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Network Properties and Democracy[1]

It is often assumed that the Internet as a medium is democratic by itself. This is a mistake. The democratic nature of the medium concerned depends on its use and the context in which it is used. The Internet can be used to benefit democracy and to harm it. However, being a network, the Internet has both properties that enable democracy and that help to damage it. In this paper these properties are listed and explained linking them to different network layers. On the basic layer of hardware, properties such as physical access and inclusiveness, connectivity, size, density and centralization are discussed. On the layers of software ("code"), properties such as peer-to-peer principle, the link structure of "Googlearchy", and power laws producing concentration stand out. Finally, on the content layer (applications), properties such as user generated content, and the limits of attention and of simultaneous input define the opportunities of democracy.

Key words: Internet, network layers, political communication, democracy

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Introduction

This chapter is about the relation between the use of computer networks and democracy. It tries to find out whether this use reinforces or weakens democracy. As many authors before have tried to show that the Internet *in itself* is , primarily, either more or less democratic than older media such as broadcasting and the press, the expression "use of" is crucial. We think this an erroneous view that has done much harm to the research of political communication with the new media. In fact, it is a technological deterministic view. Opposed to this, we argue that computer networks have a number of properties that both define and enable their use in particular contexts. In this context this means that they can be used for and against democracy. In this chapter we try to list the properties that define and enable the potential of democracy in networks.

Network properties are strategic characteristics and operational effects of computer networks that are used in social contexts. It is important to say that they combine technical and social aspects: the properties of computer/media networks, and of social networks. For example, both computer networks and social networks can be more or less centralized. Another example is the use of a technical link structure of a search engine that draws information seekers to the most popular sites. Comparatively, members of social networks look for most popular people following social acts of preferential attachment. These examples will be amply explained below.

A number of general strategic characteristics of networks have already been discussed in the Introduction. These are access, design, control, legality and security, and communication content. In this chapter we will specify these strategic characteristics in a number of concrete instances. We will also pay attention to operational effects of computer networks, which are often called network effects. They are defining effects of networks that can be reinforced or weakened by users according to their practical motivations. An example is the network effect of a critical mass. By reaching a certain tipping point

of the number of users, the network becomes ever more attractive for new ones. This is a structural effect that works more or less strong, depending on the attractiveness of the medium concerned.

In the scientific literature and in public opinion the Internet is often seen as a special medium with the following characteristics; it is supposed to be an

- interactive medium that departs from one-sided communication of the existing mass media;
- active and creative medium enabling users to transform from viewers, listeners and readers into participants;
- direct medium in which individual users determine from afar what happens in the centre (of, among other things, politics and the mass media);
- platform on which everybody is equal in principle, as assumed expertise has to prove itself before being recognized;
- peer-to-peer medium enabling the collective creation of products online, not primarily by individual authors or businesses.

All these characteristics are real to a certain extent. However, they are superficially described and they imply a positive, pro-democratic bias. It is necessary to dig deeper, analysing more abstract network properties, as well as to look for characteristics of networks that do not support democracy, in whatever view.

It is not easy to discuss the network properties that might be relevant to democracy in a clear and workable analytical framework. The first framework that comes to our mind is the constellation of the seven OSI network layers.[2] However, this distinction is too technical and goes too much into detail. We need distinctions that are both technical and social. However, the seven OSI layers can be summarized in a more workable distinction of hardware, software and applications.

2 The seven OSI (Open System Interconnection) layers are: 1. the physical layer, 2. the data link layer 3. the network layer, 4. the transport layer, 5. the session layer, 6. the presentation layer, and 7. the application layer. In Table 2.1 the Basis (hardware) is derived from layer 1 and 2, Code (software) is derived from 3 and 4, and 5 and 6 and 7 are Applications.

All three have particular features that are defining and enabling for democracy, as we try to show in this chapter. The properties to be discussed are listed in Table 1. In Section 1 we will start with a hardware infrastructure of networks that already shows a number of consequences for democracy. In Section 2 we will proceed with a software infrastructure that is very relevant for the democratic potential of networks, as it will be argued below. Finally, in Section 3 the applications of networks in the superstructure of substantial activities of political communication will be scrutinized for features that support or hinder democracy.

Table 1. Network properties with effects for democracy listed on three layers

LAYERS	NETWORK PROPERTIES
BASIS (hardware infrastructure)	- A central exchange with decentralized terminals - Physical access and inclusiveness - Connectivity, connectedness and critical mass - Size and density - Centralization, centrality and symmetry
CODE (software infrastructure)	- Standardization - Peer-to-peer principle - Link structure: "Googlearchy" - Power law and concentration - The missing middle
CONTENT (applications)	- User generated content and the limits of attention - Limits of simultaneous input - Internet complexity and lack of skills - Open and closed networking

1. Properties of network hardware and democracy

A central exchange with decentralized terminals

When serving as a medium for political communication, computer networks such as the Internet have a number of features departing from traditional media. They are summarized in the first three media characteristics listed in the introduction. First, the fact that computer networks are interactive and enable active or creative contributions to political communication is very important. The traditional media of broadcasting and the press had a one-sided communication pattern of senders with complete control over messages they send. They served as gatekeepers for all mediated political communication. The only potential access for readers, viewers and listeners was to send a letter to a newspaper or a broadcasting station, or to call a radio program when this was organized. Other options for giving feedback on politics were to meet or call politicians, or to participate in political meetings.

