Network Ethnographies in Journalism Studies:
Qualitative-Based Approaches to Media Ecologies

Abstract: *This article details a mixed-method technique called network ethnography, first proposed by Philip Howard in 2002, as it is applied to two cases documenting media ecologies. Emphasizing the qualitative paradigm underscoring these cases, we researchers successfully map the news information flows -- its influences, power dynamics, and obstacles -- in Philadelphia, PA, and Madison, WI. The mix of locational sampling, a diversified internal openness to unusual areas of empirical consideration, and formal network analysis sets up the qualitative heart of these studies, allowing for multiple levels of investigation at the micro-meso-macro tiers of local community. Despite some significant logistical limitations, the method can be scaled according to resources.*

The research method known as ethnography represents a robust manner of data collection that involves triangulating techniques such as in-depth interviewing with community observation. It is time-intensive, often expensive, and troublesome, but when done right, the process can yield thick description for understanding a phenomenon holistically. Similarly, network analysis has a long history of being able to visually and quantitatively document the relationships at work in any community or organization in a way that's also multi-methodological and rigorous, involving both visual depictions such as maps as well as tests to demonstrate things like influence within a network. Either method on its own would be sufficient for the answering of many research questions.

Until one comes upon a query that demands something more. Some have described the digital era as a "network society" where offline communities of association meet virtual relationships -- changing them, multiplying them, augmenting them, destroying them. Analysis of these networks through tests and mappings have proven useful to catalogue how linking affects paths of knowledge and how social-media platforms enhance our civic participation (Cowan & Jonard, 2004; Gil de Zúñiga et al, 2012; Maeyer, 2012; Meraz & Papacharissi, 2013). Observation of communities, both physical-world and online, have shown us the processes of feelings of belonging and how a social movement becomes galvanized, for example (Cabalin, 2014; Garcia -Ruano et. al., 2013; Uysal, 2016). These are all important things to know and to understand. However, we were interested in those intersections between the online and offline where social networks merged, expanded and retracted because of activity in both spheres. We also wanted to track information as it worked its way through this ecosystem while taking into account both the human reporters, bloggers and other producers of public information as well as how URLs and other (non-human) information artifacts and actors affected these networks. In order to really *know* a mediated ecology of information-exchange today, one must live in all of these spaces and places and be cognizant of all of the small and big influencers that help direct its information flow and make it look the way it does. Putting the two techniques -- ethnography and network analysis -- together, brought us a powerful opportunity to really know and to fully document certain kinds of questions about media ecology in a digital age.

The method is called "network ethnography," first laid out in an article by Philip Howard in 2002. Though as of 2016 it had had more than a dozen years under its belt, it had only been employed -- as far as we could tell -- a handful of times. The article at hand tells the deep narrative of two researchers who tried their hand at network ethnography in separate projects in the United States, both documenting emergent media ecologies -- in one mid-sized city in Wisconsin and in one larger city in Pennsylvania. After reviewing the scholarship to date about network ethnography, we detail the two cases to understand how network ethnography might be used productively in media studies, asking the primary research question: What can qualitative researchers learn from these two cases in terms of studying media ecology using network ethnography? Another major aim of this piece is to discuss its methodological benefits and challenges for the study of communication, and thus we pose as a second major research question: How does network ethnography fit into the realm of qualitative inquiry, if it does?

In this article, we argue that network ethnography satisfies the spatial demands of news ecological study in digital times, but poses some temporal challenges. Despite some logistical limitations, network ethnography can succeed in the cataloguing and exploration of relationships and associative connections that direct the information flow in any given ecosystem. Relations within the data are revealed at a meaningful level of analysis. The manner by which stories, technologies, and even organizational innovations travel across institutional space can be understood at a granular level of analysis. Finally, network ethnography privileges the consideration of multiple layers of stakeholders within multiple levels of analysis, as a way to intersect micro individual actions with macro social systems and hierarchies of power in place. In the pages below we first lay out Howard's definition of network ethnography as proposed in 2002, followed by the various ways it has been adopted in scholarship. Then, we engage with the concept of media ecology itself, discussing the methodological approaches to its study as well. The findings section tells the story of two case studies of media ecology employing this new technique with a discussion of the benefits and limitations to conclude the article.

