

Article

Science and technology in a mediatized and democratized society

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We inhabit an age in which economic progress in the European Union is equalized to more European research and better communication of that European research to the public. In highly developed Western democracies this implies an important role for the public as well as the mass media, both actors in a transforming public sphere. Beyond a call for more communication and more scientific literacy, the discourse has shifted to a call for more engagement and more participation on behalf of the citizen. There is a widespread sentiment however that the discipline of science communication is at a crossroads. In this paper it is argued that in a context of life politics and an increasing displacement of politics, one has to account for the trajectories of issue formation and the detours of public-ization to understand the dynamics of techno-scientific issues.

Introduction

On November 14th and 15th 2005 the European Commission (the European Union's executive body) held her second Communicating European Research (CER 2005) conference in Brussels "to promote more and better communication on science and research".¹ This is to be interpreted in the light of the ambitious Lisbon Strategy set out in 2000 in which EU Heads of State pledged to meet the 'Lisbon target' of scaling up R&D investments to 3% of GDP by 2010. The rationale behind this is the following:

More and better communication → more R&D investments → more jobs and growth

Especially the first relationship is of our concern here. Without public opinion support to upgrade R&D investments no government will downscale social, cultural or other economic investments in their national budgets. Ultimately this leads to the conclusion that more and better communication on science is regarded as crucial for the economic progress in the European Union. This emphasis on communication stood in contrast to the near invisibility of the social sciences in the conference. Although there was an exhibition of 250 stands in which 'scientists and organizations' were to 'present interesting practices, results and examples of Communicating European research',² the seminal journals *Science Communication*, *Public Understanding of Science* or *Journal of Science Communication* were missing, as was any reference to the interesting practices, results and examples that were ever published in these journals. The bulk of attention was devoted to the ('problematic') relationship between scientists and the media, and the public was left out of the equation. Nevertheless, the Science and Research Commissioner Janez Potocnik stated in the Welcome text to the conference that

Communicating and engaging with the public about research is a responsibility (...) Researchers have an obligation to inform about what they are doing, but also to listen, to understand the social context within which they operate – what people worry about, what they want or need from science.¹

In this way, CER 2005 mirrors two broader trends concerning science communication. First, although the discipline of science communication has experienced a shift from a discourse on more and better communication to more engagement and participation, the latter often serve as a rhetorical tool or a 'politics of talk' in policy documents, instead of being characteristic of a wider philosophical shift.³

Second, the conference is exemplary for an obstinate tendency to conceptualize public communication of science and technology as a very distinct form of communication, or as a separate media genre.⁴ In this paper we would like to inject this area of research with some perspectives from social theory, political science and media studies. Techno-scientific issues are considered to be confronted with the same mediatization and democratization as any other issue in social reality and as such take part in the broader shifts in society. Crucial for this paper is the transformation of the public sphere which manifests itself as a consequence of the transformation of politics on two domains: the extension from emancipatory to life politics is discussed in a first section, an extension which characterizes the shift from public understanding to public engagement with science. The increasing role of issue politics and the displacement of politics are described in a second section. The role of communication and media is the focus of a third section which discusses Matthew Nisbet's mediated issue development model as a new way of looking at the relationship between scientific issues, the media, policy, and the public(s) in the public sphere.

Science communication, the media and the transformation of the public sphere

Emancipatory and life politics⁵

Ever since the publication of Jürgen Habermas' 'Strukturwandel der Öffentlichkeit' and especially since its English translation in the eighties, the relationship between the media and the public sphere has become an important topic in media studies. The past two decades a number of authors have contributed to a more dynamic approach of the 'public sphere' concept.^{6,7} Characteristic of a more dynamic approach to the public sphere is a particular focus on the bottom-up sense-making processes of the citizen, next to the attention on institutionally oriented top-down processes. The necessity for such a dynamic approach presses forward because of the extension of the political domain from 'emancipatory politics' to 'life politics', as defined by Anthony Giddens.⁸ 'Emancipatory politics' has sprouted from the ideals of the Enlightenment and is primarily directed at freeing individuals and groups from the societal limitations that restrain the development of their 'life chances'. Once the 'life chances' have increased, citizens face the problems of 'life politics'. Having a certain number of choices at their disposal, what decisions do they need to take in order to develop their social identity in the best possible way? Whereas 'emancipatory politics' is directed towards increasing societal choice possibilities, 'life politics' focuses on the question of how people can use these new alternatives to reach 'self-actualization'.^{9,10} Next to the political developments, scientific and technological innovations have also made a substantial contribution to the expansion of 'life politics'.

