

Landscaping climate change: a mapping technique for understanding science and technology debates on the World Wide Web

Richard Rogers and Noortje Marres

New World Wide Web (web) mapping techniques may inform and ultimately facilitate meaningful participation in current science and technology debates. The technique described here “landscapes” a debate by displaying key “webby” relationships between organizations. “Debate-scaping” plots two organizational positionings—the organizations’ inter-hyperlinking as well as their discursive affinities. The underlying claim is that hyperlinking and discursive maps provide a semblance of given socio-epistemic networks on the web. The climate change debate on the web in November 1998 serves as a test case. Three findings are reported. First, distinctive .com, .gov and .org linking styles were found. Second, organizations take care in making hyperlinks, leading to the premise that the hyperlinks (and the “missing links”) reveal which issue and debate framings organizations acknowledge, and find acceptable and unacceptable. Finally, it was learned that organizations take substantive positions and address other organizations’ positions. Thus, we found the makings of a “debate” that may be mapped. Scenarios of use to support new public participation techniques and experiments are discussed by way of conclusion.

1. Introduction

In *Henry Foole*, a film by Hal Hartley, the unassuming sanitation engineer, Simon Grimsley, pens an erotic epic poem no publisher would touch. At the behest of Henry Foole, the inspirational stranger new to the small town, Simon’s poem is posted on the Internet (net). Young boys and girls the world over swoon, the mass media embraces the discovered “masterpiece,” and publishers fall at Simon’s feet. The Nobel Prize soon follows.

In a more real virtual realm, the American collective Electronic Civil Disobedience called upon web surfers to join a virtual sit-in on 10 April 1998. According to the collective, 8,141 visitors helped to “bomb” the Mexican government’s website, causing a system overload.¹ The disruptive act was intended to show solidarity with the plight of the Zapatista, the ethnic community in Chiapas vying for autonomy.² The small act of “cyberwar” buttresses the idea that the Zapatista, commanded (as has been reported) by the “world’s first Internet guerilla leader,” are involved in a novel form of conflict, whereby highly Internetted solidarity groups from “global civil society” become the key agents of change. The “revolutions” by Internet, small and large, are being taken as evocative cases for evaluating the new threats of “net war” and cyberwar (in national security circles), as well as for inspiring new opportunities for direct public participation (in activist and other Non-Government Organization [NGO] circles).³

These stories about authorial fame and revolution by Internet raise larger questions concerning the status of web publication as well as participatory action on these new media “channels.” In the examples, above, the unregulated nature of the channels enables the otherwise under-acknowledged to acquire wider recognition and make a greater impact. As such they break with the conventional procedures of gaining status for one’s words and deeds.

As is well known, the web and the net have long been praised for this ground-breaking potential, in the style of *Wired* magazine and earlier hackerdom.⁴ Here we begin to unravel these assumptions and potentials by discussing both the current epistemological value of web-based information and the socio-political value of public participation on the net. We tackle these issues with the aid of a case study on the climate change debate on the World Wide Web. While it is acknowledged that the web may still hold the potential for waging war against the establishment, we argue that it is also suited, perhaps more readily, for initiating meaningful exchange and debate with institutions, increasingly working in and with the “new media style.”

The empirical research project—“Web Geographies of Knowledge and Power”—has been an attempt to marry brands of science and technology studies, and computer-related design by visualizing relationships between issue-related websites as a debate.⁵ It holds the view that the World Wide Web has become a significant forum for relevant organizational interaction. It acknowledges and takes advantage of the explosive expansion of web development and usage beyond the specific government, university and the “hactivist” and “techie” communities of early adapters to the widest range of governmental bodies, non-governmental organizations and corporations. Such a new web pluralism, including dominant, “socially relevant actors,” provides an opportunity to access and map far more than the homepages of the obscure and the enthusiastic. The project also chimes with the new view that, to matter, the organization has a website. In particular, it takes into consideration the fact that information provided by organizations stands not alone in space (as a public relations folder or an annual report) but potentially in immediate relation to other organizations’ information in a hyperspace.

The project also recognizes and attempts to address the potential pitfalls of overreliance on the web, i.e., the (historical) dubiousness of web-based information and the low stakes of net-based participation, as we explain. Moreover, it attempts to tackle the current inadequacy of Internet search engines, especially their inability to render source context and impart indications of the socio-epistemological value of information.⁶ By meaningfully landscaping queried information, “debate-scaping,” as the conceptual technique is called, would add new contextual and participatory components to browsing.

2. Web epistemologies

For the server-advantaged, the net allows unfettered self-publication. While net publication once was thought to hold out the prospect of a “new pluralism” of voices, experience has shown that self-publication decreases the value of the information or knowledge more generally. From the beginning, net information has been viewed as “floating,” as generally unreliable, as mere information—as opposed to managed information, or even knowledge. The Internet is considered a “rumor mill.”⁷ This situation owes to the fact that the electronic publication disturbs the hierarchy of credibility by often not following the proper channels, conventionally the editors’ desks (for journalism and Simon’s poetry) or the peer review system (for science). In journalism, the net rumor about the downing of TWA flight 80 by the U.S. Navy provides a seminal case. In science the cold fusion controversy comes to mind.⁸ Following “improper channels,” scientists first spread their findings in the mass media and across new media services. They later were debunked through more standard peer review.

Increasingly print and broadcast media (the established channels) are moving onto the

Web, taking advantage of the new delivery system. In emulating the design and style of their off-Web versions, they realize (among other things) the new media's legitimacy gap. As a CBS news manager in New York has argued, in reference to the plans of established press organs to increase their net presence, "seeing the web promoted by the big anchors certifies to a lot of people that it's a place to go."⁹ The story related that the presence of the major American television news networks might bring a "dose of legitimacy to journalism on the web," the new corridors of whispers.¹⁰ Refereed academic journals on the web (including web-only journals) are similarly raising the potential status of web-delivered information.¹¹

A way of describing what's known as the "chaos" of the net relates to the dearth of authorizing entities (currently being addressed by "big anchors" and the refereed web journals) as well as the absence of (source) context. While the former has much to do with the spirit of early web development communities—"information must be free"—the latter is a product of the "incoherence" returned by search engines, one of the main entry points to the web. After entering the keyword, the searcher is given a long, disparate and loosely structured set of URLs. While there is much experimentation with engine logics, leading search engines continue to return both the "legitimate" and the less legitimate, in one list of URLs.¹² There may be the self-claim that URLs are listed according to "reliability" measures, but search engines have been ranking sites according to HTML programmers' "tagging" and the keyword recurrence in the first few paragraphs.¹³ Thus, if the keyword is well-placed and well-tagged, the engines often place it higher on the returned list of URLs, granting it greater "reliability," often with a series of red stars or percentage measures. As in the case of self-publishing, in search engine returns "reliability" is largely generated by the author of the site. The "rubbish" returned by search engines (to use the vernacular) thus has to do with these search engine logics (and commercial webmasters' knowledge of "tips to get more hits") as well as the questionable sense of security imparted by reliability graphics. Whether or not the logics are intelligible to the user, ultimately he or she relies on his own personal framework of understanding to filter the flows anew. After the search engines provide an initial filtering, the surfers practice another, which we call real-time, personal archaeology.

Before returning to the manner in which the debate-scaping technique addresses the social epistemology and personal archaeology of web-based information, we'd like to touch on the current status and value of on-line participation.

3. Phenomenological participation

As scholars have argued regarding "public understanding" and "sustainability," the terms, "public debate" and "public participation," are "open fields" (as in a spreadsheet or database) to be filled in by theorists, methodologists, practitioners and designers.¹⁴ As we know them, the notion and practice of public participation arose in the context of the new grass roots activism of the early seventies, which also proved to be a catalyst for the "participatory design" movement. With participatory design and, later, public understanding methods, such as consensus conferences, new "participation spaces" or "strategic niches" were created.¹⁵

One of the principal aims of the participatory and understanding movements has been to somewhat transform the public into experts and, thus, public debates into expert debates, giving them a higher substantive standing and more clout as a policy-making input than utterances at a corner of Hyde Park or postings on a grocery store bulletin board, the models and metaphors upon which much net participation to date is based.

As mentioned earlier, during the development of the net and the web, many praised the new media for its alleged inherent pluralism and its "many to many" connectivity. The early bulletin board systems (BBSs) and on-line communities, such as *The Well* and

perhaps New York's *Echo* and Amsterdam's *Digital City*, demonstrated and attributed to it the potential for non-hierarchical and open-ended communication, self-organization and widespread participation, largely independent of institutional guidance.¹⁶ When corporations and governmental organizations presented themselves on the web, certain original communities regarded the march of the establishment as a disappointing loss of the net's potential and independent status, a development not so unlike that of other earlier "technologies of freedom," e.g., when amateur radio operators lost their hold over the ether.¹⁷

Forms of virtual participation abound. As they do outside of the web, NGOs on the web issue calls for action and participation in causes. Greenpeace, for example, incites visitors to "become a cyberactivist," which is effectuated by subscribing to a Greenpeace mailing list. The organization also invites the visitor to "vote now" on "how much of the global investment in oil and gas production do you think oil companies should invest in renewables?" While the stakes of the issue are high, the voter is not informed about the background of the question and the recipients of the survey results. The channels of dissemination remain obscure. Other NGOs have "debate cafés" and such like to make one's views known, in an exchange.

Intriguingly, corporations and quasi-governmental organizations are beginning to take over a fair amount of the style and rhetoric of early virtual community-building and radical democracy the NGOs borrowed from the virtual communities.¹⁸ Shell, for example, has integrated a "speaker's corner" into its website, where surfers can "join the debate" by posing questions and sending in comments to the corporation, to which Shell employees react. Upon entering Shell's speaker's corner the visitor is asked if he has "got something the rest of the world should hear?" The sometimes highly inflammatory comments are left on the company website for surfers to read. The NGO-style, United Nations-affiliated Global Environmental Information Center similarly invites one to climb aboard the "Climate Change Train," an apparently participatory act, which (on the next pages) becomes a place to order educational material and more information.