Network Ethnography in Scholarship

When Philip Howard (2002) set out to study companies that provide the technological infrastructure for political media, such as databases and volunteer organizations, he found himself dismayed at the limits of traditional techniques. "This situation presented a profound methodological challenge: how could I delve into the cultural dynamics of this particular, powerful community while contextualizing my observations within the system of relations among other political actors such as parties, lobbyists, and the media?" (p.552). Network analysis didn't seem like it would be explanatory enough. Ethnography wouldn't work because the company spanned continents and platforms. So he combined the techniques in a synergetic, interdisciplinary approach that he laid out in *New Media & Society*. He defined network ethnography thus:

> the process of using ethnographic field methods on cases and field sites selected using social network analysis. Active or passive observation, extended immersion, or in-depth interviews are conducted at multiple sites or with interesting subgroups that have been purposively sampled after comparison through social network analysis. (p.562)

The technique meant a revolution for us journalism studies scholars thinking about diversity in field sites both traditional and alternative and in avoiding sample bias from the oft used snowball or convenience method. It also allowed for better, more precise documentation of change over time and better triangulation between the qualitative and quantitative. For Howard, the technique could be especially effective for what he called "trans-organizational systems" that involved multiple entities with "an expanded network of stakeholders." And yet are also connected around shared goals and comprise a matrix of associations. His research questions

> concerned the social construction of the new forms of political communication that campaigns use to organize and communicate with the public. I needed a method that would allow me to interact with people in the environment of their own professional community, as they literally and figuratively constructed technology for other political actors. (p.564)

In the end, this network ethnography[1] "strikes a balance between macro-structure and technological or organizational determinism on the one hand, and micro-agency of the social construction of culture on the other" (p.570).

A number of scholars picked up the technique, alternatively emphasizing the network analysis or the ethnography part, depending on their vantage point. For example, in one piece, Bengsston (2014) emphasized the ethnography aspect of the technique, arguing that conceptualizing the study site as part of a network helped more fully immerse the researcher in the spatial dimensions to be explored. Meanwhile, several scholars began with hyperlinking network analysis and moved outward from there. In a study of online student-protest networks around the issue of campus living wages, Biddix and Park (2008) drew hyperlink network maps to help them identify whom to interview in what they called a "refinement" of Howard's network ethnography. Others followed suit -- mostly in education policy and sociology and mostly focusing on the network analysis part of the technique (Hepburn, 201; Hogan, 2012) Olmedo 2014). Ball and Junemann (2012) tweaked the technique to use the interviews and textual analysis to construct the policy networks they were interested in documenting. They pointed out

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[1] This all is not to be confused with the frequently used term netnography (Bowler, 2010; Kizinets, 2010), which is a purely qualitative endeavor simply referring to performing ethnography on online networks. Network ethnography is less about the fact that some of this work is done online; the point of the technique is to capture online and offline relationships that traverse worlds through the use of network maps combined with deeper exploration in interviews and observation.

that the method is not so much about applying network analysis and ethnography together, but rather to channel focus on relations within the data. “We tend to see network structure as flowing from transactions rather than vice versa” (p.13). Foth (2006) expanded on the technique, calling his “network action research” that will “map the existing (formal and informal) networks that operate within the community and initiate small participatory action research projects within each of them. The task of the action researcher is then to link and harness each of these sub-networks of inquiry to form a larger networked community of practice” (p.212).

The Methods of Mapping Media Ecology

As it became more and more clear that digital technologies would spark a revolution not only in how journalism was practiced but also in how we had to research the field, the foundational premises behind network ethnography gained favor among some journalism-studies scholars. For example, in 2016, Steven Reese cited Howard’s concept as a way to resolve the spatial geographies of journalism that had become diffused and networked and that created difficulties for researchers navigating different realms along with a host of new kinds of actors and production. He praised Howard for locating “the critical actors through their strategically located position in the network that links them together—and targets interviews accordingly” (Reese, 2016, p.5). The technique, suggested Reese, also represented a levels-of-analysis framework that reminds scholars to identify where

> larger macro structures and their phenomena of interest are located. This recalls the value of hybrid methods, such as network ethnography, which find some systematic, agreed-upon way to identify significant sites for analysis. We need deeper ethnographic work in some of these emerging spaces guided, where possible, by digital mapping. (p.8)

Network ethnography as a technique enhanced traditional methods through triangulation of not only kinds of data and analysis but also the aggregation of different types of perspective in research.

This is particularly useful when we turn to the study of media ecologies, which is a burgeoning field of inquiry within journalism studies. A media ecology is the constellation of entities and individuals, organizations and institutions that make up the give and take of public information exchange in any particular community (Postman 2000). Stemming from the natural sciences, the metaphor ecology is meant to evoke networks of relationships and association characterized by competitions and synergies and an embedded inter-connectedness of any actor to its environment. In this system, individuals work to attain better positions, to learn more, to persuade, to impede the progress of competitors, to build capital, to advance knowledge, to win support/votes/love/friendships, and to otherwise improve their place in the greater universe. Lots of work is being done in this area as scholars seek to understand how these ecologies -- considered in this framework to be fluid, organic, living things -- fluctuate, expand and contract as new actors are introduced and old ones react. At first those discussing media ecologies such as

Neil Postman, Marshall McLuhan and others steeped the conversation in a literal biological understanding of what was happening as people became more and more dependent upon symbols, language, and ubiquitous media in their modes of survival as a species (Postman 2000; Ong 1982; Havelock 1982; Scolari, 2012). Later, James Carey (1989) and others draped a more abstract veil over the conceptualization as they sought to understand people's relationship to the world around them through the rituals and other meaning construction that emerged through media use. Both of these framings assume that the ways in which we have adopted media from radio and television to cell phones and the Internet represents an essential and innate interrelation with the global universe and all of its inhabitants. In other words, everyone is connected through media and communication and through these exchanges, we understand who we are and how to act.

