CURRENT PERSPECTIVES ON COMMUNICATION AND MEDIA RESEARCH

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Centre and periphery: How to understand a network

Reinhard Anton Handler

Abstract

The social sciences and humanities have turned to network analysis in order to better understand society and culture. Whether that is through digital methods or qualitative approaches such as those proposed by Actor-Network Theory, relations between actors (or actants) are mapped. The golden rule for both quantitative and qualitative approaches is that actants only exist in a network if they leave a trace. The most successful pieces of research are those that manage to distil significant associations to reveal social trends on the Internet or produce a 'thick description' of a network via ethnographic methods. Sometimes, however, minor relations or non-existing traces may deliver a more comprehensive understanding, yet they are omitted in order to concentrate on the centre of networks. This chapter reflects on my own research using digital methods, as well as ethnographic methods, in order to understand a network. To deliver conclusive descriptions of a network that are compatible with the theoretical framework, I have focused on places with rich interrelated associations and connections. I have found diverse interest groups that share strong ties and a sense of belonging to a greater community. What I have overlooked though is that this sense of belonging also spreads out to the margins of the network, where relations may be ephemeral but deliver a better understanding of what the network thrives on. By focusing on the margins of networks and personal entry points, this refection on my own research practices shall take a critical look at networks as a research axiom.

Keywords: networks, network society, ANT, centre, periphery, free software, open source software

The social sciences and humanities have turned to network analysis in order to understand society and culture that are increasingly influenced by digital media. Whether that is through digital methods or qualitative approaches such as those proposed by Actor-Network Theory (ANT), relations between actors (or actants) are mapped and measured. The most successful pieces of research are those that manage to distil significant associations to reveal networks on the Internet or produce 'thick relations' (Geertz, 1973) of a network via ethnographic methods.

This chapter reflects on my research, which is also guided by a network perspective. In order to deliver thorough descriptions of free and open source software communities, I have focused on places with rich interrelated associations and connections. What I have found are diverse interest groups that are internally characterised by 'strong ties' (Granovetter, 1973). These strong ties are people who interact with each other on a regular basis in chatrooms and via mailing lists, wikis or messaging apps. Additionally, they meet at conferences which, as Coleman (2013) has explained, are an important element for free and open-source software. Free and open-source software organisations are characterised by their shared sense of belonging to a community that also spreads out to the periphery of their networks. Relations may be ephemeral on the margins of these networks but they can deliver a better understanding and paint a more comprehensive picture. I will try to show how a network as a metaphor and notions of decentralised networks tend to concentrate on the thick relations in the centre and omit the non-central relations of network nodes at the periphery.

1. The network metaphor

It is fair to say that networks have become the dominant concept to analyse transformations in human relations. Whether it concerns forms of political organisations (Bennett & Segerberg, 2012; Wainwright et al., 2007), social movements (Castells, 2012), work and labour (Hinds & Kiesler, 2002; Rossiter, 2006; Wellman et al., 1996) or communities (Rheingold, 1993; Wellman, 1999), to name just a few domains, they tend to be understood predominantly as an array of relations in a network. The idea of thinking of society as networks can be traced back to the evolution of sociology into a scientific discipline that found patterns of behaviour in society. From the earliest beginnings, attempts to understand societies as networks have been closely associated with advanced conceptions of networks by engineers, communication networks in particular. Thus, it should come as no surprise that the first attempts to depict society as forms of networks were made in the 1920s and 1930s, most famously by the psychiatrist Jacob Levy Moreno (1934). Since then, computers have changed in terms of applicability, design and functions to a point

where they are immersed in all spheres of everyday life, and the term network lost its meaning as a purely technical term some time ago. The idea of a social network and its connection to the Internet is articulated clearly by Castells. According to Castells (2010: 469) networks constitute the new social morphology of our societies. One could also argue they have become more than a morphology and are rather an ontology, as this has become the dominant category into which things are sorted. Castells himself points out that this ontology is directly connected to computer networks. I think this passage is worth repeating:

