SISSA – International School for Advanced Studies Journal of Science Communication
ISSN 1824 – 2049 http://jcom.sissa.it/

Comment

Knowledge, responsibility and culture: food for thought on science communication

Giancarlo Quaranta

The past few decades have been marked by a rapid scientific and technological development. One of the most paradoxical, and perhaps more disturbing, features of this process is the growing divide between the increased importance science has acquired in economic and social life and a society persistently showing spreading signs of contempt, mistrust and, most of all, disinterest in research.

It is a complex issue, with undefined borders. Eurobarometer surveys continue to report that ninety percent of the Europeans have a positive view on the contribution provided by researchers to the development of society. Yet, at the same time, in large part of continental Europe, less and less young people embark on a scientific career and their professional and economic condition as researchers has significantly worsened, at least if compared with other professions. Science museums and science centres proliferate and are packed with enthusiast visitors, precisely whilst scientific faculties tend to get empty. People are seemingly confident in the abilities of science and technology to improve the life quality of future generations, but they really take action only when they have to express their dissent on the localisation of technological facilities and never – except sporadic cases in the medical field – to support research in this or that field.

It almost seems like there are two different and totally disjoined levels. As long as science is faraway and is seen as if from a window shop, everything looks bright; as soon as it gets closer, it is not interesting anymore, or it even conveys a feeling of uneasiness and rejection. Quite like animals in a zoo: fascinating and intriguing as long as they are behind cage bars; frightening when they share our own space.

Models of science communication

Hence, something here is not working properly and it may suggest that there are some unsolved issues at a level that could be defined as structural in a broad sense; and this is in spite of the achievements of science and technological research and the emerging of a society defined as a "knowledge society", precisely owing to those achievements, that permeates all the sectors of the human existence, from the economy to everyday life.

This gap has been illustrated, starting from the eighties, by a very wide and authoritative literature. Authors find its cause in a deficit of scientific knowledge that characterises mass culture; they also support the theory that two cultures do exist, one humanistic and the other scientific, being the former favourite and privileged and the latter neglected and marginalised.

Once the diagnosis was made, the treatment appeared to be evident: to foster a scientific culture to reposition science at the heart of the public's attention. The primary instrument to implement it could not be anything but science communication.

The path of science communication has therefore unfolded consistently, leaving the peaceful land of dissemination aside, to move forward to the bold *Public Understanding of Science*, it being the first attempt consciously aimed at fighting the generalised estrangement from science and technology people had shown.

A product of a real movement of researchers and communication experts, the *Public Understanding of Science* has had many merits: it has been the reference framework of governments to define, for the very first time, their own public science communication policies; it has favoured the development and the spreading of pioneering initiatives, such as interactive museums and the "cities of science"; but, most of all, it has laid the foundations to make science communication a subject for a serious scientific and political reflection.

Its limitation – perhaps the only one – was the fact it was founded on an interpretative model – the well-known *deficit model* – that has proved, rather than unfounded, irrelevant. It was based on the thesis maintaining that the public's disinterest and estrangement from science were to be ascribed solely to the lack of adequate knowledge on what science does and its results. Then, filling this information gap would have sufficed to overturn the general public's attitudes towards scientific and technological research.

Warning signs of the crisis sustained by the *Public Understanding of Science* have been provided by several research projects and surveys carried out especially to verify the effectiveness of the public science communication policies that had taken it as a reference model. Apart from few exceptions, those policies had achieved less results than expected: the public continued to show a high degree of indifference and, sometimes, a hostile attitude towards science; a significant increase in matriculations in scientific faculties had not been reported; the extent of science understanding was still highly unsatisfactory.

After this crisis, occurred at the beginning of this decade, we have entered, so to speak, a "pre-paradigmatic" era in the field of science communication, which is still ongoing. On one hand, there is an effort to improve the approach of the *Public Understanding of Science*, so as to fix its most problematic aspects; at the same time, action has been taken to define new models – such as the Public Engagement with Science and Technology – aimed not anymore at favouring a simple understanding of science by the public, but at promoting a widespread commitment to the research issues, through an open debate between scientists and non-experts on an equal footing.

