Comment

SOCIALIZATION OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH: FURTHER COMMENTS

Scientific mediation: on social processes, contexts and networks in which scientists are embedded

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ABSTRACT: *Science and Technology Studies have discussed extensively over the social factors that hinder and facilitate scientific-technological activities. Some authors even have attempted to grasp the cultural and power conflicts involved in the definition of concepts, paradigms and research programmes. I will present here a reflection on the concept of 'scientific mediation' which provides a complementary approach about the social networks that constrain, help and constitute scientific research activities. A definition of this concept and some empirical examples will be provided. Nonetheless, I want to emphasise the social processes and contexts that allow us to understand mediations as something else than mere communication and conflict resolution. Secondly, I will defend such an approach in order to support scientific research, but I think that the analysis of scientific mediation needs to be clearly separated from the ideal conceptions of knowledge-society and democratic-ethos. Socialisation of science, finally, is stressed in its meaning of collectively sharing useful knowledge for the improvement of social justice.*

This comment is focused on the notion of 'scientific mediation' which has been developed in the framework of the "Social Sciences and European Research Capacities" (SS-ERC) Project, carried out within the 6th Framework Programme of the DG Research by a consortium of six European research institutions. In that context, scientific mediation was introduced as one of the six socialisation areas of science and technology, being the others scientific practice, evaluation, innovation, communication and governance.

The expression 'scientific mediation' was a controversial one from the very beginning of the SS-ERC project. The chapter I co-authored in the main publication which came out of this project[1] was an attempt to shed light on that concept. Our argumentation was based on both our own sociological theories about science and the empirical participatory action-research we developed with two groups of natural scientists. Here I would like to enhance the understanding of this issue. First, I will define it again paying attention to the epistemic assumptions underlying the concept. Second, following the debate on the socialisation of science, I will discuss critically the practical consequences of adopting such a concept as a mere means for either applying science into society or shaping science according to the societal trends.

'Mediation' can be defined as "*medium, channel, agency, means, third term, or other indirect relationship by which two or more subjects, objects, patterns, systems, or other relationships are connected or communicate with one another*" (Wilden 1987: 160)[2]. Mediation is distinct from what is mediated: "*Thirdness mediates between first and second just as a code mediates between communicators. (...) The mediator and the mediated, the code and the message, are not of the same logical level.*" (ibid.: 161) The same author provides a theory of complex systems which, in my view, indicates the principal issue we deal with: the overlapped environments or contexts and, simultaneously, the hierarchical constraints, in which all the entities are embedded (ibid.: 73). This would lead us to ask: How are the boundaries between *levels of complexity* (environments or contexts) established and revealed? What codes, actors, situations, etc. (*thirdness*) are mediating different levels of *complexity*?

Let's be more specific. If the expression 'scientific mediation' contains a distinct meaning it is because it refers to social phenomena with a relative autonomy from others. Following I will focus on two close

types of social phenomena -conflicts and communication. Scientific mediation, I will argue, intersects with them but is something else.

Mediation is frequently used in social sciences as a mode of conflict resolution (Galtung 1995)[3]. In such a context, mediation is the process that involve at least two parts engaged in a conflict, and at least a third one who tries to help the others. Of course, there are alternative peaceful ways of solving conflicts without *external* mediation (e.g. exchanges, agreements, retirement, etc.), and there are many not so peaceful too. Hence, mediation does not belong exclusively to the world of conflict resolution although this can be a privileged field of its intervention. There are social conflicts among scientists, and between scientists and other social groups (e.g. their employers, their friends and relatives, their students, the bureaucratic staff, religious believers, etc.), and mediation could help to find a ground for mutual debate, understanding, collaboration or, simply, coexistence. However, scientific investigators can also interact with other social groups in the absence of conflict and the concept of mediation would equally apply to such a *communication,* according to Wilden's definition.

What is worth here to note is that any social relationship is based on communication. The more direct, face-to-face, accessible, immediate, and *natural* the communication is, the less mediation is needed. This argument implies, then, different degrees of mediation depending upon the social and spatial distance of the actors involved. Recall, however, that social facts such as accent, styles of dress, learnt gestures or cultural conceptions about the correct mutual proximity can mediate even face-to-face relations. In addition, we need to distinguish communication in a broad sense -as flows of exchanging goods, services, information, and people- from the restrictive meaning that it has when referred, for instance, to the dissemination of discoveries, the popularization of science, the use of internet, and so on. Mediation relates to communication in a broad sense. Moreover, it relates to something else than a simple flow of communication, since the more *social* and mediated are any of such flows, the more we need to interpret them as historical processes embedded in cultural configurations and social structures (Santos et al. 2003)[4]. Both individuals as well as groups to which individuals belong can be mediators in social processes of mediation, as argued by network theory (Pizarro 2007)[5]. As it also has been often proposed, objects, discourses, experimental situations, or professional strategies, can be also relevant elements -and, therefore, social mediators- within social contexts of scientific research (Latour 1983, Woolgar 1991)[6].