Public understanding of science and science communication

The dominant discourse in the 'Public Understanding of Science (PuS)' debate has been a declared war on the scientific illiteracy of the public. Advocates of science communication and popularization have been battling for the improvement of PuS since the beginning of the twentieth century¹¹ and the PuS movement de facto institutionalized in 1985 by the publication by the Royal Society (UK) of the 'Public Understanding of Science' report, widely referred to as the Bodmer-report.¹² This dominant discourse is typically referred to as the deficit or the science literacy model. In (mass) communication terms, this model refers to a one-way top-down asymmetrical flow (of knowledge) from the scientific community through the mass media to the public. It is a fundamentally mechanical and positivistic sender-receiver communication model, in which the media serve only for the *transmission* of 'true' scientific knowledge to the 'ignorant' lay public. Its advocates bank on linear effects in the old hypodermic needle style, the first conceptualization of media effects ever:¹³ the more the public learns about science and technology the more 1) scientifically literate and 2) the more supportive its members will become (thus ensuring the future necessary funds). We can clearly see how this conceptualization lives on in the above mentioned conference of the European Commission. It is also clear that in this line of thinking the public and the

media are problematized, and not science: the public for being ignorant, and the sensationalist media for distorting a clear picture of science.^{14,15}

This dominant (classic) conceptualization clearly conflicts with the notion of life politics. The question to what extent people use their increased societal choice possibilities in order to reach self-actualization, or to develop a social identity, cannot be answered here. On the contrary, this conceptualization is an explicit form of emancipatory politics.¹⁶ No other role than replicating the information coming from science communication is reserved for the public. And second, only the rational-cognitive level is considered, the ethical or political is made irrelevant. Overcoming the illegitimate dominance of some groups or individuals over others by emancipatory politics *only*, brings along a new dominance. Inevitably this leads to an expert-educating-a-lay-person relation. It assumes someone or something to be up the process of emancipation, as an apolitical top-down mechanism. So there appears to be a democratic paradox in PuS, although democratic motives are explicitly stated as fundamental.^{17,18} Scientific experts with an exclusive privilege on the 'absolute truth' are being put, first, on top of the social ladder through their privileged position in the knowledge economy, and second, in opposition to all outsiders (like for instance the media) waiting to falsify the truth.

Public engagement with and the public value of science

To account for the bottom-up sense making processes of the citizen, thus to account for life politics, PuS has gradually been replaced by 'Public Engagement with Science (PeS)', foregrounding more dialogical forms of science communication. Fundamental to this shift is the understanding that one will think and talk differently about science and technology, whether one is a scientist, a politician, a social scientist or a factory worker, and this is why shared meaning in social reality is easily missed and differences misrepresented.¹⁹ This shift from emancipatory to life politics is exemplified by the House of Lords' (UK) 'Science and Society' report²⁰ and the rise of consensus conferences and citizen juries.^{21,22} Nevertheless, these participation procedures are often criticized for ending up with other deficit models or with narrowing the debate to risk questions instead of questioning the wider social visions and values driving science and innovation. This is why both the House of Lords report and the Demos pamphlet by Wilsdon, Wynne and Stilgoe²³ propose to focus on the software of engagement (values, codes) next to the hardware (participation procedures). The latter warn that without a shared framework we are likely to find ourselves in one of the next two blind alleys (as was exemplified by CER 2005): (i) determinism: an almost political pressure that we must be 'pro-science' and 'pro-innovation', easily leading us down the path of defining what is 'possible' as 'desirable', as well as assuming that economic and social benefits of innovation are obvious and agreed. And (ii) reductionism: economics is always called in to assist science in its role as unproblematic source of authority, reducing dialogue to the calculus of economic growth or risk assessment.