It should be noted that science communication experts – along this path to favour the socialisation of scientific and technological research – has gradually adopted the best and most updated theories on science communication, investing on a two-way communication or on network communication, having both become theoretical and methodological approaches impossible to disregard.

However, despite the progress made, large part of the problems are still there, probably because there has not been enough thinking on the nature, the role and on the objective weight that science communication has acquired – irrespective of the awareness of it one can have – in the overall dynamic of scientific and technological research.

In this context, it may be useful to provide some food for thought.

The action scope of science communication

The first point to be thought upon concerns the action scope of scientific communication. Nearly in all cases, this scope tends to be identified with the relations between science and a not-better-defined 'public'. Even the most advanced models (such as the previously mentioned *Public Engagement with Science and Technology*) take for granted that there are a community of experts (researchers), another of "non-experts" (citizens) and, in between, a "divide" to be filled with communication.

However, this model underestimates the fact that communication increasingly plays a crucial role also in the processes to build scientific and technological research, which see an unprecedented involvement of a number of different stakeholders (besides the researchers, also decision-makers, scientific institutions managers, "europlanners", experts of technological transfer, evaluators and so on), who belong to different cultures, play different roles and even have different ideas on science and technology.

This suggests that the action scope of science communication unfolds between two poles, in highly differentiated forms and, so to speak, fragmented as never before. On the one hand, there is the pole of science construction, which is ideally founded on the activity by researchers. On the other hand, there is the pole of science popularisation, which finds its linchpin in the public. In between, there are several intermediate situations, each of which is characterised by specific dynamics at various levels: society, organization, culture, politics, but also and inevitably communication.

Seen in this perspective, science communication is marked by a strong discontinuity which is difficult to mend, unless its deepest matrix is rediscovered to allow it to interpret science communication as a single process, divided into only apparently faraway fields, yet actually tightly intertwined. The relation between science and public would then be only the last link in a long chain of communication exchanges penetrating well within the so-called 'black box' of scientific research, namely that place, at the same time physical and social, where research processes originate and develop.

Hence, we should wonder whether this action to rediscover continuity is useful or at least correct. Why poles and situations so different from one another should be unified (even only theoretically)? What is the advantage in such a choice?

The mission of science communication

This paragraph will deal with another point, this time relating to the mission of science communication.

If this mission were to favour a transmission of the knowledge produced by scientific and technological research (irrespective of the goals to be pursued in carrying it out, e.g. possibly a simple informing action or something much more complex like spurring citizens' participation in decision-making processes), then considering science communication as a single process would not make much sense, in the terms described above. Indeed, in this case the scope of science communication would be not only highly fragmented, but most of all characterised by the dichotomy between scientists and 'lay people'. Although in more or less sophisticated ways, the issue to be tackled would still necessarily be how to favour the transmission of knowledge between those 'who know' and those 'who do not know'.

Instead, if the mission of science communication were to be interpreted as a inter-subjectification of science as a human enterprise in general, of which knowledge is only a facet, the picture would change very much. Indeed, the scope of science communication would be invaded by many other science-related issues, e.g. the integration between scientific and social knowledge, the practicability of research, the financing mechanisms or the access of young people to scientific careers. When facing this, the distinction between 'scientists' and 'laymen' is not relevant anymore, being replaced by the one between stakeholders interested in addressing these issues – each one in a different perspective and with different skills – and stakeholders who are not.

Following this line of reasoning, it is possibly clearer why science communication should or may consider as its own action scope the pole apparently farther from its present interests, namely science construction. Also around this pole, in fact, communication flows are generated, concerning not only and strictly scientific or technical contents, but also the advancement of the scientific enterprise as a whole. As a result, they involve, perhaps at levels other than science popularisation, the relations between science and society.