Most participatory spaces on the web may allow many to post messages and request information and many to read both, but they seem to refer and keep only to themselves. Similar to chat lines, self-referential participatory spaces have little demonstrable impact on wider debates, and impress more from a phenomenological rather than a socio-political point of view. In the main those who "join the debate" gain a collective experience of participation (and discursive space-building) rather than tangible, co-constructed outcomes, as forged by post-standpoint politics.¹⁹ The experience of participation in a shared discursive space, however content-rich, does not yield the new cross-discursive acknowledgements and repositionings, which we would like to call the neo-pluralist potential of the web. Off-web, public debate participants in new British, German and Dutch participatory experiments often voice an analogous criticism.²⁰ Participation becomes an end in itself; the new voices find resonance only with themselves.

The current lack of effective public participation on the web notwithstanding, it is argued here that there may be potential in the idea, found perverse in some circles, that the virtual is also real or may be regarded as such.²¹ The fact that major governmental and corporate players have entered the new medium alongside the more traditional virtual community-builders may open up new opportunities for exchange between these groups, as we come to in the conclusion. Where participation opportunities are currently valued from a phenomenological point of view, the debate-scaping technique aims to explore the potential of moving from the phenomenological to the socio-epistemological and the neo-pluralist.

4. Conceptualizing the debate mapping technique

In determining the constitution of scientific knowledge or the construction of technology, science and technology scholars have benefited from notions of archaeology—the deeper mangles to be discovered upon deconstruction of sets of knowledge claims.²² Since the anthropological and cultural turn, scholars have gone in search of the fine-grained cultural and material framings—the historical biases and worldviews, the everyday practices, the available and chosen tools and instruments, and the epistemic or knowledge networks, formed by interest and situation and held together by practices, institutional good faith, and funding.²³ In the face of expert assurance and funding, the archaeological perspective relativizes the certainty of scientific or technological outcomes, and points up how the outcomes could have been other.

Web surfers, be they everyday people, organization workers, journalists or scientists, don similar spectacles while making their daily excavations. These days, much serious and leisurely research begins with a web search. After consulting the search engine, the searcher relies on ‘judgement and past experience’ in selecting, clicking through and finally patiently reading certain sources of information.²⁴ That is, the searcher practices a kind of real-time archaeology. One contextualizes one’s information on the basis of websites recently visited, former encounters with the issue at hand, and more general information-processing experiences and media interfacing habits. In other words, uncertainty about the reliability of the information is reduced not so much by the logic of the search engine and the seductive “reliability” graphics, but through everyday media consumption practice and one’s own “trust logics.”²⁵ These personal archaeological logics inform decisions about which links to follow.

Similar to the step up from phenomenological to neo-pluralist participation, we propose the change of perspective from personal to net archaeology. In medium theory, applied to new media and especially “hypermedia,” scholars sometimes speak of author/reader inversion, whereby the reader or link-follower would author *in toto* the information being surfed.²⁶ Moreover, following these “footsteps in the snow” would reveal the surfer-author’s consumption profile or personal archaeology.²⁷ We prefer to think in terms of existing (albeit dynamic) knowledge networks authored, not by the surfer, but by the landscaping technique, be it a search engine, or in this case, debate-scaping. When following links one may intuit a semblance of a socio-epistemic network between organizations, but debate-scaping intends to capture such net archaeology. The debate-scaping technique thus fills in the notions of public understanding and participation with “engagement with the socio-epistemic network.” It appoints surfers, desiring to familiarize themselves with the debate, and webmasters, aspiring to occupy a place in it, as the central agents of such engagement.

Disclosing the relations between the websites of stakeholders in a debate, the debate-scaping technique would facilitate understanding of the socio-epistemic networks for those interested in the debate, for existing participants or for those aspiring to participate.

In spatially rendering web information, debate-scaping also may be viewed in light of existing “cybergeographies” research programs.²⁸ While cybergeographers may map the web in a variety of ways, to date they have not mapped debate or discourse. Contrary to these efforts, debate-scaping approaches a demarcated set of websites as a space where organizations position themselves, at once socially and substantively, vis-à-vis other parties to a debate on a specific issue.

The organizational positionings on the web are revealed in two distinct characteristics of the World Wide Web, links and words. The positionings thus are derived from hyperlinking between organizations, and keyword cross-reference, the latter being the way in which organizations frame particular statements or knowledge claims around which a debate is taking place.²⁹ Such an approach to mapping debate on the web first depends upon the assumption that

hyperlinking behavior is non-random (in a colloquial sense). To be meaningful, hyperlinking should be less a matter of the mere whims of the organization's webmaster. The semblance of an epistemic network can be visualized as a debate only if actors significantly acknowledge other actors by linking to them in the webwork. The approach also depends upon the idea that organizations are taking positions on an issue, which refer implicitly or explicitly to other organizations' positions.

To test the assumption of meaningful socio-epistemic networks, the debate on global climate change was chosen as a springboard case. A pilot study was carried out. Among other reasons, the debate on global climate change (on the web) was selected for its wide range of actors, its global reach, its perceived high level of scientific uncertainty and the relatively clear-cut interests informing the debate.³⁰ Especially, the global nature of the issue-making process makes climate change a suitable candidate for "Internetted" debate. Another reason was the existence of clearly stated principal knowledge claims, in this case by the Intergovernmental Panel on Climate Change (IPCC), the central scientific authority residing under the United Nations. After we relate in some depth the linking patterns between organizations involved in the climate change debate on the web, the well-known statement by the IPCC frames the discursive mapping, in our description of the two-part debate-scaping technique.

The case study of the web debate on global climate change comprised the following steps: exploring and mapping hyperlinks through snowballing (or link-following), noting the recurrence of key phrases, and tracing and mapping the organizations' key phrase framings with the aid of the Textual Analysis Computing Tool (TACT).

5. Following the links: Hyperlinking styles in the global climate change debate

Research began with queries for "global climate change," and "climate change" on a number of search engines, whereby disparate lists of URLs were returned.³¹ The number of hits returned varied from 46,478 to 14,246,621.³² The lists gave the impression of a unnavigable sea of information, of a weedbed—too many organizations, too much information, too little (source or socio-epistemological) context. As expected, the vast quantities of URLs returned by the search engines did not provide an overview of what could be called a structured global climate change debate. The disconnected and decontextualized wholes were left aside.

Following web-searching intuition and keeping with the personal archaeological idea that everyday publics look to NGOs for reliable information about controversial scientific and technological issues, the researchers turned to Greenpeace and Friends of the Earth and "followed the links."³³ By clicking through the NGO link lists, other NGOs, governmental organizations, scientific institutions and corporations were reached, and the links pages of these organizations led to yet other organizations.³⁴

From these initial explorations, a first structuring principle of the hyperlink network emerged. On their links pages, NGOs generally organize the outgoing links according to institutional type. While the internal site headings and subheadings differed, an overarching classification could be discerned, namely, a division between governmental, non-governmental, and corporate organizations, or, in fact, according to their domain names suffixes, between .gov, .org, and .com.³⁵ The map-in-making now showed three groupings.

In order to determine further the participants to the debate, for each grouping a central organization was chosen: Friends of the Earth, UNFCCC, and Shell. For each grouping, they presented the debate most extensively to the user, that is, they offered the most outgoing links to actors in the sample.³⁶ For a website to be included in the sample, it was first of all required to discuss climate change, and not be an information clearing house. A strict reputational criterion for debate participation was subsequently formulated, filtering out the rest. For an

organization to participate in the debate, a central player must link to it. Thus the sample to comprise the socio-epistemic network is made up of central organizations and those of the organizations they “elect” as relevant by linking to them.

Among the “elected,” a number of websites was found that departed from the straightforward structuring principle that was adopted initially. The Global Climate Coalition (GCC) and the International Energy Association (IEA) carry the .org suffix, but do not share other characteristics of the organizations in the .org group.³⁷ According to a RAND taxonomy, non-governmental organizations can be divided into non-profit organizations (NPOs) and grassroots organizations (GROs).³⁸ The IEA, however, portrays itself on its website as a consultative body, comprised of delegates from the OECD countries. Following the RAND scheme, it should be classified as an IGO (international governmental organization), falling outside the NGO sector. The GCC describes itself as a lobby group with companies as its members. Extending the classification, it can be defined as a BONGO (business-organized NGO), which excludes it from the NGO sector as well.³⁹ Thus, the GCC and the IEA were assigned to the .com and the .gov groupings, respectively. The Global Environmental Info Center emerged as a third exception. While it is UN-affiliated, the organization (with environmental green as the dominant color) presents itself as an “NGO for NGOs” and their