Some methodological innovation has emerged as researchers try to figure out how best to document such a thing as a media ecology. Nakho Kim at the University of Wisconsin-Madison combined grounded-theory case study comparatives with agent-based modeling to identify the conditions that might contribute to successful citizen journalistic initiatives in an ecology in his dissertation (Kim, 2015). Wilson Lowrey (2012) in a monograph developed a model to understand how new players in the ecology emerged and either thrived or died by tracking health blogs with the help of computer software and combining qualitative case study analysis as well. Qualitatively, ethnography in particular has always been about connections and relationships (Hammersley and Atkinson, 1995; Luders, 200; Mabweazara 2010), especially in newsrooms (Cottle, 2003, Hine, 2009).

Several of these studies employ "network ethnography" as a guide as well, such as Mabweazara (2010). He wrote

> In keeping with Howard (2002), I argue that ethnographic approaches that are set solely in virtual space have the potential to obscure independent observations in the physical spaces of the research (such as the newsroom). They leave the researcher's purview limited only to the analysis of content made available by the research subjects in the digital spaces. I therefore propose a compromise that combines online or digital ethnography with traditional physical ethnography – shifting between offline and online ethnography – with data derived from one approach informing the next and vice versa in a single study. (p.104)

In this piece Mabweazara massages Howard's technique to suit his purposes, observing both in online and offline spaces and triangulating this data collection with in-depth interviews of the people he observed. Thus, Mabweazara commits to ethnography in the most holistic sense possible, calling it a negotiated, self-reflexivity lived experience, and does not entail the network analysis that Howard calls for. Nonetheless, but we appreciate the recognition that careful scrutiny must be paid to both all realms of the universe in today's media ethnographies. In a more mixed method approach to network ethnography, McDermott (2010) tracked the Singapore blogosphere using hyperlink network mapping and then participating in the social media spaces, following with interviews in order to track information flows in the country. McDermott appears to come closer to the spirit of network ethnography, visually depicting the blogosphere in one place before using that evidence to guide the next level of analysis.

One of us co-authors of this piece has also sought to tease out the different flavors of the "media ecosystem" perspective in an attempt to supplement the McLuhanist / Postman approach discussed so far with a perspective focusing on the diffusion and movement of stories, technologies, and innovations. From this point of view, ecosystems are more than simply environments within which different species of media thrive. They are also networks-- almost like the human nervous system-- along which messages, innovations, and journalistic stories travel, shaping and reshaping themselves as they pass over the network (Anderson 2016). While these distinctions are theoretically interesting, they are less important for the discussion of methodology that follows, except insofar as this perspective can help researchers focus on the ways messages travel across journalistic space.

Two Applications of Network Ethnography

In his debut article of the method, Howard suggests a multi-phased approach to network ethnography: identify and navigate a field site until a full understanding of its boundaries, conduct a social-network analysis to depict the field, use those findings to set the stage for more qualitative investigation such as in-depth interviews of clusters of influencers, for example. Thus we set out to try the method in our own exploration of media ecologies. One of us co-authors hit upon the idea first as a way to explore what was happening in Philadelphia, PA (Anderson, 2010, 2013).

The Philadelphia News Ecology

How ought we study- in rich, thick, granular, ethnographic detail- news production and circulation in an era in which the very boundaries of the object of analysis (journalism) are themselves both unclear and the part of the very question we want to answer? How can we, as researchers, delay predetermining what journalism is and where it can be found for long enough that we might make unexpected connections and new discoveries in a rapidly shifting digital world? These questions confronted me as I prepared to begin the ethnographic phase of my newsroom research in the Spring of 2008. I'd been conducting interviews and focus groups with activists and journalists in the city of Philadelphia since 2006, trying to understand both how journalists were *working* and also *working together* in an era in which new digital technologies seemed to offer the promise of remaking journalism as a more collaborative, fluid, deinstitutionalized occupation. I had just secured ethnographic access at the *Philadelphia Daily News*; I could start shadowing and observing my tabloid informants in May and stay more or less as long as I liked. But I'd been talking to residents and journalists in Philadelphia for long enough that I'd come to the conclusion that simply hanging out at the *Daily News* (or even at *The*