What is, as consequence, 'scientific mediation'? The easiest way to define it is as a set of social relations that scientists establish with their social environment(s), beyond their research groups. As questioned above, the boundary of a 'research group' is an arbitrary one and its own definition can be a conflictive issue whenever it is open to collective discussion. Hence I rather prefer to add the condition that the social environment is formed by non-scientists -or scientists adopting a different social role such as academic authorities, firms' managers, journals' editors, and so forth. That is to say, all the individuals, groups, organisations, and institutions to whom scientists and research groups are related to in order to promote research activities and capacities -this is the reason for stressing the qualification of 'scientific', rather than the more general use of 'social', when referring to mediation. I would also emphasise that these social relations are for the sake of collective knowledge, and not only for the particular benefits of the scientific researchers, but this would depend on the social distribution of the results coming out from those social interactions. To deal with state agencies for fund raising, to attend meetings for organising teaching, to answer emails and phone calls in order to prepare a public conference, to use the contact of a friend or a relative for getting in touch with a company or civic organization where to collect information, etc. are all typical forms of scientific mediation (see further examples in Martínez and Cuesta 2009: 131-135). Nowadays, to establish and to maintain social networks through internet, aiming to gather relevant information for present or future research, reveals an increasingly great activity of scientific mediation.

Different social ties, channels and codes of communication can be involved, as well as specific persons acting as mediators, either professionals or not. Mediation processes comprise, at least, three logical levels: social membership of actors, virtual scientific content of the interactions, and the means for getting in touch. Scientists are usually involved in such processes, achieving the skills for taking advantage of them and for dealing with the emerging troubles. Of course, social scientists can help to know better and more in-depth the long-term patterns and significant features of scientific mediation, or even to promote it efficiently. Needless to say that social researchers deal with similar amounts and kind of scientific mediation in our everyday working life, so our collaboration with natural scientists in this

domain increases the levels of complexity and it also implies reflexivity in terms of looking carefully at our different and common social practices and constraining contexts (Martínez 2008, Villasante 2006)[7].

Let's go now a step forward. What does scientific mediation imply in the light of the 'socialisation of science'? In a previous issue of this Journal, two commentators argued in favour of different ways of supporting science: a) by means of adapting it to the already existing knowledge-based society (D'Andrea 2009); b) by means of preserving its supposed democratic and rational ethos as it was defined by Merton (Wyatt 2009)[8]. Both also pointed out some of the challenges we actually face: the falling status of researchers employed by public institutions, gender discrimination in scientific careers, distrust and fears about technologies out of public control, the medicalisation of life, the application of technologies for controlling private life and work time, religious attacks to scientific knowledge, market-oriented scientific research, etc. I strongly agree with them in the necessity of supporting science and research capacities all over the society, but all of the social problems they mention seem to me that we need alternative approaches on the relationship science-society, and the above reflections on the concept of scientific mediation can provide a useful insight.

As it has been frequently verified, science and technology cannot exist in a social vacuum (Bernal 1949: 187; Mason 1985)[9]. Society provides resources, demands, values, information and people. Scientists need the influence of other scientists as well as the support of managers, friends, relatives, students, assistants, journalists, and so on. Even the active role of authorised scientists and scientific communities in the way of defining what is and what is not science, is constrained by the values and norms they take for granted as members of the society (Gyerin 1983)[10]. Scientists belong to -or are in contact with- different non-scientific organizations and social networks from which they can obtain support, inspiration or constraints. Although science is produced within *separated* scientific institutions, these form a particular *social field* of power relations and conflicts (Bourdieu 1984)[11]. This scientific field is not, thus, isolated from other power relationships, conflicts, interests and practices in which scientists are also engaged. Therefore, every society produces scientific knowledge and technologies according to the social matrix of relations and resources (including previous knowledge and non-disciplinary information available) where scientists are *located*.