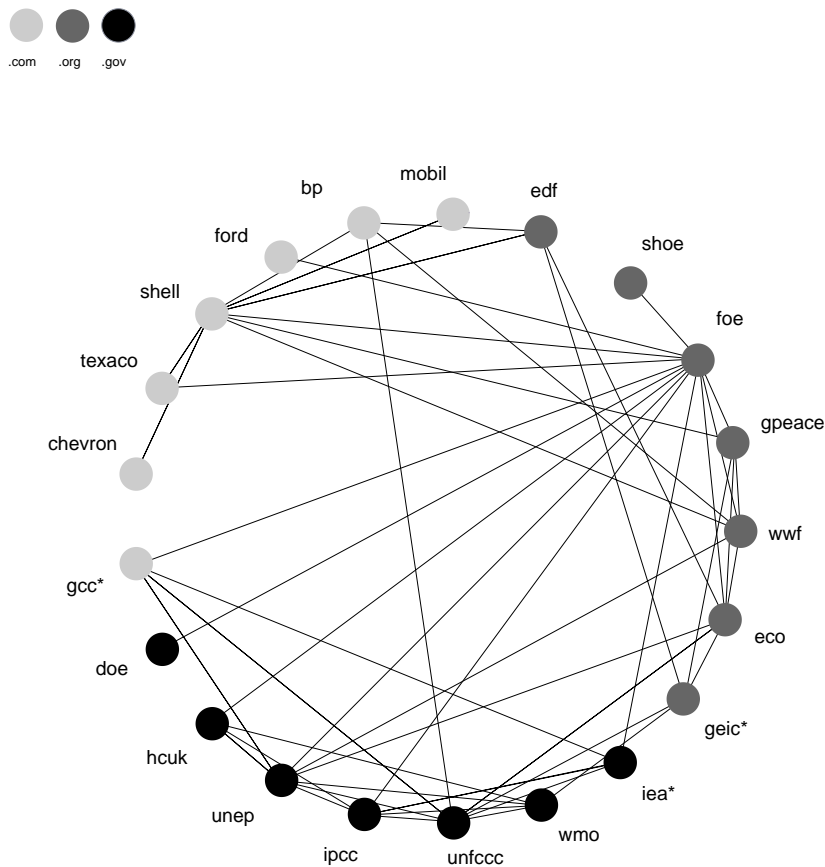


Figure 1. Hyperlink Mother map. Sample of the actors in the climate change debate on the web in November 1998, without direction of hyperlinking.

sympathizers, as an information clearing house and virtual meeting place.⁴⁰ Thus, it was classified as an .org.⁴¹ As a way of grasping the exceptional status of these bridge-dwelling organizations, representing either the .gov or the .com groups, but operating relatively (and sometimes seemingly) independent from them, we called them “delegates.”⁴²

The map of the entire sample (the mother map) served as point of departure for determining the mapping procedure to be followed (see Figure 1). While the mother map has the look of a mangle; it also displays differences in density. The lumping of the links in the lower section of .org and the middle section of .gov, as well as the white spot in the lower section of .com indicate a certain degree of differentiation in the linking pattern. The mother map thus raises the question whether the three parties to the debate, .org, .gov and .com, can be distinguished by their linking habits. It was decided that subsequent maps would zoom in on three different types of links: links internal to groups, links departing from groups, and links connecting groups in pairs (internal link maps, external link maps and cross-group link maps).

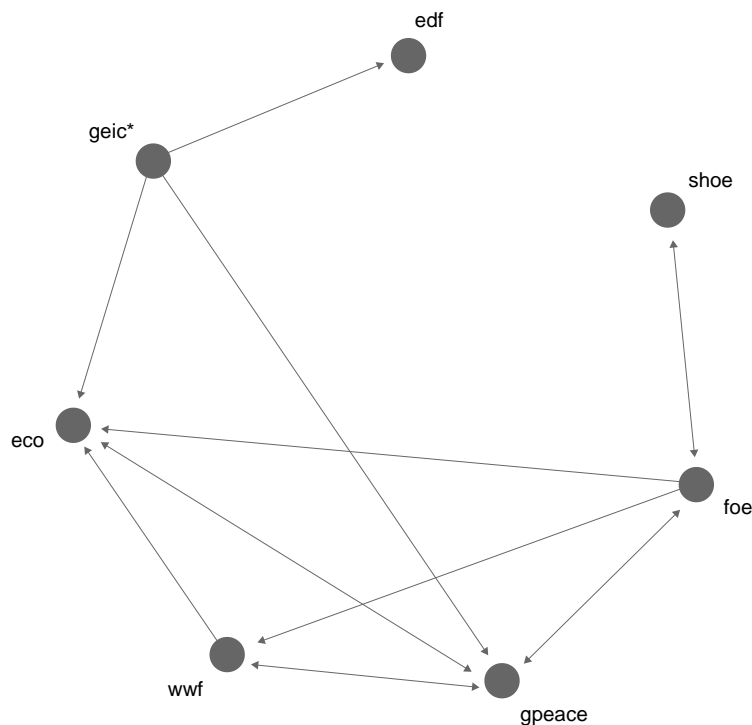


Figure 2. Hyperlink Map. Internal map of .org actors in the climate change debate on the web in November 1998, with directions of hyperlinking between them.

Considering the internal and external maps of the .org, .gov and .com groups in isolation, each group turns out to display a different distribution of links (see Figures 2, 3, and 4). Perhaps predictably and perhaps also explaining public preference for turning there for information, NGOs have the densest webwork of interlinkings. Links to other NGOs (internal links) as well as to leading governmental organizations were found in large numbers under their climate change pages. Links to the .com group are present but relatively sparse. A similar proclivity to link internally can be observed for governmental organizations, the second group.⁴³ Contrary to .org, links leaving .gov are virtually absent. Of their two external links, only one can be regarded

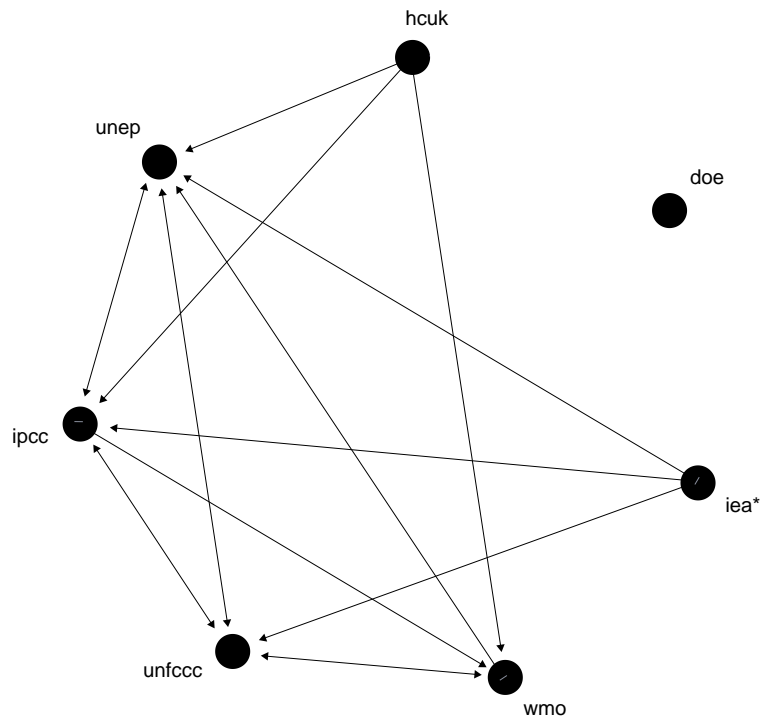


Figure 3. Hyperlink Map. Internal .gov map of actors in the climate change debate on the web in November 1998, with directions of hyperlinking between them.

as a proper link to the outside, considering the strong non-web ties that connect the Global Environmental Info Center to the UN. The intense internal linking between governmental organizations thus takes on a significant difference from that between .org. It might be taken as an affirmation of the homespun view that governmental institutions tend to form one massive, autonomously operating body.⁴⁴ The corporations, on the other hand, distinguish themselves by an almost total abstinence from linking to fellow .com's (with Shell being the one exception). .Com does engage in external linking, though less liberally than the NGOs. While the corporations thus establish connections to other players from both the .gov and .org groups, they do not link to probable supporters of their own points of view in the debate.

Finally, the link maps can be said to present three different linking styles: high internal and external linking for NGOs, high internal and low external linking for GOs and low internal and moderate external linking for corporations. Thus the conventional .gov, .com, .org distinction that generally obtained for the NGOs' link lists actually may be derived from the actors' distinctive hyperlinking activities. These behaviors may be simply dubbed the .org, .com and .gov styles.⁴⁵

6. Hyperlink diplomacy: Cross-linking in the global climate change debate

In the cross-group link maps, there emerges the view maintained by the public relations groups; following links, the surfer may "view" the professional contacts between organizations (see Figures 5, 6, and 7). The general asymmetry in reciprocal relations between the .gov, .com and .org groups are striking. While .org enthusiastically links to .gov, .gov's tie to .org is rather

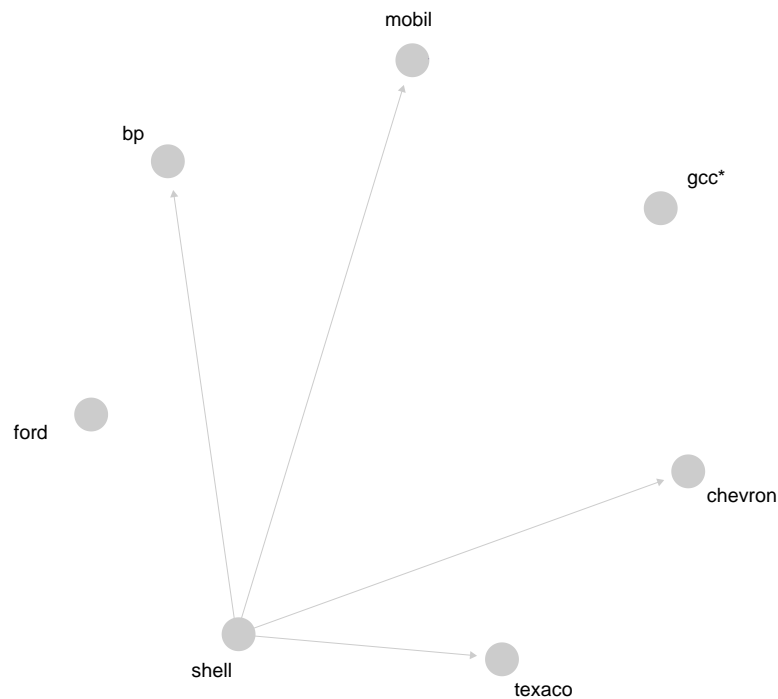


Figure 4. Hyperlink Map. Internal .com map of actors in the climate change debate on the web in November 1998, with directions of hyperlinking between them.

weak. The numerous links Friends of the Earth has mounted to .com assures a more convincing reciprocity between .com and .org, but .com is nonetheless more apt to link to .org than vice versa. As for .gov and .com, links only come from the side of the corporations. We call the asymmetry in reciprocal relations the “neo-pluralist gap.”⁴⁶ Cross-discursive acknowledgement is greatly out of balance. Especially, .gov refrains from acknowledging potential partners in discourse.