With the advent of the Internet the possibility of feedback was offered on a massive scale. A great number of political websites with interactive facilities was created. Many people installed their own political websites and blogs. According to most observers, this eliminated gate-keeping monopolies in the political mass media, an observation we will critically discuss below. At first, the Internet was used in a fairly traditional way as a new type of broadcasting with websites publishing only information. However, since the end of the 1990s, this medium has changed substantially. The interactive potential has actually been realized with lots of new facilities enabling Internet users to contribute to the so-called user-generated content. This culminated in the so-called Web 2.0 perspective after 2004.

It is important to understand that all (inter)active and creative facilities of the Internet are derived from the core property of a network as a central exchange with decentralized terminals. This property is also responsible for the first opportunity that came to the mind of the people who thought that cable, telephone and computer networks were

able to radically transform democracy. Already in the 1980s these people thought that computer networks were a direct medium for people to reach the centre of politics and democracy in decision making (parliaments and governments). In their view, polling and voting at a distance would enable a kind of direct democracy, equalling the Athenian agora in a modern society (Arterton, 1987; Becker, 1981). Here, it does not matter whether this is socially and politically realistic or desirable. One should know that at least the technical possibility exists.

Only, when few people have access to these networks, all these opportunities for (inter)active, creative and direct political communication in computer networks will scarcely be realized. This is the following network property to discuss.

Physical access and inclusiveness

Networks include or exclude. You belong to them, or you don't. Among those who do, some are more included than others. This is the hard reality of inequality in networks. The decisive step for inclusion is physical access. This means to possess the technology required in the form of a computer and a network connection. This technical and economic type of access is surrounded by human and social types. Access always starts with the motivation to get access. After this has been realized, people have to develop the skills required and they will more or less actually use the connection. Currently, the digital divide of physical access is more or less closing in the developed countries, but this certainly does not apply to skills and usage (see van Dijk, 2005). Skills and usage will be discussed in the section about content and applications.

In contemporary developed societies physical access at home comprises between 40 and 90 percent of the population. This is the most important figure for the potential of digital democracy. It defines how many "digital citizens" a country can have. In the most connected developed countries we are now approaching the end of "television de-

mocracy" and the start of "Internet democracy". The transition has not been made yet. Even in the United States, where election campaigns are heavy users of the Internet, in 2010 broadcasting, especially television and the press were still far more important than the Internet in terms of campaign expenditure and voter reception. The first reason for this is that the USA still does not have a connection rate of more than 90 percent to guarantee almost complete coverage. The second reason is that many citizens who are connected do not (want to) use the Internet for political information and communication. Instead, they might still use television and newspapers, or participate in political meetings.

Physical access can be realized by home access, by access at work or at school, or by public access (e.g. a library, a community access centre or an Internet café). For political communication home access is desirable. This is the best place for unrestrained Internet use and for free expression, provided that inmates do not interfere with it. The other places of access are not made for political communication, or the use of it is constrained by time, money and censorship in undemocratic countries (usually more than at home). Unfortunately, home access is still a luxury in most countries of the world.

Where home access is available, it can be observed that the use of it for political communication is a minority phenomenon. Even when people have an Internet connection, it is not definite that they can access all political websites, discussion lists and mailing lists. An increasing number of political Internet applications require user names and passwords. Even though sites for political information and communication usually have more open and free access than other sites with valuable or restricted content, some are reserved for (party) members and subscribers. In discussion lists people who flame, insult or do not behave well can be excluded. In undemocratic countries oppositional political websites are blocked.

Connectivity, connectedness and critical mass

Access is not the same as connectivity. The last-called property equals reachability and refers to the number of *individual* actors inside a network that are linked to one another by direct or indirect ties. This number is very important for the ability to use a network such as the Internet for the purposes of political organization. Barack Obama wouldn't have been able to organize a massive grass-root campaign among the young, new basis of the Democratic Party without a large number of volunteers that could reach each other on the Internet and by mobile phone.

A familiar network property is connectedness. However, this refers to the ratio of the number of *pairs* or *groups* of actors or nodes inside a network that are mutually reachable to each other as compared to the total number of pairs. Political communication is not only an activity of individuals, but also of groups and communities. More connected groups in both social and media networks have better chances of political organization, coherence and coordination than dispersed or fragmented networks of individuals. Connectivity and connectedness also determine the potential of participation, because they define who and to what extent can communicate with each other via the network.

At a certain point connectivity reaches a tipping point. This is called *critical mass* (Markus, 1990). From that point onwards it becomes ever more valuable for someone not connected to become part of a network, because in this way one can reach an increasing number of other individuals. Then, the number of connections accelerates, and it mostly reaches a majority of the population. This is a prime condition to realize "Internet democracy". This does not make much sense when only a small minority is able to participate. Campaign funding with small donations of Internet users, as it has become regular in American election campaigns since the Howard Dean campaign of 2004 only works because a large majority of American households is connected and frequently uses the Internet for financial tasks.

Size and density

A fairly simple global network property is size. Size matters in networks. The main reason for the organizational success of a left-leaning American advocacy group MoveOn.org is that in 2009 it had more than 5 million members. The sheer size of active members connected enables this organization to receive millions of dollars in donations, and to distribute them among liberal candidates. On the Internet political value is first counted in numbers (voters, supporters, funds), and only second in the quality of user-generated content and online debate.

Other global network properties define dispersion and influence of communication in a network. The density of a network is the number of actual links among actors as compared to the number of possible links. This determines the potential intensity of communication and enables political information exchange to reach a higher level. This could happen in an online discussion with high-frequency interaction.

