modern sciences and technologies and «opened the future». Within the still-to-be-defined knowledge society, information and communication technologies (ICT) are used to transform information in order to produce information! To allow these processes in an overwhelmed information world, networking devices are essential.

Previously, PCST was focused on explanations about nature. Within this open and global 21st early century, its main function is that of a kind of social and cultural laboratory to face issues and challenges created by the development of scientific knowledge, activities and applications. The power of science and technology has reached such a high level that science today cannot just decide by itself where to go. Consensus and citizens conferences are crucial to deal with this kind of central issues. ¶