If so, science communication may start to pursue new and ambitious goals, designed on the changes that are affecting the methods to produce scientific and technological research with an impact on the communication-scientificity relation, e.g. the establishment of wider and wider research networks, with a trans-national and trans-institutional nature; the paradoxes linked to trans-disciplinary communication; the new methods for scientific competition, in the so-called "post-academic" era; the reduction in differences between basic research and applied research or between scientific research and technological research.

In the perspective outlined, relevance could be acquired by the social dynamics that develop in the 'middle earth' where the construction of science appears to be mostly influenced by more general social trends. For example, consider the gender discrimination within science or the previously mentioned issue of the access of young people to scientific careers. These are events that do not only concern the world of research; however, in this specific context, they manifest themselves as distortions in the most basic mechanisms of the construction of science, starting from those that ensure the compliance with the meritocracy principle, which the entire research framework is based on. Those distortions occur also through the manipulation of communication, the management of the communication channels, the production of images and stereotypes, the use of symbols, and so forth; all aspects that typically involve science communication.

Once the core in the interests of science communication is considered to be not the transmission of scientific knowledge, but the inter-subjectification of science as a social enterprise, then also what happens on the borders conventionally defined (and now to be redefined) between science and society may be interpreted in a slightly wider perspective.

For example, science communication goals may include: the integration between social dialogue and scientific development, involving political leaders (frequently unskilled and disinterested) in research or finding a common ground for the many organisational and communicative functions that sustain research activity and its 'self-localisation' (for example, resources management, the construction of organisational milieus favouring creativity, the supply of goods and services essential to the research

activity and so on). Above all, science communication should keep at its heart the goal of promoting among the citizens a universal responsibility towards knowledge and scientific and technological research as general and inalienable purposes of any human community.

Scientific citizenship

These considerations on the mission of science communication lead us to the third point to reflect upon, i.e. what science communication model should be a reference to address these aspects of scientific and technological research.

Evidently, it should be founded on an interpretation of science communication in sociological terms rather than in a merely communicative perspective. Taking for granted the social nature of science and technology, this interpretation should also help to consider research, in any of its components and phases, as an activity that develops in an immersion of communication and is produced thanks to the communication flows going through it. Therefore, science and technology should not feature any area, moment or sector seeing the estrangement of society.

Besides, this interpretation may allow science communication to change the different social position science has taken over the past few decades.

The relation between scientific research and society was once regulated by a system of institutional mediations (thoroughly analysed for the first time by Robert K. Merton) that created a very clear-cut separation between the former and the latter (a separation well represented by the widely known metaphor of the "ivory tower"). It stands to reason that for long science has been imagined as a world apart, founded on norms and values that has little or nothing to do with the rest of society. Furthermore, all of this has encouraged the idea – still very much widespread – of an asymmetrical science-society relation, in which the former influences the evolution of the latter, but not vice versa.

Today, those institutional mediations have broken down or have weakened; the 'social' spaces (but also physical ones) in which research operates are the same ones where other entities also take action, being able to affect the direction and the life of science and technology. Moreover, all of this is taking place in a context of a growing centralisation of science, considered as a social and economic development priority factor, with the consequent progressive dislocation of the locus of control on research from the territory of the scientific community to the territory of politics and economy.

In this framework, scientific and technological research has acquired a character of 'social enterprise', which has been already mentioned. In order to function, it requires a wider and more differentiated mobilisation of resources, higher coordination levels, a larger public consensus and a more sophisticated division of skills; moreover, all of this in a social context – the one of the so-called 'reflexive modernity' – in which mobilising resources or steering consensus has grown particularly difficult.

Science popularisation or citizens' participation still are crucial areas for intervention. Nevertheless, what would be needed the most is a communication able to increase the overall level of responsibility to research, today looking dangerously inadequate, not only among the general public, but also between those who already have precise responsibilities in this field.