Density is supported by another network property: transitivity. A network has a high level of transitivity when it contains many groups of three or more actors that are interlinked. For example, when we have A, B and C, C is automatically linked to A when A is linked to B and B is linked to C. Many of these interlinks in a network support the speed of communication and the organizational capacity of political activities online.

Centralization, centrality and symmetry

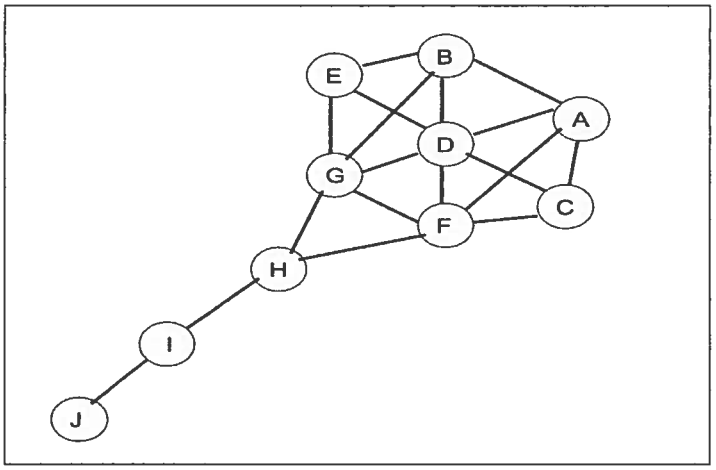
The extent of centralization of a network as a whole determines the spread of influence and the question whether political elites in practice dominate a network that is decentralized in principle. To determine the centralization of a network as a whole, the network property of centrality of it parts or its actors has to be measured.

In Figure 1 a so-called kite network is portrayed with different measures of centrality. Unit or node D has the highest *degree*, which

is the highest number of direct links with other actors. They can be divided in "indegree" or incoming ties that might indicate popularity, and "outdegree", the number of outgoing ties that might signify expansiveness. However, unit or node F has the highest *closeness,* which means the extent to which an actor is close to, or can easily reach all the other actors in a network. In this way the unit is able to be fastest in accessing important or strategic information, directly or indirectly "through the grapevine". Finally, H has the highest *betweenness*, the extent to which an actor mediates or falls between any other two actors. This actor can be an intermediary or a broker, or a gatekeeper, and benefit from information others in the network do not have, because they have no direct ties with the information source (in this figure I and J).

The meaning of all three central positions for inequality is that they enable drawing more social and material (scarce) resources and more strategically important information than other positions. Charles Tilly (1998) has invented an appropriate name for this capacity: opportunity hoarding. The significance for democracy is that individuals, or groups and organizations in a network are able to shape new political elites or reinforce existing ones that can be far more influential for political goals than the mass of Internet users. The distribution of positions in networks does not only have decentralizing, but also centralizing effects that might raise political inequality. Both are enabled by the hardware properties of networks.

Figure 1. Kite Network with Different Positions of Centrality: Highest Degree (D), Highest Closeness (F) and Highest Betweenness (H)



Adapted from Krackhardt (1990) and Bruggeman (2008)

Additionally, the symmetry of communication in networks is an important aspect of (de)centralization. When downloading contents from political websites is much more frequent than uploading or the exchange of users among each other, network communication is asymmetric. When political communication on the Internet would primarily be the retrieval of political information by citizens from political websites serving as broadcasters, in most views of democracy this would be less democratic than when these citizens themselves produce user-generated political content and interact in discussion forums and pressure groups. Here the hardware properties are the ratio of downloading to uploading and bandwidth capacity.

2. Properties of network software and democracy

Standardization

Every media network operates with particular protocols that are standardized. Without common standards people are not able to com-

municate in a network. And without communication there is no democracy. The main standard of the Internet is the Internet Protocol (IP). Together with another standard, the Transmission Control Protocol (TCP), it forms the backbone of the Internet: TCP/IP. This follows the end-to-end principle: with TCP the shortest route is selected to connect IP-addresses of computers and other terminals at the ends where users are operating. The meaning of the TCP/IP protocol for network democracy will be discussed in the following paragraph. Here we will first deal with standardization as such.

In his book *Network Power* David Sing Grewal (2008) has explained that a network with standards that are accepted by many people has power. This is the power to decide who is able to connect to the network and use it for communication with others. Generally, people prefer a general standard, because in that case they can reach many others in the same system. In this way critical mass, as discussed before, can be reached. This is one of the reasons for the steady popularity of Microsoft's operating systems and other software. Next to TCP/IP operating systems such as Windows, Mac OS and Linux, browsers such as Internet Explorer, Mozilla Firefox and Google Chrome, mark-up languages such as HTML and XML, and search engines such as Google, Bing and Yahoo are important software standards. Listed in this way, it seems that there is much competition. In fact, one of them generally is dominant and serves as a virtual standard with a lot of power to influence the potential operations of users. Examples are Windows in operating systems, Internet Explorer in browsers and Google in search engines. The struggle for power is intensified by attempts of companies such as Microsoft and Google to become the dominant supplier of all these instruments (operating systems, browsers and search engines). These instruments certainly are not neutral forces. In one of the following paragraphs we will give the example of the power of Google called Googlearchy. Grewal (2008: 172-181) distinguishes three network properties linked to standardization:

1) *Compatibility*: when two networks are incompatible, one network can exert power over another, since users must use either standard A or B, and cannot use them at the same time. Compatibility increases when different standards can easily be converted, and it decreases when this does not happen and standards are imposed.

