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Project execution

ESConet Workshops (ESCW: ESConet – the European Science Communication Network), a three-year project set up in 2005 as part of the European Commission’s Framework 6 Science and Society Programme, sets out to help address the needs of scientists to communicate. The 12 ESConet Modules presented at the end of this Publishable Report are the outcome of that project. ESConet embodies a unique, cross-European collaboration between science communication researchers, scientists, science information officers, science journalists and policy-makers. Designed primarily to help trainers who want to run training workshops, the modules have been put together to provide a framework, a scaffold, onto which effective science communication training can be hung.

ESConet consisted of 17 institutions involved with higher education and science, covering 12 countries eligible for Framework 6 funding. It had contracted to carry out three training workshops during the course of 30 months. In the end, as a result of being able to mobilise additional resources in support of its activities, ESConet delivered three core training workshops, two additional workshops to train the new generation of trainers, and a series of ESConet-related workshops in conjunction with other partners. The project was finally extended to run for 38 months, on a no-extra-cost basis, to allow ESConet to present sessions at the PCST-10 conference in Malmo in June 2008, thereby ensuring that its work became known to a wide audience of those involved in science communication training and activities.

The development the initial drafting of the ESConet Modules was carried out by a Curriculum Development Team (CDT) during the first 12 months of the project. That team identified topics to be covered and divided the work so that two members of the CDT took responsibility for each of the modules. After initial drafts had been prepared they were sent out for comment to the entire network. Comments, as appropriate and feasible, were included into second drafts. Editing of the modules continued until the very end of the project, with modifications being made in the light of new comments and – most importantly – the experience gained by ESConet in delivering the modules in actual workshops. Thus the modules that are presented at the end of this Publishable Report represent the collective work of all 17 partners. We first outline the philosophy behind ESConet and its implementation.

What is Special About *Science Communication*?

Researchers – from the natural sciences and elsewhere – are under increasing pressure to communicate, to talk to their fellow citizens about what they do, to engage with the public, and to be “friendly” to the media. But there is not much in the usual training programme for working scientists that prepares them for such activities. There are “born” communicators; and there are even more who think that they have the “gene for communication”. But for the most part, researchers are left to their own devices to pick up what communication skills they can by watching their peers and going through the ordeals of putting up their first conference poster and giving their first seminar.

Unfortunately, this training (such as it is) for talking to fellow scientists is not really much use when it comes to situations that require researchers to speak to audiences without a high level of technical expertise in contexts outside the scientific community. These contexts of public engagement include writing for popular audiences, being interviewed by the media, communicating the risks associated with their scientific work, creating an exhibit for a science

centre or festival, designing a non-specialist science website, participating in dialogue with citizens, or going out to talk to a local school group (often the most intimidating, if rewarding, audience of all). These are situations where even the most accomplished performers in the comfort zone of the scientific conference can find themselves in real difficulty. However, more and more, it is in these public environments that researchers are now being asked to perform.

There is, perhaps, a special relevance and importance to *science* communication that is often overlooked in official pronouncements as to why researchers must communicate with the public. The French physicist and science populariser Michel Crozon once remarked: "I am popularising in order to understand better what I am doing." That is to say, the practice of popularising science helps scientists to conceptualise their knowledge in ways that enable them to give some sense to what is coming out of the laboratory, observatory or computer simulation. It is only when the "words of science" have an everyday meaning that they can be used to discuss scientific issues and the relevance of science. This is something that ESConet brings to the fore.

Some may feel that ESConet embodies a central paradox: our modules are tailored towards science, yet we continually stress that science is not a unique case in communication situations, and the techniques we discuss in the practical modules, especially, are valid for many non-science situations as well.

But we do feel that there are special challenges to communicating the results of scientific research – abstraction, jargon, numbers, probabilities and all the other elements that make science that bit more unfamiliar than sport, art, politics, economics and law, all of which appear to impinge much more directly on everyday life.

The Ethos of ESConet

There are several other groups and individuals that engage in [science] communication training. So what makes ESConet different?