Moving away from intergroup relations, a distinction between cross-group linkers and the rest may be observed. As a first characterization of these cross-linkers, it should be noted that a significant number of them also receive most incoming links, and link most extensively to other members of their respective groups. Thus cross-linkers also are enthusiastic linkers and popular linkees. Accordingly, those organizations not engaging in cross-linking tend to take more marginal positions in terms of incoming links.⁴⁷ In the light of this general rule, two exceptions catch the eye. The IPCC and Greenpeace refrain from external linking, while receiving numerous incoming links and offering various internal links. As both of these organizations can be regarded as key players (the IPCC as the UN coordinator of climate change science, and Greenpeace as arguably the most famous environmental NGO), the absence of cross-links on their Websites can be thought of in specific terms of an attitude of privileged “self-sufficiency.” Generally, the linking style of the cross-linkers can be generally described as geared towards tactical interdependence.

Technically speaking, cross-linking is a practice specific to the Internet and can be regarded as a defining characteristic of web culture. We dub cross-linking the “new media .org style.”⁴⁸ Inasmuch as it was inherited from early hypertext cultures and from the early (non-governmental) net spirit of linking to both friends and foes, cross-linking, not surprisingly,

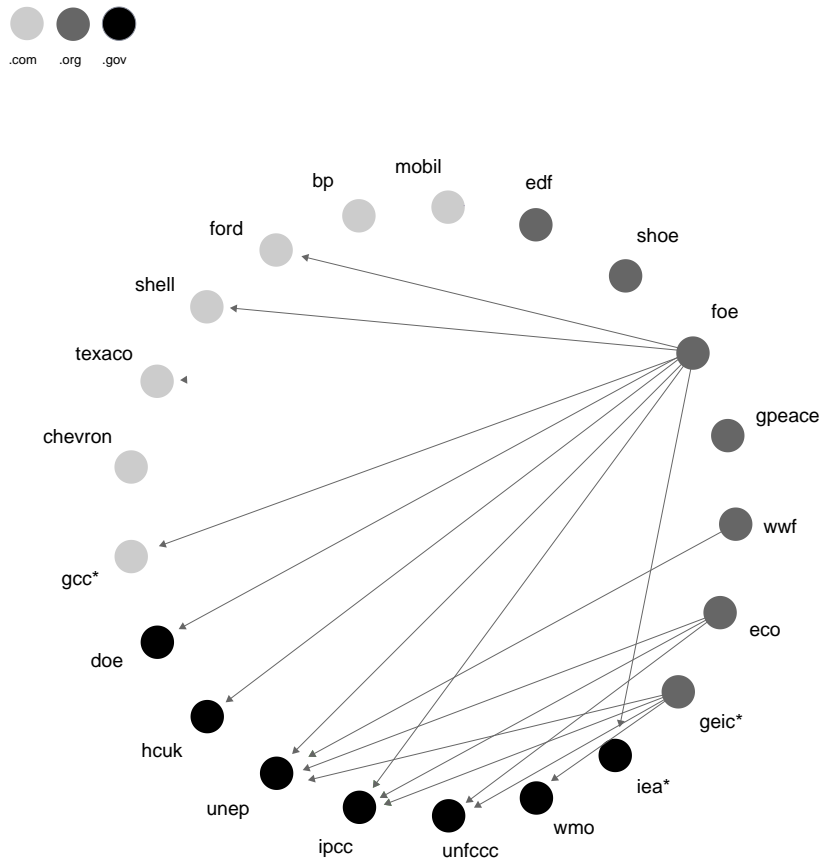


Figure 5. Hyperlink Map. External map of .org actors in the climate change debate on the web in November 1998, with directions of hyperlinking from the .org's to the .gov's and the .com's.

has become a characteristic of NGOs, far more so than of governmental organizations or corporations.⁴⁹ Half of the NGO sample cross-links. The non-cross-linking half of the sample exhibits either one of two linking styles: “closed community” or “totem pole” communications. The former is reminiscent of the academic net culture that has been steadily developing since the late '60s, as well as of the grassroots attempts at virtual community building of the late '80s and early '90s.⁵⁰ It refers to the habit of linking to the like-minded. In the climate change debate, notably the UN-affiliated scientific institutes (part of the .gov group) adhere to this style. The aforementioned IPCC, the Hadley Centre (the British climate modeling institute contracted by the IPCC) and the World Meteorological Organization of the UN all link exclusively to each other and to the other UN bodies participating in the debate.⁵¹ Two .org's with grassroots origins, Greenpeace and Shoeworld's On-Line Petition Against Nike, have remained faithful to the closed community style. The second linking style, totem pole communications, could be called the “old media style;” the public relations brochure seems to be imported into the networked medium without modification. And the opportunity to link is not taken. Mainly corporations (Mobil, Texaco, Chevron, and Ford) practice this style of communication.⁵² Incidentally, the Hadley Centre's climate change subdomain is called “brochure.”

Among the cross-linkers, different applications of the new media style can be discerned. To

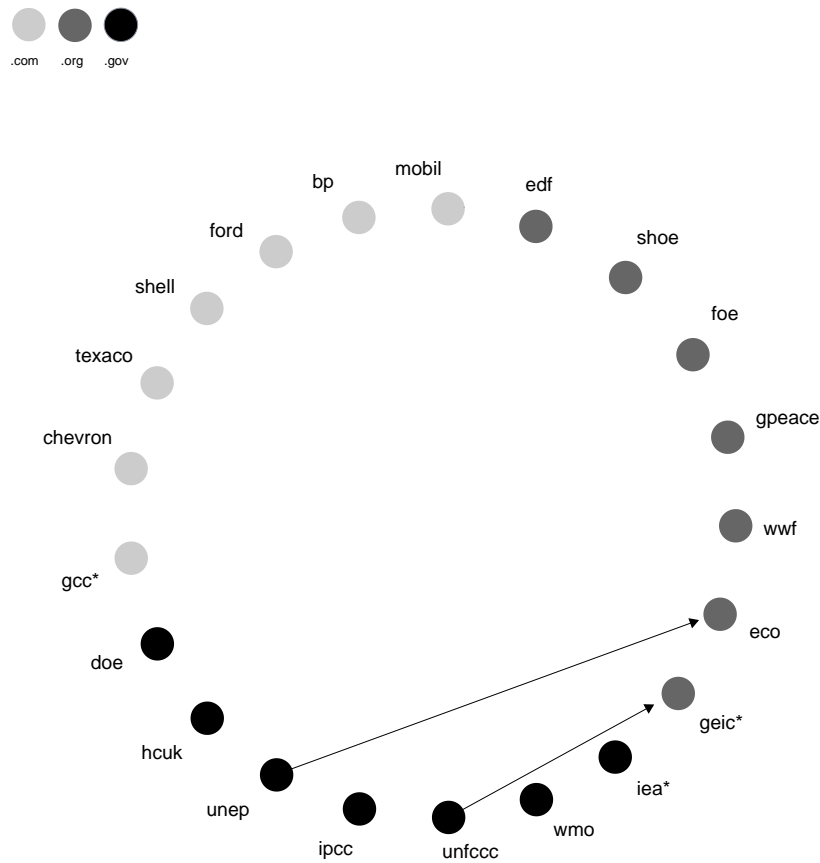


Figure 6. Hyperlink Map. External map of .gov actors in the climate change debate on the web in November 1998, with directions of hyperlinking from the .gov's to the .com's and the .org's.

begin with, there are two all-round linkers: Friends of the Earth, the grassroots organization from the UK, and British Petroleum.⁵³ The only players linking to both other groups, they provide the surfer with an annotated introduction to some of the central parties to the debate. Their linking behavior stands in sharp contrast to that of the two cross-linking UN organizations, the UNFCCC and UNEP. While the external links of these organizations can be understood in light of the fact that they are the only .gov's that have taken up public outreach in their policy plans, the meager number of external links (one, in both cases) is an indication of the governmental group's general reserve when it comes to establishing public relations with non-governmental institutions.⁵⁴ A different strategy is adopted by the delegate organizations. Significantly, these organizations provide links to players of special relevance to their own positions. The Global Climate Coalition, the corporate lobby group, links exclusively to its principal opponent, the governmental organizations, while the UN-affiliated Global Environmental Info Center links to the groups to whose approach it has committed itself, the GOs and the NGOs. Thus, delegate organizations provide pathways to significant others, which otherwise are difficult to locate directly through the governmental scientific bodies or through single corporations.