> A network society is a society whose social structure is made of networks powered by microelectronics-based information and communication technologies. By social structure, I understand the organizational arrangements of humans in relations of production, consumption, reproduction, experience, and power expressed in meaningful communication coded by culture. A network is a set of interconnected nodes. A node is the point where the curve intersects itself. A network has no center, just nodes. Nodes may be of varying relevance for the network. Nodes increase their importance for the network by absorbing more relevant information, and processing it more efficiently. The relative importance of a node does not stem from its specific features but from its ability to contribute to the network's goals. However, all nodes of a network are necessary for the network's performance. When nodes become redundant or useless, networks tend to reconfigure themselves, deleting some nodes, and adding new ones. Nodes only exist and function as components of networks. The network is the unit, not the node. (Castells, 2004: 3)

These few sentences are impressive in more than one way. They show the after-effects of a post-structuralist philosophy which incorporated debates on ecology into complex systems which are asymmetric and heterogeneous, as Ramon Margalef (1968) pointed out in his work on biodiversity. This notion influenced the use of the rhizome, by Deleuze and Guattari, to describe culture as a non-hierarchical root system instead of a tree. It can be found in Castell's network society. Latour, who Castells also draws from, also admitted that actor-network theory, to which he substantially contributed, could be renamed as actant-rhizome ontology (Latour, 1999). Castells (as well as Latour) shapes the idea of a centreless fluid way of being in analytical concepts that facilitate an outline of the reorganisation of human relations in a network society. This passage also shows a complete adoption of network engineers' vocabulary by the social sciences. The network society is a unit of interconnected nodes, intersecting curves and efficient processes. Turning both towards the vocabulary of engineers and the thought structures of post-structural philosophy results in a mash-up that looks at society as a decentralised network that is in a constantly fluid and unstable state. The term network has become commonplace as a dominant metaphor.

2. Centre and periphery

While Castells argues that a network has no centre, just nodes, earlier conceptualisations of networks do indeed depict networks as a morphology that consists of a centre and a periphery. Luhmann (1997) insists that where there is a centre there is a periphery. Without the periphery the centre would forfeit its structuredness. The difference between centre and periphery can first be marked as the concentration of people within a certain space where social complexity is higher than at the periphery. Hierarchies start there and not in the simple structures of the periphery, according to Luhman. These "structural idiosyncracies", as Luhmann (1997) calls them, do not grow out of a geographical distance between centre and periphery. What determines them is the compatibility and complexity of communication, that is much higher in the centre than at the periphery.

Luhmann's differentiation between centre and periphery attempts to describe the importance of communication technology in modernity that is characterised by the supposed unimportance of geographical distance and difference. The structural differentiation between periphery and centre is a lens for looking at networks. The idea of 'the annihilation of space' by electronic means, as Castells (Castells, 2010: 379) calls it, is indirectly borrowed from Wyndham Lewis via Marshall McLuhan. Lewis (1927/1993) writes in *Time and Western Man* about a 'global uniqueness' that is established by a 'mercurial spreading-out in time' and an 'overriding of place'. While Lewis's was an artistic concept which he called vortex, McLuhan (McLuhan, 1964/2010) translated his ideas of a dynamic and progressive image into his Global Village where space and time are abolished and mankind lives in a 'technological simulation of consciousness'. This annihilation of space does not lead us into a space of vectors and constant transitions, though we can understand the global village as a network that is an extension of our central nervous system.

What gets lost in this notion of networks as the annihilation of space is the difference between centre and periphery that Luhmann argued for. Computers have bridged spatial distances but social networks still show thick relations in the centre and weaker relations at the periphery. Hierarchies develop even at the periphery of decentralized structures. Luhmann's caveat is also valid for the most tech-friendly communities where non-hierarchical elements are of high importance, such as in free and open-source software. Free and open-source software projects combine elements of multiplicity and heterogeneity, but they also show hierarchical structures. Besides agile structures that foster self-organisation and collaboration, including continuous development and improvement, the position of a benevolent dictator for life in a project is not uncommon in free and open-source software projects. In such a case, as well as in other examples, hierarchies are the result of a meritocratic system that results in the formation of a centre and a periphery. People

who contribute for a long time or whose contributions are deemed to be substantial by other central actors get central positions. These people have more possibilities to take part in decision-making or are allowed to make certain decisions on their own that others at the periphery cannot make.