One issue is that we have tried to go beyond the basic skills required to communicate scientific information clearly and in ways that are understandable by lay audiences, vital though those skills are. ESConet has tried to develop workshops that address more difficult communication situations – communicating risk, dealing with controversial science, and the interactions between scientific information and lay knowledge – where science is not the only voice and where *listening* is perhaps the hardest thing to do. The modules also offer researchers an opportunity to reflect critically on the social, cultural, political, and ethical dimensions of their daily scientific work in an effort to prepare them for the current dialogue and debate climate of science and society relations.

All projects funded by the European Commission are supposed to feature a "European dimension". ESConet has been a distinctly European experience in which workshops have deliberately set out to have both trainers and trainees from a variety of countries across the European Union. Sometimes that has meant we have been able to give training in languages other than English, when asked for. More often, there has been a genuine multicultural (and multidisciplinary) mix that has enlivened the project and informed its work. The modules we have developed set out to capture at least part of that European ambiance.

The content and scope of the modules reflect the wide-ranging backgrounds, professional experience and theoretical perspectives of the members of ESConet. Network members are

leading experts in the field of science communication, with long records of publishing in the area, including seminal books and papers, while others are active media professionals with significant practical science communication experience. Some are early-career science communication researchers and professionals actively contributing to their discipline's development. Others, yet again, have significant experience as policy makers in the area of science-and-society. And many are full-time, published scientists who are committed to public engagement.

So the network maintained an engaging and productive balance between practical skills and reflection on more theoretical issues that affect the working lives of contemporary scientists. These issues included, among others, the place for dialogue between science and society, cultural and ethical dimensions of scientific practice, and an understanding of the values from outside science that contribute significantly to science communication in various contexts. Throughout, the project was strongly underpinned by sociological teaching and research. But the aim of ESConet was practical science communication, not a masters course in science and society. So the resulting modules aim to give trainees the skills to engage honestly and positively with various media and public audiences. They do not seek to teach the “dark arts” of public relations offered by some commercial communication training consultancies.

The communication skills training provided by ESConet offers a core skill-set, but not just a ready-made “bag of tricks” to be used to convey simplistic messages in any communication situation.

Throughout the workshops given by ESConet, the focus has been on empowering researchers – especially early-career researchers – to become proficient in basic forms of written and oral communication. When the project started, it might have been anticipated that the more advanced, and more discursive, modules would be the more difficult ones to deliver as they do not offer a set of practical skills for trainees to take home with them. And some of the feedback we received from participants in the workshops bore that out: discussions on the importance of science in culture or the role of the social sciences in critiquing, as well as guiding, science communication are not suited to everyone. More often than not, however, we found that trainees enjoyed the opportunity for reflection on broader themes that recurred over and over again. The lesson from ESConet is not to impose a restricted view of what is, or is not, interesting to researchers in the natural sciences: those who want to communicate are interested in the “whys” as well as the “hows”.

Community Building

ESConet is part of a wider community-building process in science communication. Its membership covered 17 higher education and science institutions concerned with science communication, across 12 EU countries, from the North West to the South East. (A full list of ESConet members and participants is given in the Appendix.) ESConet cooperated with other EU projects in scientific research to train their young scientists in communication skills and to develop an open attitude towards public engagement. So training workshops were organized for researchers from the Framework 6-funded networks EuroPlaNet (planetary science) CareMan (health), Lipgene (nutrition and obesity) and QUASAAR (molecular spectroscopy). In addition, other workshops making use of the ESConet modules were organized for Belgian space scientists from universities, industry and the European Commission itself, and for scientists covered by the Bulgarian and Ukrainian academies of science.

ESConet also put on sessions at major science communication events, such as FEST (Trieste, Italy) and the international Public Communication of Science and Technology biennial conference (PCST-10). ESConet members made presentations in international forums, such as the European Conference of Science Journalists and ESCITE, the European science centre network, and the American Association for the Advancement of Science, as well as a large number of national and local meetings. As a result, its work is already known widely, across Europe and elsewhere.