Nonetheless, as these PuS as well as PeS conceptualizations have a rather static nature, they fall short of accommodating the trajectories of techno-scientific issues in the whirlwind of a mediatized and democratized public sphere. Three studies have been crucial in this respect. The first was carried out in 1988 in the UK and was aimed specifically at measuring the main rationale of the deficit model: the more understanding, the more positive attitudes.²⁴ One of its main conclusions was that general attitudes to science are poor predictors of public attitudes to specific scientific issues. The second was that people who scored higher points on scientific understanding are more opposed to morally contentious areas of research than people who are less informed. The authors warned long before the GM (Genetically Modified crops and food) controversy for the complex consequences of a scientifically better informed public, and suggested that "the opinions of a scientifically well-informed public may serve as a check on public and political support for certain areas of research".²⁵ The other two studies (specifically about biotechnology) are both from Massimiano Bucchi and Federico Neresini. Surveys carried out in 2000 and 2001 again showed that being better informed did not lead to more positive attitudes with respect to different biotechnologies, yet it was associated with asking for stricter state regulation, which should not be left to scientists or business, but for example to consumer groups, instead of potential beneficiaries.²⁶ Media exposure did not prove to be relevant, so the authors conducted another study in 2003 aimed at explaining public hostility to biotechnologies.²⁷ In this study 69% of respondents defined science as 'loaded with interests': a clear indication that scientific research can no longer count on an aspect of

impartiality and disinterestedness. Citizens also expressed a strong request for involvement and public participation: one out of five indicated that ‘all citizens’ should be involved in decisions regarding biotechnology (utopian approach) against one out of ten indicating scientists themselves should be left to bear the full responsibility (elitist approach). Although the authors exposed no belief in either one of these two approaches, their results did represent a concern “for the procedures connecting scientific expertise, decision-making, and political representation (...) Experts are not sufficient because political actors and institutions are considered inadequate in this area by the majority of citizens”. So we need to take into account (i) the role of specific issues instead of science as some kind of abstract institution, (ii) the consequences of a ‘morally contentious’ framing, and (iii) the role of both in the perceived (in)adequacy of procedures involving scientific expertise, decision-making and political representation.

Issue politics

Although both the adherents of the deficit model as its participatory critics claim to be pursuing democratic goals, let us consider the practice of democratic politics first. Since the famous debate between Walter Lippmann^{28,29} and John Dewey³⁰ around the first quarter of the twentieth century, ‘issues’ are attributed an essential role in democratic politics.³¹ Certain features of what both authors perceived as the rise of a technological society in the United States around World War I, e.g. a media revolution and a proliferation of complex issues (which renders this analysis even more relevant today), led them to a re-conceptualization of political democracy: public involvement in politics is occasioned by issues and democratic politics is about finding a settlement for those issues. The public becomes involved whenever existing institutions fail to reach a settlement for a certain issue. This means the public is only secondarily and indirectly involved through the communication of these issues, and its agency is derived from its ability to influence the actors that are directly involved. A crucial element in issue politics is that the formation of a public in this process is understood as a consequence, or effect, of the political processes of ‘issue formation’. In these processes, communication and media play a crucial role, to which we will come back in the next section.

In the current context issue politics is only becoming more prominent.³² In the late modern societies of the second half of the 20th century many scholars have observed a crisis in the modern institutions of rational control which has given rise to structural transformations of society,^{31,33,34} as exemplified by Beck’s risk society.³⁵ This brings forth displacements of power and politics, caused by (i) a successful democratization which decreases power of intervention by the state, (ii) the invention and marketing of new technologies which increases the power of intervention by actors in the social domain, and (iii) the pervasiveness of the mass media, which subject activities outside of the official political domain to public scrutiny. Globalization is also an important factor in the displacement of politics. The displacement of politics away from traditional national democratic institutions is exemplified by trans- or supranational institutions as the United Nations, the World Trade Organization, or the European Commission, and by the rise of transnational NGO’s like Greenpeace or Friends of the Earth.

However, a crucial displacement of politics for this paper is found in Science & Technology Studies in which it is argued that science itself is the pursuit of politics by other means.^{36,37} Especially in the case of biotechnology, techno-scientific developments today are reconfiguring society and nature to such an extent that these are said to be political interventions.³⁸ The distinguishing element here is that in most cases democracy only comes in after these interventions have been made. Many people in the developed world have come to see science with suspicion and hostility, as they do not feel they have any ownership, control or influence on the sciences and technologies marketed by their governments and industry.