A third, perhaps most extravagant, adherent to the new media style is Shell. One of the first multinationals to enlist an Internet manager (who is also an open dialogue advocate), Shell

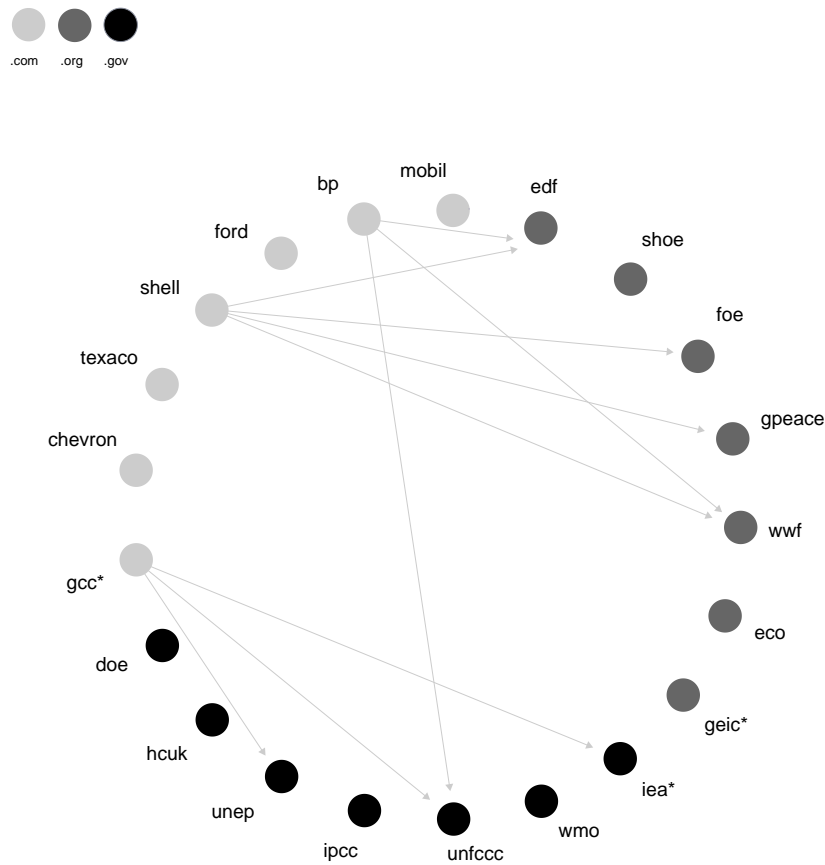


Figure 7. Hyperlink Map. External map of .com actors in the climate change debate on the web in November 1998, with directions of hyperlinking from the .com’s to the .gov’s and the .org’s.

wholeheartedly embraces the opportunity to establish web contacts with potentially hostile parties, including Greenpeace.⁵⁵ While linking to a number of high-visibility NGOs most probably familiar to the surfer (thereby recognizing them, as Shell explicitly states, as parties to the debate), Shell maintains a link list without governmental organizations. The list also contains a number of organizations (e.g., hardware) whose *raison d’être* is hard to assess. Without a content-oriented introduction to its links, Shell presents them under the heading of “going visiting.” with the remark that every voice has a right to be heard. (In the disclaimer Shell distances itself from “the opinions expressed on the following websites.”) In the new style, Shell blends the early net rhetoric with the corporate disclaimer. With regard to linking and characterizing its links, Shell thus produces the kind of uncertainty characteristic of the climate change debate. Where others simplify, Shell complicates.

7. Discursive strategies in the global climate change debate

Just because organizations don’t link to one another doesn’t mean that they are not involved in the same debate, it is readily acknowledged but difficult to appreciate, when link surfing. While hyperlink maps do inform us about the group and individual styles of allegiance, they

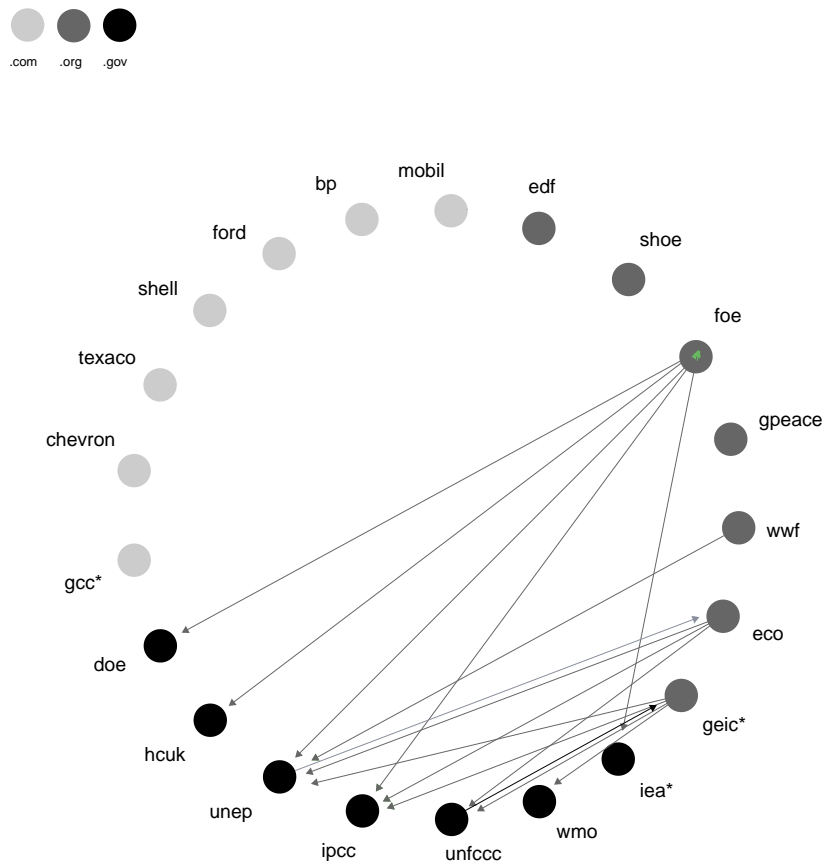


Figure 8. Hyperlink Map. Cross-group map of .org and .gov actors in the climate change debate on the web in November 1998, with directions of hyperlinking between them.

only disclose one infrastructure in the landscape. More fluid relationships emerge, however, as organizations borrow and comment upon key phrases. Through reference to commonly acknowledged statements, indirect dialogue is taking place.

In the case of global climate change, the dialogue is especially apparent owing to the presence of a central governmental scientific authority in the debate. On the web, the scientific claims and policy guidelines published by the UN's IPCC gain authority over others, by virtue of such acknowledgements. Reading through the information of NGOs and corporations, the frequent reference to a surprisingly small number of IPCC statements gives the impression that IPCC is the backbone of the debate. Thus the hypothesis was put forward that the contexts of occurrence of specific IPCC statements on other parties' websites indicate discursive relations between .org, .com, and .gov. They also show the extent to which there is room for further constructive, cross-discursive acknowledgement, and even transparent dialogue.

As may be read across the climate change debate (on the web), in its Second Assessment Report, the IPCC states that "the balance of evidence suggests a discernable human influence on global climate." The statement provides official scientific legitimation to the claim of human factors in climate change, thereby also designating a direction for future policy. The statement is present on the websites of leading NGOs and corporations. On the governmental websites other than the IPCC, the statement was not encountered.

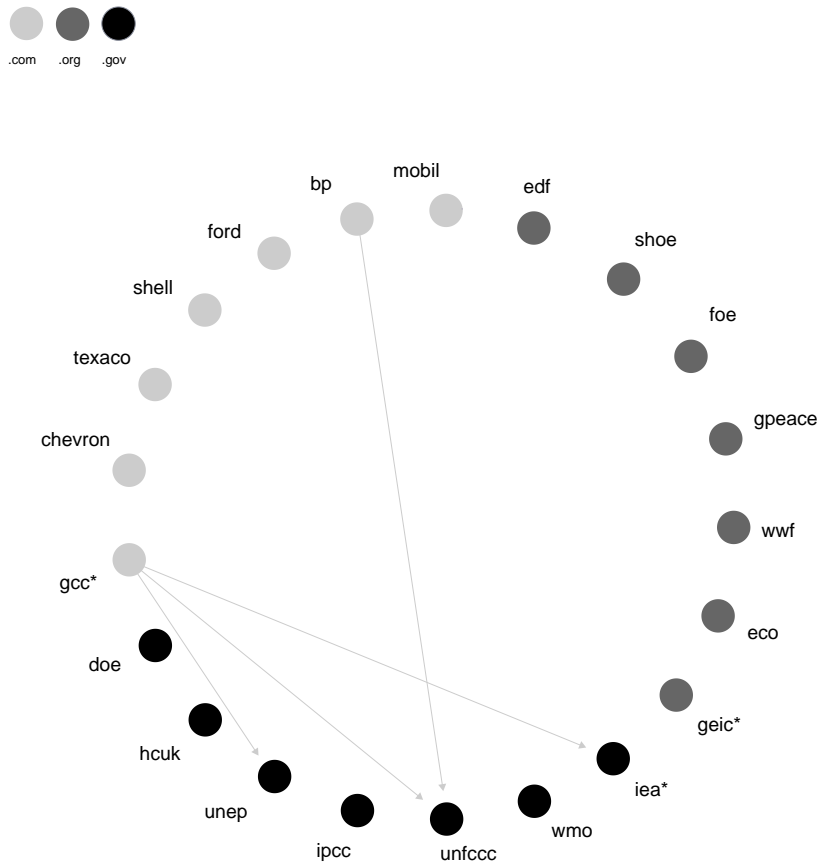


Figure 9. Hyperlink Map. Cross-group map of .com and .gov actors in the climate change debate on the web in November 1998, with directions of hyperlinking between them.

Their contexts of occurrence were traced by downloading the relevant sites' climate change areas and running them through TACT, the textual analysis computing tool. Using the keyword in context (KWIC) feature, the key phrase in context was located. Quotations appearing around the principal scientific knowledge claim were captured and loosely mapped. (See Figure 11.)

The quotations display the varying ways in which organizations put the statement to use, and as such indicate their positions in the debate. Broadly, the statement is presented as support for relativist or realist positions, as a target of skepticism or as an incentive to seek more radical confirmations of human factors in climate change. NGOs mainly introduce the statement as evidence of the human inducement of climate change, either by (reactively) authorizing the report as a foundation for policy (EDF), or more radically, by referring to the stronger empirical evidence for human influence on global climate not mentioned in the report (Greenpeace). Corporations tend to use the statement as an affirmation of scientific uncertainty. Shell, for example, does so indirectly. While affirming the accuracy of scientific findings about the climates past, Shell goes on to doubt the prospects of predicting the future. Mobil bluntly negates the scientific evidence for human influence on global climate on the grounds that climate change is simply unpredictable.