2) *Availability*: this is the ease with which a network accepts entrants that want to adopt its standard. Here network power can be reached in two opposite ways. A network can be available or accessible to a high degree and attract many new entrants, in this way building the power of numbers. A network can also reduce availability by offering difficult to achieve standards, in this way creating an exclusive club or other organization. Exclusivity can also be a source of power. Political communication usually opts for high availability, but low available and closed political clubs or discussion forums are no exception.

3) *Malleability*: a network standard can be more or less open to revision. Actually, standards should be less malleable to serve their functions of uniformity and coordination. However, malleable standards increase the flexibility of networks to adapt to the environment. This is a dilemma. For example, there should be standards for working political discussion forums (rules and moderation), but when the nature and attendance of discussion changes, these standards should be revisable.

The discussion of these network properties of standardization might seem far-fetched when discussing democracy. However, it is important to realize that in a contemporary society the complete technological design of networks and their applications is made by private enterprises, while the political activities and potentials discussed here are basically public, and they should be open, accessible and malleable to all.

Peer-to-peer principle

The exchange of information via a central medium by people using local terminals is considered to be the most important network property for equals that are called peers. It has a hardware basis of connections as previously discussed, but it also has a software component. This is the TCP/IP protocol. In fact, TCP/IP *is* the Internet. It enables the exchange of information on an equal basis. In politics this information can be knowledge, opinions or votes. The basic, supposedly democratic idea is that everybody can speak simultaneously and be heard by everyone on the network. The potential of networks to exchange information at a distance, and yet reach a common ground has immediately made an appeal to advocates of plebiscitary, pluralist, participatory, and libertarian democracy. In a paragraph above we referred to the so-called teledemocracy that wants to use this potential to propose a contemporary plebiscitary version of the Athenian agora (Arterton, 1987). From that time on, strong libertarian currents among Internet users saw the principle of peer-to-peer networking as the hallmark of the Internet, enabling all kinds of self-organization.

After the year 2004 this principle was reinforced by the perspective of Web 2.0 and the rise of user-generated content. Benkler (2006) in his *Wealth of Networks,* and Tapscott and Williams (2007) in *Wikinomics*, among others, proved themselves to be strong supporters of this perspective and of peer-to-peer networking that enables mass collaboration and social production on the Internet. However, these authors also refer to particular nuances. Benkler (2006: 247) says that "there never has been a complex, large modern democracy in which everyone could speak and be heard by everyone else". Indeed, below we will argue that it may be easy to speak on the Internet, but difficult to be heard. Tapscott and Williams (2007: 25) admit that "though egalitarianism is the general rule, most peer networks have an underlying structure, where some people have more authority and influence than others". Precisely this "underlying structure" will be the focus of our attention now.

The potential of peer-to-peer networking for democracy strongly depends on the role of the central exchange that is required to enable network communication. In one way or another, a network has to store, process and exchange. This can happen more at the centre or more at the terminals. This has both technical and social aspects.

A technical aspect is the transformation of the decentralized TCP/IP protocol into a more centralized protocol. This happens in the so-called IP 6 or IP sec(urity) that will be introduced shortly. This version of IP labels packages of Internet data streams with numbers that enable operators and security agencies to identify the packages, to steer them and to tap their senders and receivers. This is not a comforting idea for citizen peers in less democratic societies, societies under surveillance, or for people who want to participate in online discussion forums anonymously. The storage and processing capacity of peer-to-peer networks can be located in the centre, at the terminals, or in an intermediate exchange. This technical aspect also distributes power. In the first music exchange sites, such as Napster, there was a central directory of songs to distribute. Then, storage capacities and directories moved to "super nodes", as with the Gnutella service. The next step was to store them on the computers of the users themselves. Finally, the networks for music and video exchange, which operate with Digital Rights Management Systems in order to charge for download exchange, are centralized once more (see Benkler, 2006: 419 a.n.).

In political peer-to-peer networking most discussion or exchange of views and information is not anonymous. In systems of electronic voting at least the authorization of voters is needed. This requires a relatively centralized system. In online discussion forums discussion rules and central moderation are often enacted. Here we meet social aspects of the, more or less, centralization of network exchange. See below under the property "simultaneous input".

Link structure: "Googlearchy"

The peer-to-peer or end-to-end principle of network design might not limit the sites that citizens visit, but the link structure of the Web certainly does. Many suggest that innumerable sites, among them political ones as well, are accessible to all users. The Internet is supposed to be a narrowcasting medium offering contents for every imaginable preference. In the opposite perspective of the user, it would eliminate the gatekeepers that control entry to the traditional mass media. In doing this, it is supposed to give a voice for all users, marginalized or resource-poor groups included.

Practice is far from this theoretical potential. There is "Googlearchy" present on the Internet. This is the rule of the most heavily linked. This rule effects both the reception and the creation of political communication on the Web. The link structure between sites is one of the most important network properties. It obeys strong statistical regularities. It is created by the software Google, and other search engines are designed to rank pages among the billions that are available. The most familiar software algorithm that Google and others use is PageRank. This puts sites that receive lots of links from other sites on top. In this way it strengthens the advance of these sites even more. Another algorithm for ranking is HITS, which uses this reinforcing structure of links on top even more, primarily linking to "hubs" and "authorities" in a particular field of interest. Both order the number of sites by the inlinks they receive.