Today, two factors render this analysis extremely relevant. First, issue politics is particularly visible in the context of the displacement of politics. Second, issue politics also gains in prominence in the context of life politics, in which social identity, self-actualization or lifestyle play a primary role. West-European citizens for example no longer identify themselves with strict political ideologies. Social identities and individual lifestyles have become essential to making choices, to choosing different sides on different issues, and engaging in politics. This takes us to the next focal point in this investigation: issue definitions.

Mediated issue development

Now what exactly is the role of communication and media in issue politics? It was mentioned above that all those affected by an issue become involved, although secondarily and indirectly, through the communication of this issue. Anthony Downs³⁹ was the first to set out different stages to study the nature of public attention in his 'issue attention cycle'. At first an issue is stuck in the pre-problem stage until a certain triggering event takes the issue into the public arena. In stage two, public attention to the issue is high and there is public pressure on political leaders to act. A gradual decline of public attention sets in as soon as the dramatic and exciting elements needed to sustain public interest become exhausted and new issues compete for attention. Of course, this Downsian linear model is to be supplemented with other factors to do justice to the complexities of the career of a 'public problem'. First of all, it is crucial to keep in mind that issues are produced by processes of collective definition, in which the intrinsic so-called 'objective' properties do not explain the constitution of the problem. This collective definition is an ongoing social construction, an interpretive struggle, and does not occur "in some vague location such as society or public opinion but in particular public arenas in which social problems are framed and grow".⁴⁰ Examples of public arenas are numerous: governments, parliaments, courts, news media, television, books, internet, blogs, NGO's, political campaigns etc. The news media are a very important public arena to study this collective definition and ongoing social construction, not only because their societal reach, but also through their role of guiding public pressure on political leaders to act.

It was Elmer Eric Schattschneider⁴¹ who pointed out that politics is a set of strategies for the displacement of issues in which the principal strategy is the 'conflict about the conflict': the struggle over the definition of the issue at stake. It is this definition which decides where the issue is decided, who participates or not, and which arguments are most persuasive. That is why Noortje Marres pleads for focusing on the trajectories of issue formation: the basic question is whether an issue definition or displacement is aimed at more participation from the public (democratic movement or socialization of the issue) or at limiting the parties involved (antidemocratic movement or privatization of the issue)? Therefore democratic politics is to be defined as the public-ization of affairs, e.g. issues that affect the public and existing institutions fail to settle depend on detours of public-ization for their settlement. A democratic deficit is witnessed whenever bad issue displacements occur, e.g. when an issue is displaced to a location that is inaccessible to publics.

Matthew Nisbet and Mike Hume⁴² have worked towards a model of mediated issue development (see figure 1) in addressing some of the criticisms left at the doorstep of Anthony Downs. Nisbet & Hume identify four key underlying social mechanisms driving issue attention cycles: (i) the type of policy venue or arena to debate the issue, (ii) the control of media attention and the framing of the issue in advantageous terms, (iii) the shift in news beats and the media definition of the issue at stake, and (iv) the policy and media context relative to competing issues.

Returning to Schattschneider, table 1 shows how the conflict about the conflict decides the scope of participation: defining a scientific or technological issue purely in technical terms limits the scope of participation and serves in the interests of the actors advantaged by the status-quo in decision-making. Disadvantaged actors, who benefit from a displacement of the issue, will depend on the detour of the public-ization of the issue to expand the scope of participation and the potential for change. In this public-ization the dramatic dimensions of the issue will be emphasized to drive conflict expansion and attract public attention and concern. This more dramatic and political framing will provide a narrative for journalists reporting on the issue and therefore the issue gains the capacity of shifting across news beats, from specialist journalists like science writers and business reporters to political and general assignment reporters, a shift which will also increase the amount of coverage devoted to the issue. A concomitant rise will occur in the opinion pages, letters to the editor and editorials, which are more likely to emphasize the ethical dimension of an issue than journalists themselves, through the latter's preference for appearing impartial. The opposite is of course also possible: actors disadvantaged by a public-ization will struggle to gain back decision-making by redefining the issue in technical terms and thus limit the scope of participation. Nisbet & Hume point out that in administrative policy venues, like regulatory or funding agencies, special access is typically granted to the industry and the scientific community, and decision-making is left in the hands of administrators, scientists and independently constituted scientific