Hence, it should be debated whether a circular-shaped communication model is to be adopted – differing from the previously mentioned linear models – based on 'scientific citizenship'. This would symbolise that, facing the issue of responsibility, a distinction between scientists and 'laymen', between experts and non-experts does not make sense any longer; there is only the citizenship dimension, which is built on 'knowledge', widely accepted as a common asset, to be preserved, fostered and exploited, for the benefit of everyone.

The difference this model has on the others can be detected in the role played by researchers.

In the context of the *Public Understanding of Science* or also of the most up-to-date models, researchers are communication-spreading centres, as they are the carriers of specialised knowledge and techniques to be shared. In the model of the 'scientific citizenship', researchers do not have a specific position any longer and, as a result, they should be considered as stakeholders, but also as targets of science communication. This is because many of them are facing the mighty and complex changes that have invested both the new knowledge production and the science-society relations, living in a context of uncertainty for their identity and the consequent responsibility. This condition is very similar to the one experienced by common citizens, that have to face a general call for responsibility – that may be

regarded as a 'technological responsibility' –, running the risk, in case of no response, of becoming accomplices of the destiny of one's country. In conclusion, scientists and common citizens should be different, in the context of a scientific citizenship, in their field, but not in their essence.

If this applies to 'expert people', it should apply more to other stakeholders, such as political operators, enterprises and employer organizations, the non-profit sector, teachers, trade unions, research managers, local administrators or, finally, the public in general.

The dual dimension of the scientific culture

Along this line of reasoning, we find the fourth and final issue to ponder upon: the nature of the scientific culture, which is an indispensable instrument in the construction of a universal 'scientific citizenship'.

Undoubtedly, by 'scientific culture' one could mean a familiarity with science, built starting from a basic knowledge of its methods, history and contents. In these terms, spreading a scientific culture is a necessary step to be taken to make everybody sufficiently aware of the potential and the risks connected to science and technology. This action would favour the participation of the people in choices that concern the scientific and technological development, the spreading of a sense of belonging to a scientific 'tradition' (particularly rich in Italy) and the transmission, especially to young people, of a passion towards science and the scientific method. Within this dimension of the scientific culture, vital instruments for intervention include – now more importantly than in the past – science museums, science centres, journals, books or TV programmes popularising science, science festivals or pedagogical initiatives addressed to children.

However, starting from the remarks on scientific citizenship, one can at least get a glimpse of a second dimension of the scientific culture which focuses not on the contents of science, but mainly on science as a collective 'enterprise'. Then, this second dimension should tackle some issues such as: the reinforcement of the so-called 'third mission' of universities; the links of research with the political and economic development; the impediments and the hurdles with a political, organisational, cultural or social nature which hinder its development; the institutions and the research networks that implement it; the infrastructures it needs; the factors which may jeopardise it in the next future. The purpose of this all is, at least, to steer clear of the risk of people knowing who Galileo or Newton are, despite not knowing anything about how research works in their country. In a more strategic perspective, investing in this dimension of scientific culture is necessary to let everyone be in a position to find their place in science and technology, understanding what role they may or can actively play, possibly still within their professional life or their personal interests.

Even in this last respect, science communication has a potentially decisive weight. Indeed, it is necessary for some purposes, e.g. to appropriately identify the various entities to turn to; to understand what perception of science and technology they represent; to devise the most suitable instruments to reach them; to spur the various stakeholders to take on their responsibility to research; to support, through communication, a network of relations that may allow to translate this awareness on responsibility into new attitudes and new forms of social actions.

This is, for the most part, an uncharted territory, yet it should explored very quickly, considering the delays European research risks to suffer in comparison with other continents where the responsibility related to research is maybe more pressing, widespread and concretely implemented.

Translated by Massimo Caregnato

Author

Giancarlo Quaranta, a sociologist, is the President of the CERFE (Centro di Ricerca e Documentazione Febbraio '74). He has been studying epistemology of social sciences and he is an expert in the field of training and research planning. He is the author of numerous publications, among them "L'era dello sviluppo" published in Milan in 1985 and "L'associazione invisibile" published in Milan in 1982.
E-mail: giancarloquaranta@yahoo.it.