Throughout the life-span of the project, early-career science communication researchers and professionals were given an opportunity to work closely with colleagues from across Europe, establishing contacts, upgrading skills, discussing best practice, and establishing potential future research collaborations. All members of ESConet had the opportunity to contribute meaningfully to module development and were encouraged to participate in training workshops delivered to EC-funded scientific networks. Likewise, early-career scientists from various disciplines worked alongside each other in an environment outside their day-to-day scientific work, an interaction that developed further their science communication skills and encouraged them to reflect on the wider social, cultural, political, and ethical dimensions of their scientific work.

But perhaps the most important community building to have been achieved as part of the ESConet project is the training of a new generation of young science communication *trainers*. This took place formally at two workshops – in Dolenjske Toplice, Slovenia, and Trieste, Italy. During the Dolenjske Toplice workshop, trainee trainers were first put through an intense delivery of the modules, as if they were researchers being trained. For the Trieste workshop, the new trainers – in their own turn - delivered the modules to their peers and to officials of the European Commission responsible for ESConet. Training new trainers also took place informally, on the job, as the project matured, as more and more of the newer trainers delivered training to researchers from the EC-funded networks being trained. This whole, highly reflexive, experience, and the input of this new generation of trainers, has been decisive in shaping the modules ESConet has eventually produced.

Pedagogy

The modules presented here are not an all-embracing teacher-proof textbook for science communication. They are not intended as a comprehensive and exhaustive “recipe”; instead they are offered as an effective model for science communication training. They are aimed at future trainers who have existing educational or professional experience in science communication, and would like to train natural scientists and technologists in communication skills. The modules are also targeted at early-career researchers in the natural scientists or science communication who want to deliver future workshops of their own, if given some guidance on how to go about it.

So the modules provide a general framework for the content, and how it can be delivered in practice, while offering scope for trainers to use their own examples, case studies, lecture structures, and teaching strategies. A key lesson from the ESConet experience has been that the more that the content of the modules that can be drawn out from the workshop participants themselves, through group and plenary discussions, the better. The more that trainers can ask key questions that enable trainees to bring their own experiences to bear on the issues of science communication, the more *everyone* will get from the modules and the workshops as a whole.

But training – of necessity – is limited to short periods of time. So participants who undertake one of ESConet’s workshops receive trainee notes, giving them something to look back on after the

warm glow of excitement that these workshops often engender has begun to dim. All of the modules have been successfully trialed with workshops of researchers and trainers. The researchers who were trained came from a variety of scientific fields including, among others, planetary science, healthcare diagnostics, spectroscopy, and food science. ESConet is therefore confident that these modules have wide applicability, across the natural sciences and for those engaged in applied and “blue-skies”, curiosity driven research.

The Modules

ESConet has produced 12 modules that can be adapted, pretty much as required, to deliver workshops for young, inexperienced researchers and for more experienced and senior science communicators. Each of them follows a similar pattern, so that trainers can structure their workshop to suit to time and the facilities that they have available. A comfortable room with projection facilities is clearly a prerequisite, and some of the modules require computers, printers and recording equipment. But overall, the modules build into workshops that can be delivered on a fairly tight budget, so long as a degree of ingenuity is employed. Modules were divided into basic and advanced, core and optional, practical and discursive, and it is recommended that trainees undertake the core modules before the advanced options, whether in the same workshop or at different times. Modules can usefully be described as practical or discursive, depending on whether the focus is on lectures and discussion, or on a practical science communication activity, although some overlap is inevitable. Short descriptions follow:

Who Are You Communicating With, and Why?

Core, basic, discursive

This module acts an opener to the workshop proper, and is designed to open up the trainees to the possibilities and pitfalls of communicating with lay audiences. Before embarking on any communications activity, it is vital to ask: who is your audience, and why are you communicating with them? For any science communication activity to be successful, it is important to understand the specific characteristics of the audience that may shape how people relate to science. So the first section of this module looks at what we know about European citizens and their attitudes to science, making use of the European Commission’s Eurobarometer surveys, among other information sources. The second part of this module presents the reasons why lay people need and seek scientific information, using the “uses and gratifications” approach from communication theory. For both sections there are short exercises, including asking trainees to introduce themselves, outline their experience in communicating with the media and lay audiences, and say what *their* particular motives are for being involved in science communication. Because it introduces these fundamental concepts, this module is a *basic* requirement for any workshop.