Type of policy venue	Administrative arenas	Overtly political arenas
Scope of participation	limited	expanded
Access & input decision-making	few actors	diversity of actors
Consensus	high	eroding
Intensity of conflict	low	high
Potential change	incremental	nonincremental
Attention	scant	media and public attention
Special access	industry, scientific community	general public or other interests
Scientific authority	high	low
Policy monopoly	science and industry	pluralistic
Issue definition/frame	technical dimension: scientific evidence, cost-benefit calculations	dramatic dimension: ethics, morality, uncertainty, social concerns
Referential symbols	devoid of emotional content	emotionally charged
Symbolic weight	low	high
News beats	science writers, business journalists	political, general assignment reporters, opinion pages, letters to the editor, editorials
Potential volume of coverage	low	high
Narrative structure	uncommon	common

Table 1. Different features of administrative and overtly political policy arenas

advisory boards. In these institutional arrangements, technical and scientific arguments are the most persuasive, and science and industry enjoy a policy monopoly.

Scientific authority is created and defended in these arenas in part through the dominance of impersonal and neutral technical discourse, (...) the shift in framing of an issue from technical terms to dramatic terms [serves] as a key element in promoting the scope of participation around science-related controversies.^{43,44}

Once the issue has been displaced to overtly political arenas, consumer groups or environmentalists enter the process of decision-making, and scientific authority will suffer in the face of arguments based on social concerns.

This model of mediated issue development (see figure 1) has been applied to the issues of plant biotechnology,⁴² stem cells⁴⁵ and intelligent design,⁴⁶ all in the United States. The model proved especially valuable in providing some explanations to the low level of controversy surrounding the plant biotechnology issue in the US in comparison with the rest of the world. The framing of the issue in technical terms since early policy decisions appears to be one of the main reasons for the limited scope of participation, and this is how a policy monopoly was established in administrative policy arenas⁴⁷. Apparently the US, Canada and Argentina had a similar goal in mind when a complaint was filed with the World Trade Organization (WTO) in 2003 alleging that the European Union's 'de facto moratorium' on GM crops and food was illegal on the basis of international trade rules (i.e. a lack of scientific foundation).⁴⁸ In this case, as promoters of plant biotechnology, the three accusers were the actors disadvantaged by the (European) status-quo who depended on what Noortje Marres would consider a corrupt issue displacement to limit the scope of participation because the situation was clearly damaging their (economic) interests. Taking the issue to the WTO meant reframing the issue in technical economic or scientific terms and putting policy back into an administrative policy arena, simultaneously granting special access to scientists whom the trade diplomats relied on to inform their rulings.