There is no escape from these page-ranking effects. The basic reason for this is that the Internet is simply too big. Nobody is able to view all the information it contains. The inability of political information seekers on the Internet to cover all information has three basic causes. First, as a natural fact, human information seekers are unable to cognitively process the vastness of information and they just need search engines and other instruments. Second, they show a lack of skills in using them. Research indicates that users rarely look past the

first page. In a 2006 study (Pass et al., 2006), it was observed that 90% of total clicks went to the first page, and 74% to the top five search results, while the top result received 42% of all clicks. When search engines improve, users are viewing even fewer hits (Jansen, Spink, 2006).

The third cause is the preferential attachment of users. Like in every network, members prefer links with the most popular group or network member, in this way increasing its popularity. Choosing between political information and communication sites, people tend to choose big and familiar ones, just like television viewers have their favourite channels. Now, we will demonstrate that the biggest part of political information retrieval addresses a handful of sites.

Hindman (2009) has tried to estimate the portions of the Internet that the average user is most likely to see while searching for political information. He classified three million pages with a particular automatic program starting the selection process with twelve lists of 200 highly ranked American "seed sites" of a variety of political categories. They were abortion, death penalty, gun control, U.S Presidency, U.S. Congress, and general politics. He discovered a startling concentration of interest for a handful of very successful sites. The most successful sites appeared to receive between 14 and 54 percent of the total links - all to a single source of information (Hindman, 2009: 47-54). Nine of twelve lists of high-ranked American "political sites" revealed a top 10 that accounted for more than half of the total links.

A power law and concentration

This concentration is a general pattern on the Internet (see Huberman, 2001). Advocates of the Internet as a medium for news and political communication have often claimed that Internet use is more equally distributed, with the effect of being more democratic because far more sites or channels are available and freely accessible than on the television, radio or newspaper market. Many observers even

fear that the Internet leads to fragmentation of news consumption and political communication, producing in-crowds of citizens interested only in their own social and political views and cultures. In fact, the opposite happens. In practice, the use of Internet for news and political communication is more concentrated than in the traditional mass media. Hindman (2009: 90-101) has made an inventory of online and offline media audience shares using U.S. Internet traffic data of May 2006 produced by the company Hitwise Competitive Intelligence. Results are in Table 2.

Table 2. Audience Shares for Online and Offline Media, U.S. 2006

	N	Top 10	Top 20	Top 100	Top 500	Gini coeff
All Web sites	1.325,850	26%	30%	40%	51%	.76
News and media	7,041	29%	37%	56%	79%	.88
Political sites	970	31%	43%	77%	99%	.85
Radio	1,290	7%	11%	61%	77%	.53
Newspapers	1,058	19%	29%	61%	91%	.69
Magazines	653	27%	36%	67%	98%	.70

Source: Hindman (2009: 90, 97)

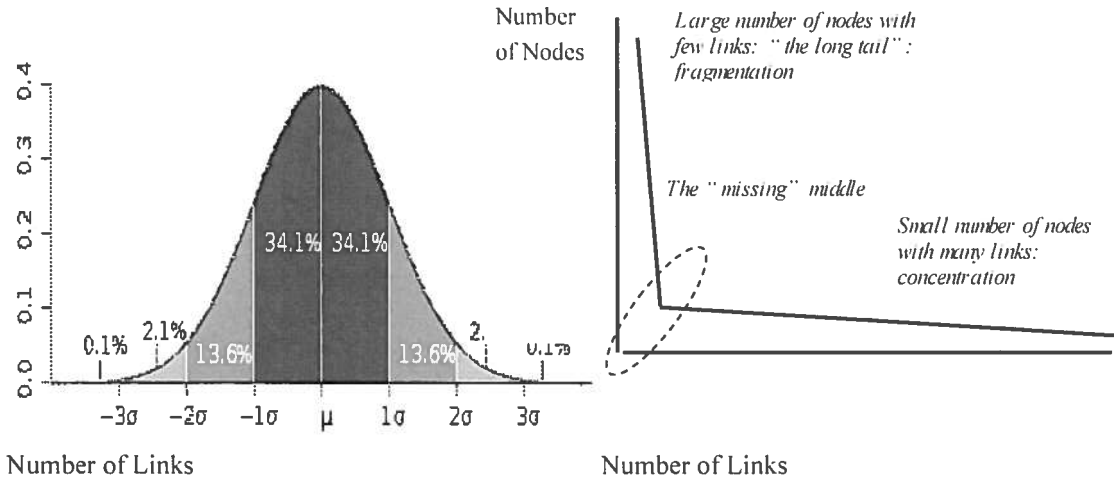
Note: The Gini coefficient is a metric for (un)equal distribution. Higher is more unequal.

Table 2 shows that, with the exception of political sites, there are far more online than offline media. Yet, concentration of audience shares is higher in online media. News and media sites, as well as political sites, are most concentrated. The Top 10 of political sites has a share of 31% of the audience, and the Top 100 has 77%. With the traditional media of newspapers, for example, this is 19% and 61% respectively. The best-known metric for inequality and concentration,

the Gini-coefficient is highest for political sites, as well as news and media sites.