It is clear to me that science has influenced many aspects of modern and contemporary life, in both positive and negative ways, but this would not necessarily lead to science-centred approaches. Science does not need to adapt to society because it is already *adapted* -it is a social product. There can occur some problems -for example, in the public settings for the production of science after the long wave of privatising policies, and the social consumption of technologies without knowing its scientific basis and environmental consequences. But they should be managed by social, political and scientific bodies altogether. The main problem, then, is to produce the democratic institutions where such problems can be dealt with by means of involving the participation of all the social actors and reducing, at the same time, the social inequalities which affect their possibilities to participate. Knowledge-society is not an ideal one, so it would be more harmful to adapt scientific research to it than to transform society into a more democratic one than it used to be (Canfora 2004)[12]. Managers of private companies and of the military complex -the least democratically regulated bodies- are fully aware that their control all over the world is based on continuous scientific and technological research, so an additional problem is to distinguish what kind of research we need to improve in order to transform society and democracy. This argument also applies to Wyatt's principal question: socialising what for whom? Ideal science may be close to the Mertonian ethos, but real science is basically a profession *among* others -a set of social practices that produce information, objects, services, etc. within established social organisations. It seems to me almost impossible to work for an ideal science without dealing first with the work conditions of scientists, their professional careers, the ways they are evaluated, the public expenses *invested* in science, etc. Their material interests for remaining in control of their organisations (as Weber, Collins, Parkin and other sociologists remarked) can result in particular impositions of procedures, privileges and, eventually, wrong ideas (scientific as well as political or cultural) over the whole society. I do not see it, thus, as an immaculate model of democracy and rationality. In spite of its valuable contributions to promote rational communication, society cannot look at 'science' as a mirror for building better institutions and for taking important collective decisions. For me, rationality is the starting point for reshaping democracy, not the end of the process (Harvey 1996)[13].

As we have seen, scientific mediation refers to the ties that scientists keep with their social environment. Though the demarcation of a social environment is a matter of contest, our argumentation

suggests that an examination of such ties as broad flows can give us a better understanding of the actual social networks in which real scientists are located. Moreover, as social actors, scientists are often also professional consultants, members of professional boards and committees, professors, parents, etc. so that they also act, not as autonomous agents, but as members of those social groups. Thus, these social groups can be both a relatively external environment of scientists and the inherent social environment in which they produce science and technology. Adaptation to society would mean the arbitrary selection of particular tendencies or dimensions of actual society. Instead, scientific mediations are addressed to connect scientists with particular social settings based on neat boundaries of membership. Some of these connections are just for the sake of the scientists' interests as such or as members of any of the social groups they belong to. Accordingly, an analysis of scientific mediations should regard on the ways those social connections can benefit collective knowledge, rather than to cover *hidden manoeuvres* of scientists with the pursuit of general interests -that is to say, within the framework of the ideal science. Political careers of some scientists or their influence to hire relatives in their organisations are, for example, typical social mediations that do not necessarily generate *immediate* scientific contributions to society. Of course, all of this apply to both natural and social scientists. Transdisciplinarity is, then, my preferred word to call upon mutual self-reflexivity of different scientists in order to know the social processes - mediations included - that constitute them as such.

  Lastly, I would like to make a final remark on the concept of socialisation. D'Andrea and Wyatt reminded us of its traditional meaning in social sciences as a process of social integration and adaptation to norms. This conception produced too many criticisms along the twentieth century so present theories tend to emphasise, preferentially, double bonds involved in mutual interactions, social mechanisms for establishing norms, openness/closeness of social structures to accept protests against norms, etc. Socialisation, nowadays, for structural or post-structural approaches is not a question of individuals and values, but of modes of belonging and social groups. Thus, social reproduction of inequalities can be regarded as resulting from processes of socialisation where social networks, communications and mediations are crucial. But socialisation comprises also a *communitarian* meaning: a way of sharing things. To socialise means to take part as well as to have equal rights, equal access and equal resources (or, at least, not too much unequal) (Tilly 1998)[14]. It is possible to belong to groups and organisations where there is no flavour of such a common ground, but then we would speak of mere integration -forced integration for those who have not many alternative options, and voluntary integration for those who obtain significant benefits or expect to obtain them in the future. To conclude, this approach would leave us with a new research agenda where scientific mediations -along with other social processes in which scientific research is embedded- should be examined too in terms of their contributions to that communitarian sense of socialisation. So to ask, what can science offer to build a more equal society? What kind of scientific knowledge is urgently needed to socialise for solving social problems? Then, it is from the point of view of actual society and democracy that a research on processes, contexts and networks where scientists are embedded, should be developed.

Notes and references

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