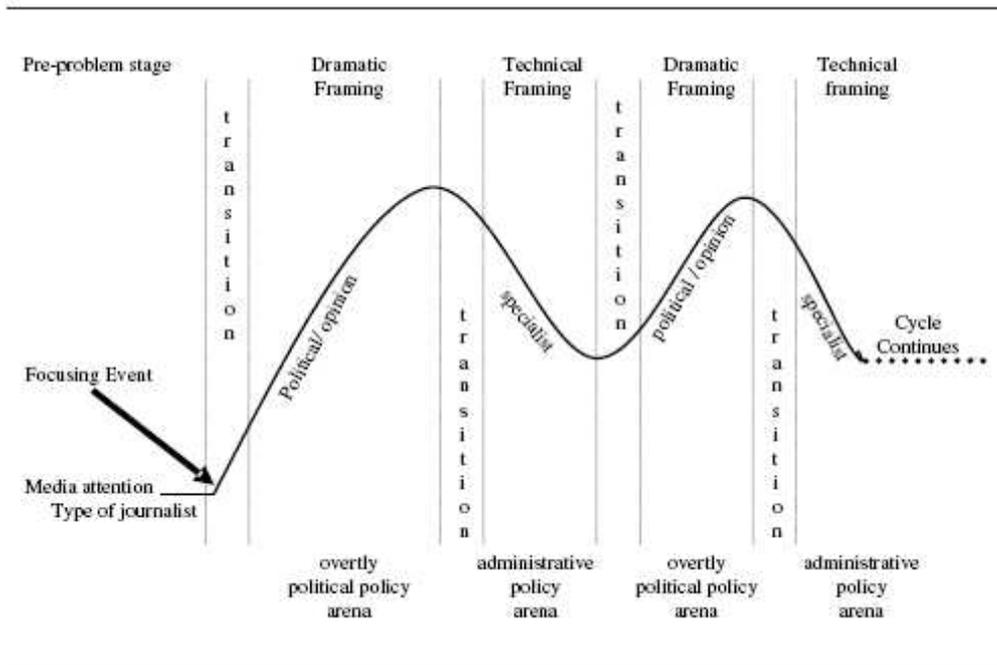


Figure 1. Model of Mediated Issue Development⁴⁹

Conclusion

The European Commission's Communicating European Research Conference 2005 was used as an introduction to this paper as it mirrors two broader trends concerning science communication: a shift in discourse from calling for understanding to acknowledging the importance of engagement, and the conceptualization of public communication of science and technology as a very distinct form of communication. The former has been attributed to the extension of the political domain from emancipatory to life politics, of which the basic argument is a focus on the bottom-up sense-making processes of the individual, and the question how individuals use the increased societal choice possibilities to develop their social identity. The extension of the field from public understanding of science to public engagement with science was characterized as a specific case of this broader shift in society. Nonetheless, as both the PuS and PeS conceptualizations have a rather static nature and imply that public communication of science and technology is a very distinct form of communication, it was argued that these fall short of accommodating the trajectories of techno-scientific issues in the whirlwind of a mediatized and democratized public sphere. In the context of life politics and an increasing displacement of politics, issue politics gains in prominence and becomes particularly visible. Therefore, to understand the dynamics behind science and technology disputes one has to account for the trajectories of issue formation and the detours of public-ization for the settlement of techno-scientific issues. When politics is a set of strategies for the displacement of issues, then the principal strategy is the definitional or interpretive struggle as the framing of an issue decides where the issue is decided, who participates or not and which arguments are most persuasive. In a public-ization process the dramatic dimensions of an issue like ethics, morality, uncertainty, and controversy will be emphasized to attract public attention and drive conflict expansion in order to shift the balance of power concerning a certain issue. And here is where the crisis of PuS and science communication is partially located. In this mediated and democratized public sphere, specific science communication programs or PR-efforts have to compete in the public arena with rival framings, rival PR-efforts and rival issues. For the scientific community this loss of control over the issues in the public sphere is a frustrating experience and accusations of 'sensationalist' media coverage and 'ignorant' opponents (e.g. NGO's, social movements or the citizen in general) quickly follow. In the words of Ulrich Beck, we can say that the scientific

community (whether in PuS or in – the often rhetorical nature of – PeS) struggles to hold on to the model of primary scientization established in the nineteenth century and refuses to enter the phase of reflexive modernization in which the principle of methodical scepticism is also applied to science itself and a demonopolization of scientific knowledge comes about.³⁵ This model of primary scientization is based on a certain view of the relationship between scientific practice and the public sphere. Only under the conditions of a sharp distinction between tradition and modernity, lay person and expert, and an unbroken faith in science and progress, can scientific results be advanced in an authoritarian fashion in the public sphere. Certain harmonious power relationships between science, business, politics and the public sphere are of course an important feature of this model of primary scientization, and it is these power relationships that have come under increasing pressure. The issue of plant biotechnology is a primary example of this, at least in Europe. Maybe the recent surge in science communication programs, information campaigns, conferences, exhibitions, etc. is a consequence of science (or business and politics) trying to come to grips with a changing power structure in the relationship between science, scientific practice and the public sphere. These efforts, however, serve only to adapt the self-presentation of the scientific institution rather than to question its forms of power and social control. And this is where in the case of issues that affect the public and existing institutions fail to settle, disadvantaged actors will depend on the detours of public-ization to expand the scope of participation and the potential for change. The mediated issue development model is valuable exactly because it maps the trajectories of issue formation and the displacement processes, and demonstrates how the framing of an issue, will reflect and shape where the issue is decided, by whom and with what outcomes. Social reality is foremost an interpretive struggle and the mass media in modern democracies constitute a crucial public arena where this struggle is often won or lost.

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