How can these figures of concentration be explained? Again, this is due to a particular network property or effect. It is the so-called power law distribution of links and nodes in networks. This is a statistical regularity. In more commonsense language it is called the "rich are getting richer and the poor are getting poorer effect" on the Internet. Sometimes, this is also called the "Matthew effect", according to a similar-sounding gospel of Matthew. What makes the statistical background is that the number of links and nodes (sites or users) on a computer network such as the Internet is not divided according to a normal distribution. This would mean that most nodes have an average number of links, and that few have many links or a small number of links. See Figure 2.1 on the left. Instead, there is a power law distribution. This is marked by many nodes with a few links and a few nodes with a very large number of links. "They have the power". This distribution has the so-called "long tail". The middle part of this distribution is much smaller than in the case of a normal distribution. See Figure 2.2 on the right.

Figure 2.1. Normal Distribution (left) and **Figure 2.2.** Power Law Distribution (right) with Number of Links and Nodes in a Network



The basic reason for the appearance of a power law distribution on the Internet is that it has become too big, as has been claimed before. When networks grow, their nodes tend to cluster. It is impossible that everyone has a link to any other node in a large network. Clusters at a local scale link with others and create bigger clusters at a global scale. These clusters are called *small worlds* that might be linked to other small worlds, in this way creating a global world. This enables the concentration process we are discussing here. Humans of flesh and blood realize this process, perhaps unwillingly, by making more or less free choices. First, the global network gives them more opportunities than they had before in their local world with a limited number of media and people to reach. Subsequently, they have to choose among the apparently endless possibilities. Some will make a choice by chance, browsing freely on the Internet. However, most people will link to the sites and people they know and are likely to come back too (i.e. by creating Favorites lists). This is called preferential attachment. This phenomenon can be influenced by advertisement and attractive brand names, by being accessible and easy to use, and of course by offering more information, services and other things that attract people. The crucial fact is that the bigger the attention for a site, the more means the site gathers to be competitive in these offerings. Finally, we have the collective phenomenon of crowd behavior. People tend to follow one another when making choices. Crowd behavior also is an important characteristic of network processes.

In this way, the choice of political websites on the Internet is also focusing on relatively few nodes. While the opportunity to choose seems endless, in fact, it is directed to fewer different choices. So, the problem of fragmentation of political communication and information on the Web might be smaller than the problem of concentration, in practice limiting pluralism and choice. This peculiar paradox can only be explained by the appearance of the network property of a power law. Those in power are getting ever more powerful.

The missing middle

The argument of concentration and less choice in practice is countered by the distribution theory of the "long tail" brought forward by Anderson (2006). He claims that all choices can be made on the Internet because every imaginable product and idea is available here. This even goes for old products and ideas that are no longer available on regular markets. The long tail is portrayed at the top-side of the second picture in Figure 2.2.

In political communication the theory of the long tail has led to claims that a vast number of small information producers and opinion givers together produce a mass of input that contributes to public life and to democratic politics (Benkler, 2006, Sunstein, 2008). The focus on small content producers is partly justifiable. Taken together, they do get more of the total audience online than in traditional media (Hindman, 2009: 134). However, their contribution is fragmented. And they rarely aggregate or cluster to create larger, moderately read websites or blogs.

The trickling upwards of small political content producers to create bigger ones is a claim made by some observers who assert that, for instance, elite bloggers aggregate small contributions into a representative whole with a big influence on online public opinion (e.g. Benkler, 2006: 242). Hindman (2009) has shown that such intermediaries are rare, and that it is striking that the middle is missing. There is a bifurcation between many small political information producers and a few large producers. Metaphorically speaking, we have a big head, a long tail and a small body. Figuratively, this small body is shown in the narrow space in the left corner of the power law distribution picture in Figure 2.2.

3. Properties of network content and democracy

User-generated content and the limits of attention

The content that can be sent and received in a medium partly depends on the properties of that medium. The main property of networks in this regards is that they enable (inter)active actors or users that not only receive, but also produce messages. The threshold for access and user input is considerably lower in the medium network of the Internet than in the traditional mass media. In the first ten to twenty years of the existence of the Internet, this property was scarcely recognized. In fact, it was used as a broadcast medium, as traditionally framed content was only transformed from print into electronic shapes. Even the advent of the World Wide Web with its hyperlinks did not substantially change the unidirectional nature of the medium. In the second half of the 1990s, this started to change with new Internet applications for masses of users such as web-logs, audio-visual exchange sites, chat-boxes, social media, and new forms of instant messaging such as Twitter. The number of personal websites also expanded. In this way the Internet transformed into an altogether different medium with user-generated content that started to compete with content published by established media and institutions.

The potential of user-generated content produced by average users has generated expectations of empowerment for citizens. This opportunity would give new voices to citizens that felt voiceless before. The power of elites in established mass media and in politics to control the dissemination of information would be broken. The gate-keeping capacities of these vested interests would come to an end. In these expectations it is apparent how much one counts on the network property of interactivity and the potential of user input because the threshold of input has become lower, and because there is supposed to be access for all. The enabling property of the medium is turned into a defining property. It is assumed that users have been waiting for this opportunity, but never had the chance before. There is no attention given to

the enabling capacities required: the motivation and the skills of users to take this opportunity.

