

Workshop 4: Physics and Public Understanding

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Method of work

The work of the group was divided into three parts:

1. Mutual introduction of participants, their experience with public understanding of physics and expectations from the workshop.
2. Information about Malvern seminar results, discussions in two parallel sessions concerning communicating science requirements and the roles of institutions communicating science.
3. A common discussion to summarise the workshop group recommendations.

Ideas of 23 participants from 15 countries¹ were written in bullets by three reporters². Every participant received them after the sessions. Here are the main points arising from the partial discussions that the participants assume as very important:

1. The State of Public Understanding of Science

The success and importance of science are themselves not enough to be put into evidence by the general public.

Science is not generally seen as a part of mainstream culture. Physics and chemistry are “negatively charged” (scientific language, atom bomb, nuclear power plants, pollution etc.). People tend to be afraid of science rather than attracted to it. Their motivation towards science and technology is, due to the ways of science introduction in schools and the media, poor. They believe that science is beyond their sphere of interest. Knowing nothing about science is often not viewed as a bad thing, especially by girls.

Scientists cannot just assume that the public has no scientific understanding. Many people have detailed knowledge of some aspects of science – for example, the science involved in motor engineering or wine making. There are different degrees of interest and understanding amongst the public and amongst the scientists. Do most scientists have any real information about what the public does or does not know about scientific topics?

Recommendations

Universities, research centres, science industries and physical science organisations should:

- Collaborate to provide courses in science communication for journalists, policy makers, scientists, science students, etc..
- Bring physics to the people through the establishment of community-based science centres and outreach programmes.
- Sell physics to the media by making it accessible and relevant to the public and through linking physics to other disciplines.
- Look for effective ways to respond to people’s needs and interests.
- Value and expect the communication of scientific research.

And finally:

- All the participants of this workshop realise the importance of teaching science in general, and physics in particular, to everybody, and therefore each of us will try to do at least one thing to communicate physics to public and will report on it at the second “Physics on Stage” festival.

¹ of different experience with communicating science from universities, high and secondary schools, physics institutes, science centres, media and communication with industry

² Brenda Keogh from Manchester Metropolitan University, Heike Look from Dieburg high school in Germany, Katie Gallagher from Trinity College in Dublin

There are not enough institutions responsible for public understanding of science, such as interactive museums and science centres focused professionally on public relations of science, non-formal lifelong learning, research into public understanding of science, questions that aid learning and motivation, support of schools by present science knowledge, training for teachers etc.

There is a contrast between learning science in science centres and learning science in schools. School is an important source of science learning but not the only source. In some countries there do not seem to be enough science centres. In schools, as well as for the public, only some fields and aspects are commonly promoted (for example astronomy, classical mechanics), thus missing the everyday experience and relation to Nature and environment.

2 a) Communicating science requirements

- Value what the public do know rather than viewing what they do not know as a deficit from what they should know.
- Communicate to the public where the answers to scientific questions might be found.
- Ensure that children have a positive view of science from a young age.
- Ensure education in science communication at universities.
- Development of local science centres and libraries for the public that are easy to get to and make it easy to understand science.
- Review the role of science centres as a link between teachers and scientists.
- Influence the media to represent science and scientists more appropriately.
- Encourage local industry to communicate science to local communities.
- Interdisciplinary science projects using complexity and arts to communicate science (for example science teachers working with teachers of other disciplines).
- Extraordinary events (interactive exhibitions, festivals, competitions, lectures of famous physicists, open days at universities and science institutions).
- Special public venues to communicate science (concept cartoons, posters, science theatre).
- Mobility, travelling exhibitions, exchange and dissemination of learning aids.

2 b) Roles and activities of institutions and individuals in communicating science

- **Museums and science centres** should
 - interest people in science through unique personal experiences;
 - focus on science in an interdisciplinary way;
 - introduce aspects and different approaches of science not usually presented;
 - address current issues and present possible answers;
 - address all levels of knowledge;
 - show the public how science affects their lives;
 - should collaborate with universities;
 - play an active role as the pilots of new educational concepts;
 - play an active role in establishing networks of young scientists;
 - have outreach activities such as fairs, partnerships with TV and radio broadcasters, etc.
- **Universities and research institutions** should:
 - contribute more to the public understanding of science;
 - collaborate with science centres;
 - create science communication for journalists, science research students, teachers and artists;
 - use older students to teach younger students;
 - educate young scientists in communication, encourage graduates to go into media;
 - make it more attractive for scientists to publish in public media (instead of exclusively in scientific and technical journals);
 - value and support the communication of science as part of any research activity (allocating resources accordingly);
 - give science teachers experience in laboratories.



- **Public Media** should:
 - propagate more science (scientific discoveries, hypotheses, tasks, methods etc.) than science fiction (Hollywood etc.);
 - invite scientists, especially young scientists, to present their work to the public;
 - prepare discussions between science students and non-science students on science problems;
 - introduce general problems (environmental, medical etc.) in discussions with scientists;
 - consult scientists on the presentation of pseudo-science (astrology, etc.);
 - always cover science in the daily news;
 - elaborate science topics with the same care as art pieces;
 - balance the programme structure so that science and science education play a significant role.

- **Individual scientists** should:
 - try to give responses to the people's needs and questions as part of making science more humanised, more part of everyday experience and democracy;
 - represent themselves in ways which are accessible to the public and use everyday language in public communication;
 - look for ways to communicate science through links with other disciplines (arts, environment, etc.);
 - recognise that public interest in science may lead to science funding through policy makers;
 - recognise that science funding will not necessarily lead to public interest if scientists are not sufficiently involved in the public understanding of science.



European Physical Society should:

- create a coherent resource of public understanding of science materials, supported by the EU.

Governmental institutions should:

- promote public outreach of science through science centres, local industry, libraries, and public broadcast of TV and radio programs.

All the participants, of this workshop realise point out the importance of teaching science in general, and physics in particular, to everybody, and therefore each of will try to do at least one thing within her/his own context to communicate physics to public and will report on it at the second “Physics on Stage” festival. I offer the Schola Ludus address for the purpose of collecting the reports:

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