Media Writing

Core, basic, practical

This module provides scientists with the skills required to prepare a press release, as an example of writing for lay audiences. Before developing their writing skills, trainees are also given an introduction to news values that they can apply in their own press release writing. The module engenders good written communication practices that may be widely applicable, including in a purely research setting, such as a scientific conference. This is a module that underpins many of those that follow. It is considered a *sine qua non* for a workshop in which participants with little or no experience of science communication are to be trained.

Talking to the Media

Option, basic, practical

This module examines the various forms and uses of the media interview in which scientists may be involved and involves participants in a practical simulation of a media interview. It reviews participants' experiences and expectations of media interviews. It considers the media's approach to interviews and sets out the range of contexts in which scientists may be interviewed. Participants are advised on preparing for media interviews, underlining the importance of clear focus on key points, and of anticipating the possible lines of questioning. Participants are presented with a scenario in which the media wish to interview them, and they have the opportunity to prepare with a colleague-participant, under trainers' supervision. Participants are interviewed by media professionals in one or more settings; the default setting, however, is the radio interview for live broadcast or recording. This module is clearly highly useful for developing basic oral communication skills.

Public Science on the Web

Option, basic, practical

This module examines the various forms and uses of the web as a medium of public science communication. Tutors and participants will review critically selected examples of science web sites, aiming to identify elements of good and bad practice, and to establish criteria for effective sites. Participants will be encouraged to reflect on the use of language, structures of information, use of images, inclusion of interactive features and hyperlinks, and other features of web sites appropriate to science communication in various contexts. Participants will undertake supervised exercises, working in pairs, to review critically selected science web sites and to produce an outline of a web page or pages about the project, programme or institution to which they belong. Tutors and participants will review together the pages produced.

How the Media Cover Science

Option, advanced, discursive

There is much anecdotal evidence of scientists experiencing difficulties with journalists and broadcasters when it comes to popularizing their work: researchers complain of inaccuracies, oversimplifications, removal of qualifying statements, over-emphasising controversy etc. Much of the uneasiness between the worlds of research and the media is due to mutual unfamiliarity and this module is designed to increase researchers' familiarity with the world of the media. It presents an overview of the main features of media presentation of science and technology issues. It reviews the key findings of long-term studies of media coverage of science and technology, highlighting the dominant trends across time, the main differences across the diverse media (TV, press, radio) and presents some particularly significant case studies.

Presenting Research to Policy Makers

Option, advanced, practical

This module introduces trainees to some of the concerns of policy-makers in relation to science, technology and medicine. It provides some initial understanding of the requirements of non-expert policy-makers for information about science, technology and medicine, using European examples. It is aimed particularly at presenting to Members of the European Parliament or to European funders such as the Commission, the European Space Agency, the European Science Foundation *etc* so it would be useful for this module if trainees were familiar with the European

Parliament and its committees, and the policy background of the European Commission's Science and Society Action Plan. As a practical exercise, trainees present a short written report on some aspect of science and technology that has key policy implications, or they propose a project to potential funders or funding bodies. This workshop trains participants in oral and written presentation skills. As such, there is an expectation that those taking it will have taken the modules in *Media Writing* and *Talking to the Media*, or have some similar experiences with written and oral science communication to lay audiences.

Communicating Risk

Option, advanced, practical/discursive

Risk is an unavoidable element of our society, and medicine, science and technology – as drivers for change – inherently bring risk along with their new developments. But, at the same time, medicine, science and technology are essential to the solution and avoidance of risk. This module introduces trainees to essential issues involved in communicating scientific topics that contain an element of risk, such as new technologies or potential pandemic diseases. Participants therefore get to understand that a range of cultural, social and psychological factors, not just narrow scientific facts, combine to create an understanding of risk among various publics. The scientific facts may not be the deciding factor in how people decide to act relative to a risk. The module will explore the differences between communicating ready-made science and science-in-the-making, which involves uncertainty. In learning how to communicate science that contains risk or uncertainty, “experts” must also learn to listen as well as explaining their own view clearly. In this module, trainees will take part in a scenario exercise where they have to communicate a current scientific topic involving risks to various affected stakeholders. This involves trainees being put, themselves, into the roles not just of scientific researchers with information to impart, but also citizens with various professions and interests.