A second and more basic problem with the overambitious interpretations of this network property is that it is not fully considered. One supposes that there is an audience for every new voice. This is a basic mistake. Let us suppose that every new Internet user has the same period of time to read and to write on-line. In such case, this new Internet user would find only "an audience of one". Fortunately, most Internet users take more time to read, listen and view than to write and to produce sounds and images. Moreover, it takes more time to produce than to consume messages on the Internet. So, the audience for a new voice is larger than one. However, it is also limited. As we intend to show in this chapter, it is so much easier to speak than to be heard on the Internet. There are five basic limits to finding an audience on the Internet for new voices with user-generated political content (Hindman, 2009: 131-133):

1) Political communication is only a tiny proportion of Web-usage. In the year 2007 only 0.12 percent of Internet traffic in the US went to political websites. The sum of news and media sites did not even reach further than 2.9 percent – while, for example, 10.5 percent went to adult sites and 7.2 percent to search engines (Hindman, 2009: 60-61).

2) The link structure of the Web limits the content that citizens actually see. This is the consequence of "Googlearchy" that has been discussed previously. Online visibility for new political voices will on average be extremely low. The general patterns of "Googlearchy" may be even stronger in the political field. This field is fractally organized in subcultures and media of political communication and attention. Users with political interest first turn to the sites of their own political views to inform themselves and to give their own opinions (Hindman, 2009: 36). Subsequently, the link structure of the Web prevents them from escaping this field of preferential attachment. Voices from another political direction may not be heard at all.

3) Much of the search engine use is shallow. Chances that citizens will find new voices of other citizens are small, because they lack the skills to appropriately use search engines (see next paragraph). Also, those politically interested are usually looking for a familiar site they know (navigational query), or they ask a very simple question (content query) with attention directed towards the first hits only. This means that most of the indexed political content is completely irrelevant because it does not find an audience.

4) Vested political media keep in control of a vast majority of Internet content. Traditional news organizations also supply most of the political news and information on the Internet. User-generated content, among others in political web-logs, frequently copies, processes and reacts to online newspapers and journals and to offline broadcasting, and the press in political affairs. It is costly and it requires a high level of expertise to generate one's own new content that is sufficiently valuable and attractive to reach an audience of some proportion. The fact that entry barriers are diminished does not remove the demands for quality and expertise. Voices of a lower quality or those usually drawing less attention can only reach large audiences under exceptional circumstances. This is the case when a political weblog, for example, addresses a scoop or scandal with information never published before.

5) Social hierarchies also emerge in alternative or new voices of the citizenry. Frequently we hear claims that the Internet is shifting power away from political elites to the voices of the citizenry, among others, to successful political blogs. These claims overlook the fact that a small group of A-list bloggers actually gets more political blog attention (references) than the rest of all small blogs combined. They also ignore the fact that successful blogs are all but ordinary citizens. These new Internet elites are not more representative of the general public than the old political and media elites. They are completely dominated by high-educated, elite or middleclass white males (see

Hindman, 2009: chapter 6 for data). These elites also consist of people with the best Internet skills and arts of deliberation. In general, producing user-generated Internet content requires more skills than consuming it (see below).

Limits of simultaneous and equal input

A network property that is often praised and used by those advancing deliberative democracy in online discussion forums is the fact that in a network with a central exchange an unlimited number of discussants can express their voice simultaneously. The exchange processes all input and list the result in a feedback to all discussants. This fundamentally different from physical meetings where less people are able to participate, and where turn-taking with some discussion leadership has to be organized. Many assume that discussion leadership is less important in online forums. Many people also assume that when discussants cannot see each other, this removes status differences as all feel free to contribute without the influence of status, gender, ethnic origin, or whatever social attribute. Unfortunately, both assumptions are wrong.

A long tradition of so-called CMC observations and experiments since the 1970s has shown that in online forums more, and not less discussion leadership (moderation) is required than in physical meetings (see Johanson et al., 1979; Kiesler et al., 1984 and summaries of more recent research in Thurlow et al., 2004; van Dijk, 2006). This happens at least, when one wants to prevent disruptions like flaming, scolding, insults or group polarization, and as one wants to reach some agreement or any conclusion in an online discussion. In most online discussions some moderation is simply required to achieve results. This limits the complete freedom assumed.

CMC research has also shown that status differences do not disappear in online discussions. Some theories even claim that these differences are emphasized in CMC conditions of isolation, deindividuation

and physical distance (Spears, Lee, 1992; Walther, 1996; Postmes, Spears, 1998). In these conditions people keep looking for clues of the identity of other discussants online.

A related assumption is that simultaneous input online is able to produce collective intelligence of a higher order than the intelligence that can be achieved in physical groups with limited extension. This is the assumption of the so-called wise crowd. Evidence shows that online collective intelligence can be effective when it succeeds in mobilizing the ample body of knowledge that is available in society, also in political affairs (Sunstein, 2008). However, moderation and other discussion techniques have to be adopted to correct a large number of disadvantages in group dynamics. According to Sunstein (2008), group dynamics in online forums might lead to:

- *Amplifying errors*: bias in groups tends to be not reduced but extended; escalation to a course of action that is failing can often be observed;
- *A common knowledge effect*: information and views held by all group members have far more influence than minority or individual information/views (that tend to remain unvoiced);
- *Cascades*: following the lead of others people go along with the crowd to maintain a good opinion of others though they know better (these people also remain silent);
- *Polarization*: deliberating groups divide individuals' initially dissimilar views into more opposing ones instead aligning them.

All these social and psychological effects increase the chances that the potential of the network property of simultaneous and equal input will not be realized. One has to take into account the above mentioned social effects so that benefit could be gained out of such technical network property in support of democracy.