The center-periphery question arose at the start of my research. By deciding to locate my study in the realm of free and open-source software, I was confronted with the dilemma of how to get access to the field. FOSDEM, Free and Open Source Software Developers Meeting, seemed like a valid start in order to get acquainted with a field I was not invested in nor in any way involved in before (besides being a user). However, the problem in terms of doing research there is the sheer size of this meeting/ conference. Every year, it brings around 7,000 people together for two days in Brussels. Attending Europe's biggest conference/ meeting of free and open-source software contributors was helpful to get an overview of the field. Later, I reflected on my data that I collected there in 2016 and 2017 and began to realise that most people who attend FOSDEM are those who are at the centre of networks. They are members of an organisation, they go to Brussels for a weekend to meet kindred spirits, and they regularly contribute to projects. People on the periphery of these networks, programmers who occasionally send a piece of code to a project or publish it on a sharing platform like GitHub, do not typically travel to the conference. Thus, while free and open-source software can be analysed as a network of a variety of organisations, projects and people, collecting data at a physical meeting such as FOSDEM might only capture the central nodes. The contributions of the actors on the periphery can hardly be captured with such an approach.

3. ANT and centrality

As mentioned earlier, the network metaphor plays its part in actor-network theory. Apart from highlighting the inseparable interweaving of the social and the technical by including non-human actors in the network by giving them agency, ANT replaces spatial metaphors such as close and far, or inside and outside, with associations and connections. The notion of the network, Latour (1996) explains in a short article commenting on actor-network theory, is a lens that allows one to look at society-nature in a different way. The obvious impact of the way we look at things is exemplified by visualisations in social-network analysis. These colourful network diagrams are indeed impressive and certainly played their part in allowing social network analysis to established itself as a key research method across many disciplines and a major research area. Latour (1996) recognises the influence of technical networks in actor-network theory but he argues that it is a mistake to give an actor-network a technical meaning in the sense of a computer network or a train

network as the former is neither strategically planned nor does it reach a stable or final state. Instead of being static and topological, a network has to be considered dynamic and ontological. Actor-network theory adds the notion of the actor to modify a mathematical conception to the network. However, this attempt at animating networks leads to a second misunderstanding, Latour explains. Actor-network theory does not add social networks into the mix but it does go beyond the social relations of human actors by including non-human and non-individual actors. Connections do not have to be qualified as social, natural or technical. This theoretical conceptualisation displays the interplay between technical transformations and social organisations that is informed by the network metaphor. For ANT this means not starting from universal laws and deciding 'to take local contingencies as so many queer particularities that should be either eliminated or protected, it starts from irreducible, incommensurable, unconnected localities' (Latour, 1996a: p372). While this approach tries to avoid a priori assumptions and analytical frames that are imposed on the data, centrality becomes a possible problem.

Ethnography is the preferred methodological approach of ANT-related research. It assembles various research methods such as in-depth interviews, participant observation or field notes that are all geared towards capturing the queer particularities that Latour favours instead of grand narratives. Ethnography is about collecting data on small-group interactions in workplaces or special conferences in a non-systematic way. A more systematic approach would lead to the construction of artificial situations and hinder the researcher from entering the field 'as it is' (Hammersley & Atkinson, 2007). According to Howard (2002), such an approach helps to immerse oneself into a community as it provides multiple perspectives and depth, but it sacrifices control, researcher objectivity and generalizability (Morrill & Fine, 1997).

The character of ethnography resonates well with the notion of a decentralized network as the methods are designed for capturing local specifics and small groups. Focusing on the central actors in these local groups though is a problem in ANT-related research. The theory delivers a useful framework to understand the emergence of networks. Intermediacy and centrality are not included in Actor-Network theory. The opposite is the case, as ANT focuses on problematizing these categories. Actor-Networks are not stable, they are in flux and are renegotiated constantly. Change is key and a centre can shift, actors might lose some relevance or create new networks. Providing a theoretical toolbox to understand and capture these movements is the strength of ANT. While theoretically, it does not neglect 'the small actors' by focusing on the 'big actors' (Law, 1991), in research practice a lot of ANT-related studies do focus on the central actors because change and fluidity can be best observed by analysing shifts at the centre.