Hands-On Science

Option, advanced, practical

This module outlines the evolution of science centres in Europe and considers their importance as sites for informal science learning in society. Trainees will experience designing and creating a hands-on exhibition based on an area of scientific research, taking into account theoretical guidelines concerning the design of successful and creative exhibits. In this *advanced* module, trainees will learn about the importance of having a theme for the exhibition, telling a story through the exhibits, and how best to design roles for exhibition guides.

The Social Sciences For Science Communication

Option, advanced, discursive/practical

This module is designed to enhance the awareness of trainees about the relevance of social science resources for science communication. Several of the tasks in planning and evaluating major science communication activities – e.g. festivals, engagement processes, museum exhibits – require skills and knowledge drawn from the social sciences. Understanding better these resources could lead to improved interaction between experts and non-experts. Starting with examples of practical situations, this module will introduce trainees to some of the methods and tools that the social sciences can offer. Trainees will then carry out practical exercises, relevant to their own disciplines and expertise, that make use of the methods presented.

Science and Controversy

Option, advanced, discursive/practical

The methods, merits and motives of science can lead to various social, cultural, ethical and religious controversies. Claims about science's unique ability to discover reliable knowledge about the natural world are now being critiqued. And it is important to remember that science, as it develops new, big claims and theories, is controversial among scientists themselves. (Note that the modules on *Communicating Risk* and *Talking Science and Listening* deal more with potential public controversies involving science and its implications.) This module introduces trainees to the reasoning behind these challenges and controversies, and focuses particularly on science that is controversial within the scientific world. Significant contemporary controversies about science and from the history of science are examined, illustrating the role of controversy in creating scientific knowledge. Practical exercises for this module include organising a café scientifique around a controversial subject, or revisiting some old scientific controversies, with participants putting themselves into the role of the disputing parties, assuming they do *not* already know the outcome of the dispute, so that they can present and challenge evidence and opinions.

Talking Science and Listening

Option, advanced, practical/discursive

Scientists will face both opportunities and obligations in their careers to discuss their research face-to-face with various interested non-scientists. These non-scientists may include politicians, policy-makers, interest groups, community groups, business representatives, and members of the general public. These communication situations frequently occur outside the prepared environments of formal presentations or the unique situations of mass media interviews – and so demand a set of interpersonal skills. In the current political climate of science and society interaction, dialogue has been noted as a crucial means of engaging with the public, especially in areas where sections of the public are recognized as having a level of non-professional expertise, or lay expertise, in a scientific area. This module introduces trainees to conceptions of science in dialogue, and outlines key interpersonal communication skills needed to engage effectively in discussion and dialogue with others. Special emphasis is paid to active listening. The module culminates in a scenario exercise in which participants will assume the role of different interest groups – including scientific researchers - in society who are meeting to reach consensus on a pressing social or economic issue that has a significant scientific dimension. This module should be viewed as an *advanced* module, possibly an *optional* module in a longer workshop.

Science in Culture

Option, advanced, discursive

The public representation of science is the result of a combination of a great multiplicity and variety of factors, the origins of which are difficult to trace. This module provides a brief introduction to some of those factors, and aims to generate a final discussion on why science communication is important at a number of levels. It explores how science and science communication may be influenced by political, social and economic interests within various contexts. In short, it reinforces the lessons learned in the workshop by emphasising the context and importance of science communication. This short module can make a useful reflective session, as a break from more practical modules, or as a session to finish off a workshop.

Dissemination and use

The work of ESConet has been disseminated to other science communication workers through its website and through a number of presentations at meetings and conferences. A full list is given in the *Final plan for using and disseminating the knowledge*.

At its meeting in December 2007, ESConet took the decision to establish itself as a not-for-profit Community Interest Company (CIC), based in the UK. It will use to the modules, which are the intellectual property of those members of the ESCW project who wish to be associated with them, and were developed in the project, as teaching materials for future workshops for scientists and scientific networks and interested science communicators who wish to use the modules in their own communication training.