Open and closed networking

The Internet is also hailed for its supposed open character. The idea is that this is a characteristic of the Internet in itself. If this is true, it would be a network property as well. This is a property of content as the assumption is that communication on the Internet is relatively open. People might also consider the choice between open and proprietary source on the Internet, but this is a network property on the level of software.

Presently, the Internet is primarily a public medium though it is also used for private communication. Keeping things private on the Internet is difficult, as people trying to defend privacy and intellectual property rights continually notice. As a medium for political communication, the Internet seems to be more open than the traditional mass media. News spreads around easily, whether it is confirmed or not. Political gossip and scandals abound on the Internet. The public and private life of politicians is published immediately when some interests see the need or benefit of doing this. The web publication of all intimate details of the affair between US-president Bill Clinton and Monica Lewinsky in 1998 would not have happened in the mass media of the past.

For evident reasons political communication is more open than other types of communication. Politicians have a public function and they have to inform citizens and convince voters to be successful. The Internet has added to this characteristic. Networks can easily spread all kinds of information. However, there is no additional network property that turns this into a necessity. It remains a choice enabled by technology. In the previous section we have seen that network communication can also be closed by using particular properties of network hardware and software. This also goes for political communication. In many applications the adoption of user names and passwords is on the rise. Confidential communication can still be protected by technical means. Encryption is amply used by high government officials when they exchange views and information. Disclosers in e-mail

messages of these officials, and other civil servants are more a rule than an exception.

The American author Laurence Lessig (1999; 2001) has written two books that give many examples of the importance of the so-called "technical code", among them a number of network properties, for the open and closed character of the Internet as a public medium. These books demonstrate that the open character of the Internet is far from safeguarded.

Internet complexity and lack of skills

The last network property of content discussed here is related to the technical and substantial complexity of the Internet. This means that it is not easy to use for many people. The prime, and perhaps the most important, condition for the use of the Internet for political communication is that all citizens have access to the Internet and are able to use its applications designed for political and citizens use. Access does not only mean physical access to computers and networks, it is also a matter of motivation (in this case for online politics) and of having sufficient digital skills (van Dijk, 2005). Digital skills is used as an alternative term for digital or computer literacy as this term better emphasizes that using digital media is not only a cognitive affair but also a matter of action, interaction and transaction.

A number of media characteristics of the Internet as a network require users to have new skills or competencies. These demands come on top of traditional competencies of being able to read, write, speak or produce other media content, and to make choices and decisions. Van Dijk (2005), and van Deursen and van Dijk (2009a, 2009b) have made operational definitions of four Internet skills, a special type of digital skills. First, there exist operational skills, the skills to command hardware and software; the popular expression being "button knowledge". Then, there are formal skills. Every medium has particular formal characteristics. Regarding the Internet one has to learn to

browse and to navigate using hyperlinks. The third type of skills is information skills: the ability to search, select and evaluate information on the Net, for example, using search engines. The last type of (so-called "higher") Internet skills are strategic skills: using the Internet as a means to reach a particular personal or professional goal.

In large-scale performance tests of representative sub-sections of the Dutch population in a media lab, van Deursen and van Dijk (2009a, 2009b) have observed that tasks of operational and formal Internet skills were performed much better than information and strategic skills. Operational skill tasks were successfully accomplished by 80% of subjects and formal skill tasks by 72%, though the time required to complete these tasks was exceedingly different for people of different age and level of education. However, information skills tasks were only completed by 62% with a large spread of time needed. For example, subjects performed very badly in selecting and evaluating the results of search engines. Finally, strategic skills posed most problems. They were only completed by 22% of subjects with the largest spread of time required. Here, subjects for example had to choose a particular political party that in its election programme proved to be in favour of a particular issue.

Operational and formal Internet skills are medium-related skills. Properties of the Internet oblige users to develop these skills. They are also required to learn the information and strategic Internet skills that have both a medium-related and substantial nature. They are similar to skills required for the old media of print and broadcasting. However, extra skills are required. For example, in using a search engine one needs the operational and formal skills concerned and the information and strategic skills to select and evaluate the search results. In the above mentioned performance tests it was observed that young people and people with a higher education level performed better in operational and formal skills, but (surprisingly) people of medium age and seniors performed better in information and strategic skills (van Dijk, van Deursen, 2009b). So, provided that older people sufficiently master operational and formal Internet skills, they are able to perform

better than the young generation on the Internet.

This analysis supports the argument that the properties of the Internet offer a (additional) handicap or barrier for people with a lack of Internet skills. This especially goes for people with low education level who are already behind in democratic participation. Online political communication requires more information and strategic skills than any other activity on the Internet. The argument that the command of the Internet is becoming easier by the day does not help here, because technology does not come to a hold, and ever more advanced political applications are offered that require even more information and strategic skills. Again, discussion of this property shows that the Internet may be offering more access and more opportunities to politically communicate than older media, but it also reveals that for some people it becomes more difficult in practice to express in this way and to be heard. More handicaps for those already behind in political participation (those with lower levels of education and all those excluded from Internet use) present no advantage for democracy, at least not in most views of democracy.

Conclusion

In this paper we have tried to show that the Internet in itself is not more democratic than older mass media. As a network it has a number of properties that are able to both support and reduce democracy. These properties are defining and influential. However, they are no matters of natural necessity. They are enabling or limiting conditions that can prove as both opportunities and risks. To be able to take these opportunities and to reduce the risks, one has to know these properties in order to develop a realistic online politics. So, the function of this paper was to offer explanation. We hope it has served to qualify both utopian and dystopian views of digital democracy.

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