The attitudes present trappings of a socio-epistemic network: an overview of the range of

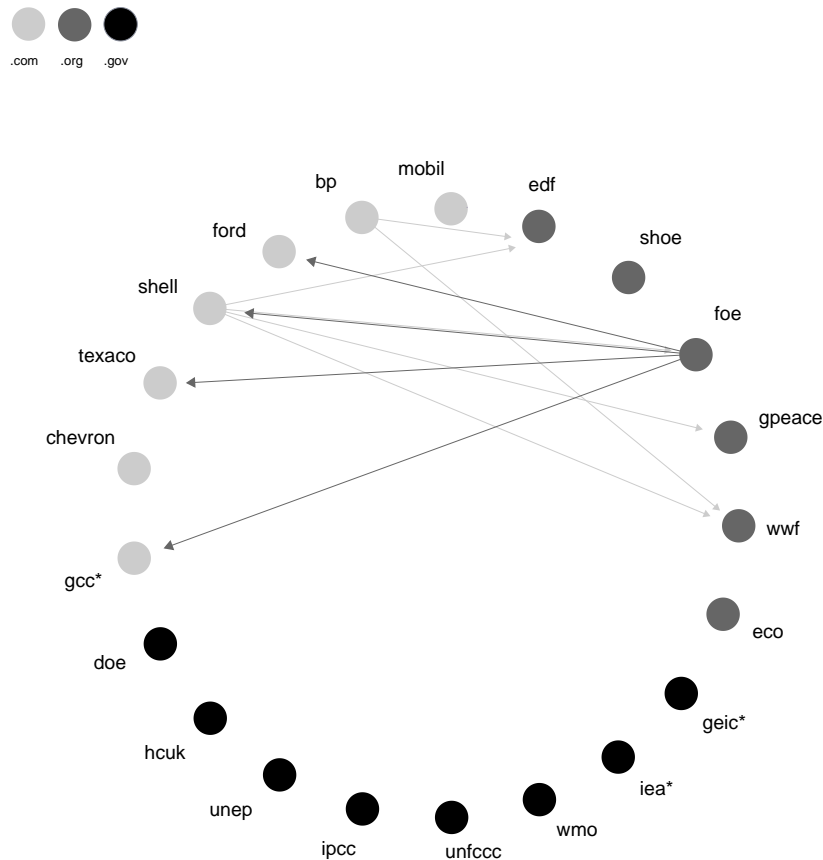


Figure 10. Hyperlink Map. Cross-group map of .com and .org actors in the climate change debate on the web in November 1998, with directions of hyperlinking between.

positionings and conflicting interests making up the debate. In making reference to one another, the organizations are performing the debate, on the web. On the map one notes discursive relations among non-linking parties. Greenpeace, which doesn't link to the GCC, at once acknowledges and positions itself in opposition to the corporate delegate organization, accusing it of manipulating the .gov's. More constructively, Shell makes a conciliatory discursive gesture towards the IPCC, a group to which it has not linked.

8. Conclusion: Scenarios for joining and participating in the debate

The case study of the global climate change debate confirmed the researcher-surfers' intuitive link-following impression of the non-randomness of hyperlinks between websites presenting a common issue. Distinct linking styles could be distinguished and the different framings of an authoritative statement provided an overview of the debate on a discursive level.

Broadly speaking, hyperlinking by one organization to another, and reciprocal hyperlinking, may be said to represent a single or common acknowledgement of meaningful acknowledgement in the debate. To link is to recognize; linking by a leading participant brings the other party into the (interlinked) circle of the debate on the web. It even makes the party into

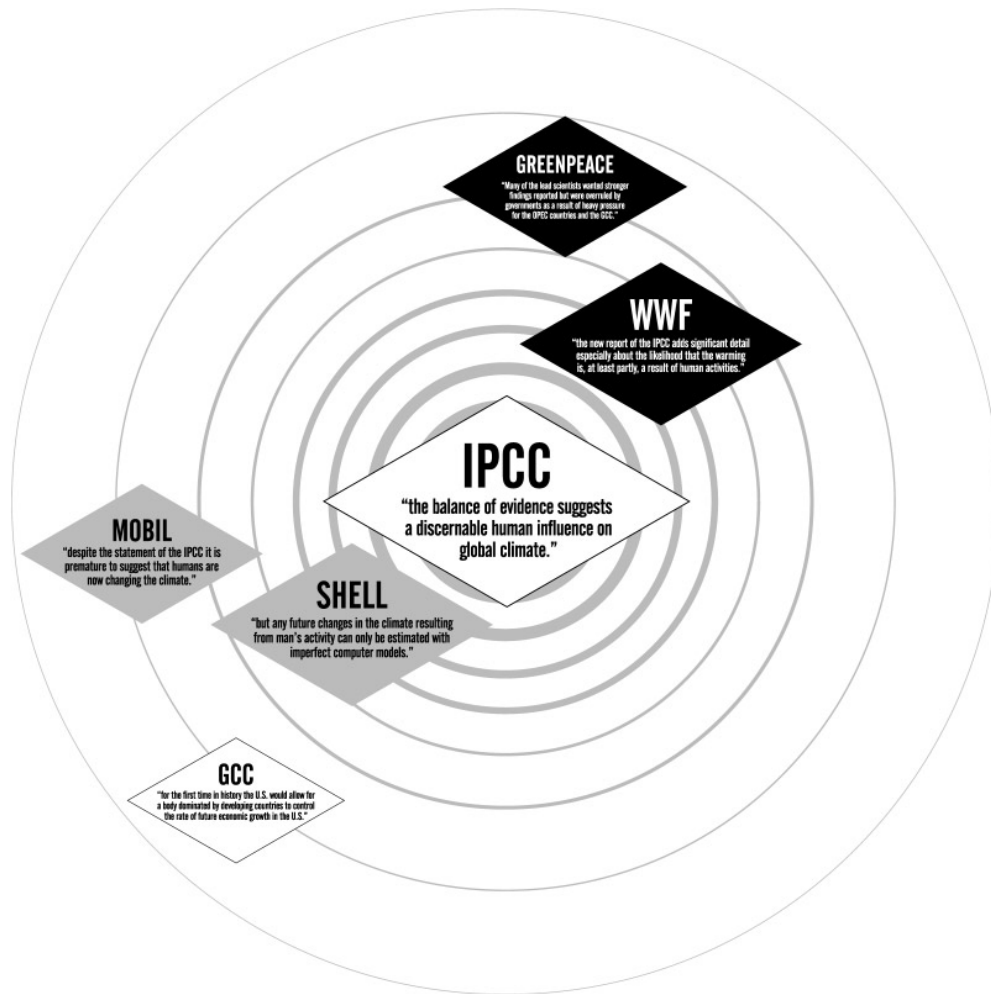


Figure 11. Discursive Map. Significant actors in the climate change debate on the web, positioning themselves around the IPCC statement, "the balance of evidence suggests a discernable human influence on global climate."

a participant, from its point of view, and subsequently the surfer's. Similarly, non-linking is a sign of non-recognition, or, more radically, is an act of silencing through inaction. (Greenpeace does not link to Shell, but Shell links to Greenpeace.) Using the debate-scaping technique as a "tool for thought," one notes the seeming eagerness with which the ostensibly less powerful parties link, while more powerful largely do not. The more powerful don't feel the need to acknowledge further discursive activity and participation.

A hyperlink debate map may be said to reveal the extent to which organizations recognize others as meaningful participants, and is generally useful for participants, journalists and debate rapporteurs. On paper or in actual real-time operation, the mappings could invite the participants to consider their hyperlinking activity, even explain it. Such a reflexive process would occasion the leading participants, in good faith, to think through which viewpoint commonalties may be forged, in order to pinpoint future hyperlinking for the sake of public transparency.⁵⁶ Portraying another organization's position on one's own website could be

“footnoted” or substantiated by way of a link to the other organization. Thus, the maps at least allow for debate observation as well as meaningful reflexive participation by existing participants. They also provide the opportunity for new groups to join the debate, described presently.

Just as commercial net operators learn search engine logics to increase their web visibility and their hit rates, a group or person may become relevant in a web debate by learning the debate-mapping logic, which is less arcane. With the logic currently developed, a group or individual may enter the public pool and map by requesting linkage from a leading participant to the debate, which serves as a low-threshold vetting procedure, perhaps necessary in order to avoid a flood of democracy. The person or group in question would practice the art of hyperlink diplomacy. To identify the leading participants in order to request single or reciprocal linkage, one would need only refer to the map and, ideally, contact the webmaster (who may instigate deliberations over new organizational hyperlinking policy).

Where the emphasis is on content, the discursive maps become central. In the search by individuals and groups for potential common ground, alliance-building, consensus-formation, and new substantive positions, the discursive maps, queried for the relations of positions taken by debating parties, would show who’s taking which stand, in reference, for example, to one or more future scenarios currently under consideration. Thus the scenarios themselves could be the queried keywords or phrases, among other, more free-flowing options. Of course the participants would be reminded to continue to make their positions known on their websites, and webmasters would become key information disseminators and gatekeepers. Silence on one’s position would be just as revealing.

We wish to conclude with a brief scenario. The announcement in the newspaper for social groups to apply to take part in the participation event also lists a URL, where prospective participants may operate an engine that maps (or authors) the terrain of the debate in question. Using mapping techniques in the early phases of the exercise, participants (on the web) are elected not so much by the leading participants, as is the current situation, but by the engine’s open logic, i.e., according to its criteria for the selection of parties to be included in the debate pool. Unlike a public debate or consensus conference, where on the big day agenda constraints winnow the speakers’ list to the “opinion-makers,” with citizen questions from the floor, with debate-mapping the relevance of a social group or citizen is not determined by the agenda-setter. The engine’s debate map would facilitate cross-discursive acknowledgments and positionings, setting the stage for a neo-pluralist forum.

