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Technoscientific futures: Public framing of science

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ABSTRACT

Using the broader framework of science and technology studies and insights from social research on public understanding of science, this paper discusses specific aspects of the public perception of science. It is accomplished by means of analysing public discourses of ignorance as well as the interrelations between discourses of science-in-general and science-in-particular in lay narratives, thereby advancing the approach originally developed by Mike Michael [24,25]. This study is based on two empirical cases of future-oriented science-related matters, climate change and biomedicine (xenotransplantation). Discourse analysis is applied to two thematic focus groups in Latvia between 2008 and 2009. The analysis introduces a set of more specific rhetorical devices and discursive strategies employed by laypeople in reflecting on the role of science and in providing their assessment of modern technoscientific solutions.

1. Introduction: science and technology and the future development of societies

Science and technology (S&T) are pervasively becoming one of the constitutive elements not only of the present society but also of our perception of the future path and mode of human development. Take, for instance, the efforts and the official rhetoric used by the European Commission at the policy level to position S&T as the basis of the European future by means of adopting *Science and technology: the key to Europe's future* [7], a communication aimed at securing Europe's leading role in research and technological development. As argued by Jürgen Habermas, the institutionalisation of scientific-technical progress as a guiding principle in modern society has been brought about with the upsurge of the capitalist mode of production [16]. As a result of profound human endeavour, modern scientific and technological developments are exerting a significant impact on the social structure of society (both material and cultural) and the distribution of agency within it – affecting micro, meso, and macro levels. These developments influence the way we perceive and define ourselves, interact, organise our social lives, and they are very likely to become further reinforced in the future. While this might sound rather deterministic, the expansion of scientific research, increased knowledge generation and dissemination, as well as penetration of technological processes and artefacts in our physical and social environment is clearly evident. It is not that deterministic, however, in terms of the direction of this influence of scientific and technological development, which can still be seen as rather unpredictable and socially negotiable.

S&T nowadays form part and parcel of our visions of the future co-constructed by various stakeholders, including scientists, engineers, policy-makers as well as the general public, which are based on both novel expectations and past experiences. Understanding the role and place of S&T in the present society – pursued here within the broader framework of science and technology (and society) studies (STS) (cf. [2,9,19]) – can provide some insight into the possible future scenarios and trajectories and form a basis for different foresight exercises and future-oriented analysis and assessments. An important issue at stake in this context concerns the legitimate agents of such assessments and the sources such exercises should be based on. Over the

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recent decades there has been a rather marked shift in the academic discourse, not least within STS, towards the concept of 'socially distributed expertise' [29,30]. This has also been accompanied by increasing attempts of practical application in policy-making through initiatives of public involvement in decision-making on S&T-related issues (cf. [20]). Such an approach envisages that official expert judgements seek to be complemented by or juxtaposed with lay perceptions and public knowledge in order to improve the scientific governance at large (cf. [18]). All these developments relate to research on the public understanding of science (PUS) with its different paradigms.

PUS research dates back to the 1950's when the first thematic large-scale population surveys were carried out in US, followed by a range of European countries in the 1970's and 80's [39]. Since then PUS research has evolved through the emergence of three sequential paradigms, namely, (1) scientific literacy (1960's–mid-1980's), (2) public understanding of science (1985–mid-1990's), and (3) science and society (mid-1990's) [3]. Each of those represents a distinct framing of the problem or "a diagnosis of the problem that science faces in its relationship with the public" (ibidem: 80) and different suggested solutions.

According to this categorisation, the *scientific literacy paradigm* was based on the perception of the need to know science (facts, methods) in order for the public to be culturally competent, become good/useful citizens, and be able to appreciate science ([3]: 80–82). Due to its preoccupation with the "psychometrics of factual knowledge" and increased education efforts, it did not take account of the public perception of the scientific process and the legitimate potential of negative public attitudes towards science (ibidem). This paradigm served as a basis for the so-called 'public deficit model', which "adopted a one-way, top-down communication process, in which scientists – with all the required information – filled the knowledge vacuum in the scientifically-illiterate general public as they saw fit" ([28]: 116). This kind of a paradigm does not allow for public participation in predominantly expert-driven deliberations over the present and future development of S&T, given the perceived epistemological differentiation between lay and expert knowledge.

Subsequently, the *public understanding of science paradigm* redirected focus from the lack of public knowledge towards the lack of public trust and belief in science, which was seen as threatening the established status of the scientific institutions ([3]: 82–84). This phase and its underlying reasoning have been encapsulated in the PUS axiom – "the more you know, the more you love it", which *a priori* prescribes a positive correlation between knowledge and attitudes (ibidem). This paradigm, however, failed to empirically demonstrate such a direct and straightforward causal link (cf. [1,11]). Sometimes treated by scholars as an extension of the above-mentioned public deficit model, it has been said to lack the view on knowledge- or science-in-context. In terms of public engagement, this paradigm also does not provide a solid basis for encouraging dialogical relationship between expert community and the general public due to its focus on knowledge acquisition rather than mutual knowledge sharing and constructive debate on specific S&T issues.

Acknowledgement of the importance of contextualising science and its interactions with laypeople was accordingly taken up as the basis for the *science and society paradigm*, along with shifting the 'faults' towards the scientific/expert community, given their increased alienation from the public ([3]: 85–86). The solution supported by this paradigm is seen in an up-stream (early) public engagement with the aim of rebuilding public trust and incorporating public views in determining the course of new and ongoing S&T developments. As can be implied, in terms of public participation, this paradigm is geared towards facilitating science-society dialogue on an equal public/expert basis.

Perhaps as a result of the changes in thinking within the framework of the 'science and society' paradigm, it may be significant that there has been a symbolic change in the title of the thematic EU Framework Programme (FP) programme committee from 'Science and society' under FP6 (2002–2006) to 'Science in society' under FP7 (2007–2013). This may reflect a shift in the positioning of science and society not as two distinct entities standing apart but as integrated and mutually related ones – a vision that aims not to dichotomise the two parties but rather focus on their potential non-hierarchical positive synergies. Besides, as noted by Irwin and Michael, "instead of assuming the contrast between science and society, it becomes necessary to explore contrasts between actors or constituencies each comprised of mixtures of both science and society" ([18]: 111), thereby highlighting the overall blurring of the seemingly established polarised categories of science/society and expert/lay (communities, knowledge, actors) in modern society. The same trend from polarisation to hybridisation applies to the very concepts of 'science' and 'technology', whereby a new hybrid form of 'technoscience' [22] has emerged as a new category to characterise the increased interdependencies and the fusion of these phenomena. The growing interdependence of research/science and technology has been attributed only to the late nineteenth century, brought about by the increasing 'scientization of technology' in the industrial systems of the most advanced capitalist countries ([16]: 59–61). As argued by Andrew Pickering, science as such "grows out of the mundane world and, as technoscience, comes back to inflect the dynamics of the latter" ([31]: 297).

Based on this general framework, the paper aims to advance several debated aspects of the complex science-technology-society relations, derived from an analysis of two focus group discussions – one on climate change and another on xenotransplantation.[1] In particular, it focuses on the way laypeople discursively reflect on and position themselves vis-à-vis science by studying the specific discursive strategies and rhetorical devices used in this process. The main emphasis is placed on the interrelationship between the general and particular public views on science and the variations in the lay discourses of scientific ignorance.

[1] The use of live cells, tissues and organs from a non-human animal source, transplanted or implanted into a human in order to replace organs injured or affected by diseases.