Thus, centrality in networks is a problem for ethnographic work. When ANT-related research focuses on smaller groups such as small-scale research

teams or small companies, the fluid (re-)formation of networks, or translations as Callon (1986) called them, can be easily observed. When analysing bigger organisations, however, centrality can become a problem. Studies of free and open-source software show that centrality plays a part in the organisation of bigger projects. Berdou (2011) analysed two projects, GNOME and KDE, and found that a core developer group makes a large number of commits and is responsible for maintaining key parts of the code base. These core developers are often paid developers, another strategy to stabilise the centre of the network. According to her research, core developers do the major share of work on the central parts of the code. Actors on the periphery tend to be given other assignments that might constitute peripheral work. This form of network is not permeable, translations in the understanding of ANT are not the common case. Actors on the periphery of the network stay on the periphery. Berdou suggests that this has more to do with the practical requirements of a project. Maintaining the code base requires a high degree of specific knowledge and skill. Core developers who are paid by a project can develop specifically needed skills as they have the time to assemble the necessary parts. Part-time contributors or volunteers who occasionally make contributions cannot gain highly specialised insights. I have started to analyse LibreOffice, which is less focused on writing code and also less centrally organised. This project has paid contributors too, but they do not exclusively work on code but tend to be engaged in marketing or user design, while there is only one paid developer who is responsible for maintaining the core infrastructure. Thus, LibreOffice is highly dependent on the contributions of volunteers. While there is a small but stable group of contributors, a lot of additions and edits come from peripheral contributors. However, there is centrality in this network as well, which also becomes visible at their major community event, their annual conference. Peripheral contributors are not likely to participate and it might also be true that central actors and peripheral contributors have different priorities, as Berdou (2011) suggests: Paid developers search for technical excellence while volunteers focus on practical use and access.

4. Conclusion: Measuring centrality

Central nodes in networks are influential, they might have great control, they are visible, and they are involved. The major difficulty, I suggest, is the method of measuring centrality. Centrality is traditionally measured by four parameters: "Degree" is based on the number of direct links a node has to others in the network, "betweenness" is based on the number of times a node is part of the shortest pathway between two other nodes, "reach" is based on the number of nodes that a

single node is linked to through two steps, and "eigenvector" is based on the idea that the centrality of any node is determined by the centrality of the nodes to which it is connected (Bonacich, 1972; Freeman, 1977). The nodes on the periphery of a network, those which are not central, are viewed as not being very important.

I have tried to show that centrality plays a major role in decentralised networks. Differentiating between the centre and the periphery of a network, and thereby focusing on the centre, is often the result of research. Even with free and open-source software, a community that motivates itself and is often described as being decentralised and open, networks have centres and peripheries. Centrality plays a major role, but I would argue that it depends on how centrality is measured. Degree, betweenness, reach and eigenvector might seem to be abstract categories that are applicable in network analysis, but they can be fruitfully deployed in qualitative research as well. A free and open-source project such as LibreOffice is characterised by degree, as it is supported by a community that tends to be linked very well. It shows a high degree of betweenness as people are interconnected quite well. And it also offers a high degree of eigenvector, as central nodes are connected with many on the periphery. LibreOffice has managed what well-working free and open-source projects have managed to do, i.e. spreading an ethic and imagination of a community throughout the network to the periphery. What I as a researcher have to do is follow these links and include the nodes on the periphery. While the network perspective helps to explain major shifts and their consequences, it is important to consider what to include in (or exclude from) the network. Adopting the boundaries of the network which its central subjects have established results in concentrating on the central actors and might exclude potentially more complex and less organised structures on the periphery.

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Biography

Reinhard Anton Handler is a PhD researcher in media and communication studies at Karlstad University. He studied communications, Hispanic linguistics and literature, as well as philosophy, at Vienna University and the Universidad Autónoma in Madrid and obtained a master's degree in communication studies. His dissertation project revolves around collaborative structures in free software production.

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