While this article only scratches the surface of the sociology of hyperlinks and discursive affinities on the web, it does reveal the sensitivity with which organizations choose to make links. It also reveals that organizations are taking position on the principal knowledge claims on the web. Thus, at least for climate change, there is little need to engage in much social engineering to have organizations put their viewpoints on the web.⁵⁷ They’re there to be viewed by surfer-archaeologists, policy-makers, scientists, knowledge-managers, map-makers as well as greater and lesser relevant participants alike.

Acknowledgments

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Appendix

Key: List of Actors and their Climate Change Web pages, November, 1998.

.org (non-governmental organizations)		
1. Gpeace	Greenpeace	http://www.greenpeace.org/~climate
2. FoE	Friends of the Earth	http://www.foe.co.uk/climatechange/
3. WWF	World Wildlife Fund	http://www.panda.org/climate/
4. ECO	ECO Climate Action News Network	http://www.igc.apc.org/climate/Eco.html
5. EDF	Environmental Defense Fund	http://www.edf.org/issues/GlobalWarming.html
6. Shoe	Shoeworld's On-line Petition lobbying Nike	http://www.shoeworld.co.uk/protest/
.com (corporations)		
1. Shell	Royal Dutch/Shell Company	http://www.shell.com/c/c2.01.html
2. Mobil	Mobil	http://www.mobil.com
3. BP	British Petroleum	http://www.bp.com
4. Texaco	Texaco	http://www.texaco.com/default.htm
5. Ford	Ford Motor Company	http://www2.ford.com/environment/enviroindex.html
6. Chevron	Chevron	http://www.chevron.com/environment/peopledo/index.html
.gov (governmental organizations)		
1. IPCC	Intergovernmental Panel on Climate Change	http://www.ipcc.ch
2. UNFCCC	United Nations Framework for the Climate Change Convention	http://www.unfccc.de/
3. UNEP	United Nations Environmental Program	http://www.unep.ch/index.html
4. WMO	World Meteorological Organization	http://www.wmo.ch
5. DoE	Department of the Environment (United Kingdom)	http://www.detr.gov.uk/detrhome.htm
6. HCuk	The Hadley Centre (United Kingdom)	http://www.meto.govt.uk/sec5/CR_div/Brochure
delegate organizations		
1. IEA	International Energy Agency	http://www.iea.org/climat.htm —(classified as .gov)
2. GCC	Global Climate Coalition	http://www.globalclimate.org —(classified as .com)
3. GEIC	Global Environment Information Center	http://www.geic.or.jp/geic-climate.html —(classified as .org)

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- 1 Electronic Civil Disobedience describes the bombing procedure as follows. A web surfer connects to Flood Net, which appears on the Internet only at an appointed time, so as to avoid detection. Flood Net automatically connects the surfer to a pre-selected website, and the software automatically hits the selected site's reload button every seven seconds. If thousands of surfers connect with Flood Net during a particular day, the mass of activists could disrupt the operations of the particular site. For a full report on Flood Net actions, see the Electronic Civil Disobedience website at <http://www.thing.net/~rdom/ecd/ecd.html>.
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- 3 John Arquilla and David Ronfeldt, eds. *Athena's Camp. Preparing for Conflict in Information Age* (Santa Monica: RAND, 1998). (PAGE NUMBERS?)
- 4 Richard Barbrook and Andy Cameron, "The Californian Ideology," *Science as Culture* 26 (1996): 44–72.
- 5 Debate-scape follows from a research project at the Department of Science & Technology Dynamics at the University of Amsterdam and the Department of Computer-Related Design at the Royal College of Art, London; and Richard Rogers, "The Future of Science and Technology Studies on the Web," *EASST Review* 16 (1996): 25–27.

- 6 Steve Fuller, *Social Epistemology* (Bloomington: Indiana University Press, 1989); Richard Rogers, "Playing with search engines and making lowly information into knowledge," *Mediamatic* 9 (1998): 122–130.
- 7 Here reference is made to the popular notion of the Internet as rumor mill, as portrayed, for example, in a segment of 60 Minutes, the American news program in 1997. To view the segment, see <http://www.ewatch.com>.
- 8 Bruce V. Lewenstein, "From Fax to Facts: Communication in the Cold Fusion Saga," *Social Studies of Science* 25 (1995): 403–436.
- 9 *On-line Journalism Review*, 14 July 1998, at http://www.ojr.org/indexf.htm?/sections/features/98_stories/stories.tvWeb.071498.htm.
- 10 Matt Drudge, *Washingtonian Whispers*, <http://www.drudgereport.com>.
- 11 Rob Kling and Lisa Covi, "Electronic Journals and Legitimate Media in the Systems of Scholarly Communication," *The Information Society* 4 (1995): 261–271.
- 12 There have been three generations of search engines: the library science-based, human-arbitrated engines with URL self-reporting (Yahoo!); the automated, with algorithmic logics and spiders crawling the web (Alta Vista, Lycos, Infoseek, Web Crawler, Excite, Hot Bot, etc.), and the hybrids, or bespoke browser-engines, as Xerox Parc's Information Visualizer and SenseMaker; for the new hybrids, as well as the Internet archive, facilitated by Alexa, see Clifford Lynch, "Searching the Internet," *Scientific American*, March 1997; in its MetaSpy feature, which allows the viewer to "catch a glimpse" of all queries made to the engine, MetaCrawler has two pathways, the "filtered" and "exposed," the latter showing the amount of adult entertainment sought on the web.
- 13 Lucas Introna and Helen Nissenbaum, "The Public Good Vision of the Internet and the Politics of Search Engines," *Preferred Placement: Knowledge Politics on the Web*, ed. Richard Rogers, (Maastricht: Jan van Eyck Akademie Editions, 2000); and *Search Engine Watch* at <http://www.searchenginewatch.com>; It should be noted that search engine logics have been moving in the direction of greater "reliability" and "authority" measures. Sites are beginning to be boosted in search engine returns according to their number of "links in," as with Google.
- 14 Ulrike Felt, "Continuity and Change in Public Perception of Science," *Between Understanding and Trust. The Public, Science and Technology*, eds. Meinolf Dierkes and Claudia von Grote, (Reading: Harwood, 2000); Merle Jacob, *Sustainable Development: A reconstructive critique of the United Nations Debate*, Ph.D. Dissertation, Göteborgs University, Göteborg, 1997; and S. M. Lele, "Sustainable Development: A Critical Review," *World Development* 19 (1991).
- 15 Andrew Jamison and Ron Eyerman, *Seeds of the Sixties* (Berkeley: University of California Press, 1994); Richard Sclove, *Technology & Democracy* (New York: Guilford Press, 1996), pp.184–191; Meinolf Dierkes, as Meinolf Dierkes, Ute Hoffmann and Lutgard Marz, *Leitbild und Technik* (Berlin: Sigma, 1992); Richard Rogers, *England & the Channel Tunnel*, Ph.D. dissertation, University of Amsterdam, 1998, chapter 5; Johs Grundahl, "The Danish consensus conference model." in *Public Participation in Science: the role of consensus conferences in Europe*, ed. Simon Joss and John Durant (London: Science Museum, 1995); and www.ucalgary.ca/~pubconf/.
- 16 Howard Reingold, *The Virtual Community* (Reading: Addison-Wesley, 1993); Katie Hafner, "The Epic Saga of The Well," *Wired*, May 1997.
- 17 Ithiel de Sola Pool, *Technologies of Freedom* (Cambridge, MA: Belknap Press, 1983); and Susan J. Douglas, *Inventing American Broadcasting, 1899–1922* (Baltimore: Johns Hopkins, 1989), pp.187–215.
- 18 Reingold, *The Virtual Community*.
- 19 Michiel Schwarz and Michael Thompson, *Divided We Stand: Redefining Politics, Technology and Social Choice* (Philadelphia: University of Pennsylvania Press, 1990); *Public Participation and Sustainable Development*, ed. Andrew Jamison, PESTO Papers 1 (Aalborg: Aalborg University Press, 1997); and *Technology Policy Meets the Public*, ed. Andrew Jamison, PESTO Papers 2 (Aalborg: Aalborg University Press, 1998).
- 20 Richard Rogers, "Whither Public Participation in Technology? A Report on the Cultural Politics of Technology Development: European Experiences," *EASST Review* 17 (1998): 18–21.
- 21 Julian Stallabrass, *Gargantua. Manufactured Mass Culture* (London: Verso, 1996), pp.57–59; and Manuel Castells, *The Rise of the Network Society* (Oxford, UK: Blackwell Publishers Ltd., 1996).
- 22 Andrew Pickering, "The Mangle of Practice: Agency and Emergence in the Sociology of Science," *American Journal of Sociology* 99 (1993): 559–589; Michel Foucault, *L'Archéologie du savoir* (Paris: Editions Gallimard, 1969); and Joseph Rouse, "Power/Knowledge," In *The Cambridge Companion to Foucault*, ed. Gary Gutting, 92–114 (Cambridge: Cambridge University Press, 1994).
- 23 Karin D. Knorr-Cetina, "Epistemic Cultures: Forms of Reasoning in Science," *History of Political Economy* 23 (1991): 105–122; Joseph Rouse, "What are Cultural Studies of Scientific Knowledge?" *Configurations* 1 (1992): 57–94; and Hans-Joerg Rheinberger, *Towards a History of Epistemic Things* (Stanford: Stanford University Press, 1997).
- 24 The quotation comes from <http://searchenginewatch.com/Webmasters/rank.html>.
- 25 Brian Wynne, "The Public Understanding of Science." *Handbook of Science and Technology Studies*, eds. Sheila Jasanoff, Gerald E. Markle, James C. Petersen, and Trevor Pinch (Thousand Oaks: Sage, 1995).

- 26 Paul Levinson, *The Soft Edge: A Natural History and Future of the Information Revolution* (London: Routledge, 1997), pp.136–147.
- 27 Alan J. Munro, Kristina Hook, and David Benyon, eds., *Social Navigation in Information Space* (Vienna: Springer Verlag, 1999).
- 28 “Geographies of Cyberspace” project, led by geographer Martin Dodge, University College London, at http://www.cybergeography.org/geography_of_cyberspace.html, and http://www.geog.ucl.ac.uk/casa/martin/geography_of_cyberspace.html, for several server locations, data traffic and thematic or subject mappings of cyberspace.
- 29 Here we do not treat the design and information visualisation issues, apart from saying that prototyping to date has been inspired in part by Web Stalker, I/O/D’s site mapping software, and the aforementioned “cybergeographies” program. On the former, see the review of Web Stalker by John Cayley, “On Programmatology,” *Mute* 11, 1998, pp.72–75.
- 30 Brian Wynne and Simon Shackley, “Global Climate Change: The Mutual Construction of an Emergent Science Policy Domain,” *Science and Public Policy* 22 (1995): 218–230; and Brian Wynne and Simon Shackley, “Representing uncertainty in Global Climate change Science and Policy: Boundary-Ordering Devices and Authority,” *Science, Technology and Human Values* 21, (1996): 275–302.
- 31 In the top ten of the returns on Climate Change queries on Alta Vista, Infoseek, HotBot and Webcrawler on 16 June 1998, no single web page was returned twice.
- 32 Marti A. Hearst, “Interfaces for Searching the Web,” *Scientific American*, March 1997.
- 33 Eurobarometers, e.g. European Commission, *Europeans, Science and Technology—Public Understandings and Attitudes*, DG XII, EUR 15461, June 1993.
- 34 The number of mouse clicks required to move from the opening pages to the organizations’ link lists varied widely, but it was decided that if the link list was readily available, the jump from one organization to another could be called one jump. Many new organizations discussing climate change were reached in two jumps (four clicks), but that number dwindled with the third jump (generally the sixth click). It was decided to limit the set of actors in the debate, for the time being, to those actors (or actors’ sites) within two jumps from the originally trusted organizations. Manual hyperlink mapping (on chalkboards with messy chalk and erasers) ensued, and organizational “geographies” were plotted and drawn. Others have called these “jumps” “degrees of separation.”
- 35 For example, Friends of the Earth presents its outgoing links under the headings “Science and Impacts of Climate Change” (listing governmental organizations); “NGOs and Climate Change Campaign Sites” (listing NGOs) and “the Fossil Fuel Lobby—organizations blocking vital emission reduction targets” (listing corporations); <http://www.foe.co.uk/climatechange/exlinks.html>; WWF distinguishes between “Weather” (GOs), “Policy” (NGOs) and “Science” (information clearing houses); and <http://www.panda.org/climate/Web.shtml>.
- 36 For the NGOs, Friends of the Earth presented the highest number of outgoing links and the most elaborate (hypertext) description of the debate. For the corporate component, Shell provided the most external links. In the case of the governmental organizations, UNFCCC offered the highest number of outgoing links.
- 37 While there are several websites in the sample whose URL does not carry the suffix of one of the three groupings (Friends of the Earth, Shoeworld On-line Petition against Nike, Global Environmental Info Center, IPCC, UNFCCC, UNEP and WMO), these deviations can be traced back to differences between national policies of suffix allocation. This is not the case with the Global Climate Coalition and the International Energy Association, whose suffixes do not deviate from the usual group suffixes. Instead, these two organizations carry a suffix that places them in a grouping to which they only partly belong. For the purposes of analysis we place the UN organizations in the .gov grouping.
- 38 Ronfeldt *et al.*, *The Zapatista Social Netwar in Mexico*, p.35, divide non-governmental organizations in NPOs (non-profit organizations), PVOs (private voluntary organizations) and GROs (grassroots organizations). According to the classification the following organizations do not belong to the NGO sector: IGOs (international governmental organizations), GONGOs (government-organised NGOs), GINGOs (government-inspired NGOs), and QUANGOs (quasi-NGOs).
- 39 The RAND classification would place the GCC in the category of PVOs (private voluntary organizations), which are defined as part of the NGO sector. The classification does not exclude from the NGO world the non-profit organizations that represent the for-profit sector.
- 40 In the “about GEIC” section, it is explained that the organization is “owned by the United Nations University and the Japan Environment Agency” and established to “better involve NGOs and other grassroots organizations in international and national environmental processes.”
- 41 According to the RAND classification, the Global Environmental Info Center could be categorized as a GONGO (government-organized NGO) or as QUANGO (a quasi-NGO). Since the organization was founded in response to the UNCED process (and Agenda 21) in concert with NGOs, we prefer the QUANGO classification. GEIC is both a quasi-governmental organization and a quasi-non-governmental organization; yet its NGO-style web presence

- occasioned us to call it an .org.
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 - 43 Noortje Marres, "The Debate on Climate Change on the World Wide Web: A Network Analysis," unpublished ms., University of Amsterdam, 1998.
 - 44 Andrew Ross, *The Chicago Gangster Theory of Life, Nature's Debt to Society* (New York: Verso, 1994).
 - 45 Noortje Marres and Richard Rogers, "Depluralising the Web and Repluralising Public Debate: The Case of the GM Food Debate on the Web," In *Preferred Placement: Knowledge Politics on the Web*, ed. Richard Rogers (Maastricht: Jan van Eyck Akademie Editions, 2000).
 - 46 With neo-pluralism, we refer to the changed conditions of pluralism on the web, as occasioned by the arrival on the web of dominant, "socially relevant" organizations mentioned in the introduction. More specifically, it refers to the acknowledgements across organizational groups (between .gov, .com and .org) currently being established on the web. Diametrically opposed to the "neo-pluralist gap" may be placed the "neo-pluralist potential". Here the broadening of the scope of cross-group acknowledgements is highlighted as one of the future scenarios for the web.
 - 47 The average number of incoming links (average in-degree) for cross-group linkers (FoE, WWF, ECO, GEIC, UNEP, UNFCCC), Shell, BP and GCC) is 3.9. It is 2.5 for the rest. The average number of links going out to group members (average out-degree to group members only) is 2.3 for cross-group linkers, and 1.3 for the rest.
 - 48 Michael Hauben and Ronda Hauben, *Netizens: On the History and Impact of Usenet and the Internet* (Los Alamitos: IEEE Computer Society Press, 1997). We define the exploitation of the possibilities of the web as a specific style, also because of the large number of websites that do not make use of this opportunity—a little less than two thirds of our sample. Our ideas about the cross-linking potential (the neo-pluralist, new media culture) contrast with the "virtual community" and "Netizen" school, which emphasizes linking between the like-minded, "sharing and caring" discussion lists and on-line community networks as defining the potential of web culture.
 - 49 See Patrice Riemens, "Don't Panic! Hack it!," In *Infowar*, ed. Gerfried Stocker, and Christine Schöpf (Vienna: Springer Verlag, 1998).
 - 50 Katie Hafner and Matthew Lyon, *Where the Wizards Stay Up Late: The Origins of the Internet* (New York: Simon and Schuster, 1996); and Roza Tsagarousianou, Damian Tambini and Cathy Brian, eds., *Cyberdemocracy: Technologies, Cities and Civic Networks* (London: Routledge, 1998).
 - 51 The IEA is another adherent of the communitarian linking style.
 - 52 Two other organizations in the sample engage in totem pole communications: the British Department of the Environment (.gov) and the Environmental Defence Fund (.org). They are the only organizations of their groups that do not link.
 - 53 Since BP's merger with Amoco, the company has returned to the totem pole style of communication.
 - 54 As it is formulated in the "about" sections of their websites.
 - 55 Interview with Simon May, Internet Group Manager, Shell International Ltd. by Richard Rogers, 12 October 1999, the contents of which are edited in the film, *The Rogue and The Rogued: Amongst the Web Tacticians* (Maastricht: Jan van Eyck Akademie Design & Media Research Fellowship, 1999, <http://www.govcom.org>.) In another piece, Simon May substantiates his enthusiasm for open dialogue as follows: "the fact that anyone can be a publisher cheaply, can be seen, or at least searched and looked at worldwide, and can present his/her viewpoints on homepages or in discussion groups is not merely a menace, but also a unique challenge . . . It's all about being able to react, listen and learn!"; and Eveline Lubbers, "The Brent Spar Syndrome," *Read me, ASCII Culture and the Revenge of Knowledge*, ed. Josephine Bosma, Ted Byfield, Matthew Fuller, Geert Lovink Pauline van Mourik Broekman *et al*, 281–285 (New York: Autonomedia, 1999).
 - 56 By "pinpointing" is meant simply that an organization may link to a specific part of another organization's site. By programming the activation of an outside site within the current site (as is increasingly done), the surfer could view the other party's site without leaving the original party's. This may be most acceptable to those organizations desiring their "frames" or framings to remain primary.
 - 57 Further case studies would test the generalization of the claims made in this paper.

Authors

Dr. Richard Rogers (rogers@chem.uva.nl) is lecturer in technological culture at the Department of Science Dynamics, University of Amsterdam, Netherlands, lecturer in Computer Related Design at the Royal College of Art, London, U.K., and Design and Media Research Fellow at the Jan van Eyck Akademie, Maastricht, Netherlands.

Noortje Marres (noortje.marres@janvaneyck.nl) is Theorist-in-residence at the Jan van Eyck Akademie, Maastricht, and also studies Science Dynamics and Philosophy at the University of Amsterdam, Netherlands.