Philadelphia Inquirer or the newspapers website Philly.com) wouldn't give me a clear enough picture of how journalism was changing in a digital age. In brief, I was running into all sorts of people that fancied themselves journalists even though they didn't work for traditional news organizations, and many more people who were increasingly confused about what journalism even was and where it was taking place. To understand journalism in Philadelphia, it seemed clear, it was necessary to get outside the walls of the traditional newsrooms and study the larger ensemble of journalistic actors in Philadelphia—the entire ecosystem, as it were. To some degree, I'd been primed to think this way by my own decade-long work as a journalist-activist and blogger, using the internet to cover stories that were being ignored or misrepresented by what we dismissively called, at the time, the "mainstream media."

While this made conceptual sense, how I could I possibly justify it methodologically? Howard's article, discussed in detail above, offered one path forward. Using a social network analysis of digital space, one could locate the central hubs of the journalistic ecosystem in Philadelphia, along with the different connections between them. The key here would be to *localize* the network map as much as possible; while I was interested in the penetrations between local news in Philadelphia and larger national and international news organizations, I was first and foremost concerned with the way digital information flows mapped onto geographical space. To that end, I constructed two digital network maps, drawing on what, in retrospect, appear to be two highly primitive forms of online social network analysis, using data compiled through both a free website service called "Issuecrawler" and also making a research partnership with a local New York City company called Morningside Analytics. Morningside Analytics "draw on social network analysis … to uncover Attentive Clusters—communities, large or small—that share knowledge and focus attention on particular sources of information and opinion.. Issuecrawler was "web network location software, consist[ing] of a crawler, a co-link analysis engine and three visualization modules. It … crawl[ed] specified sites, captures the outlinks from the specified sites, performs co-link analysis on the outlinks, returns densely interlinked networks, and visualizes them in circle, cluster and geographical maps." The two these maps of the Philadelphia media ecosystem (see Fig 1 and Fig. 2) gave me an early, rough sense of what newsrooms I should observe, what bloggers I should interview, and so on.

Even before I began the later stages of my analysis, it was possible to draw several early clues about journalism in Philadelphia from the social network maps, subject, of course, to further ethnographic verification. On the Morningside Analytics map the structure of the Philadelphia media sphere was fairly clear—there was a powerful, centralized core of A-list blogs, and an increasingly less powerful but large secondary list. Unlike other online maps analyzed by Morningside Analytics, the dominant structural feature of the Philadelphia blogosphere was the divide between key bloggers and "everybody else," a distinction that transcended differences in political ideology or subject matter. Within this center core (Fig 1.3), two additional sub-groups emerged: a more dominant; cluster that was largely professional, often paid, and primarily news focused (the 8 blogs on the center left), and a second group, running off commercial blog software like Blogger or Wordpress, whose content appeared more personal and narrative oriented, and less newsy.

On the issue crawler map, on the other hand, two main clusters appeared. The first was similar to the central blog cluster that appeared on the Morningside Analytics map and included many of the same websites. A second cluster, however, emerged around a cluster of national left-leaning political blogs, located near the top of the map. One of my initial speculations was that there existed a special category of “bridge blogs” between these two clusters, a set of blogs that wrote about both local and national issues and thus brought local issues to the attention of a national audience. Finally, local, non-“bloggy” websites like septa.org, readingterminalmarket.org, philamuseum.org, appeared on the far fringes of the issue crawler map.

It is important to state for the record here that these social network maps only served as a general analytical guide. I wanted avoid letting my view of Philadelphia media become “over-structured” by the visual representation of a mathematical algorithm. To aid in that effort, I supplemented my maps with a much more substantive ethnographic approach to choosing my field sites, I began this process by attending a large conference in Philadelphia in March of 2006 that invited professional and amateur journalists to discuss the future of local news in Philadelphia. Spurred by the pending sale of the *Philadelphia Inquirer* and *Philadelphia Daily* News, the conference would go on to play a large role in my dissertation research. This in-person work was important insofar as it served as a methodological check when choosing field sites and interviewees. Another relevant theoretical inspiration for the project-- actor-network theory, with its emphasis on the work needed to both “construct the social” and its skepticism towards letting pre-existing structures dominate our empirical thinking-- also helps serve as a methodological check-- asking, as it does, for us to slowly and carefully follow our various actors in and out of the networks they inhabit.

A bit more here about the nuts and bolts of the research itself. Like much ethnographic work, I didn’t attempt to make sure my study was “representative” in any larger way, although I did pick Philadelphia as an area of study in part because it seemed slightly more representative of the larger urban news ecology than, say, New York or London. That said, it was unique in its own ways- it had two newspapers (a tabloid and a broadsheet) owned by the same company that still competed with each other. My research was comprised of six months of newsroom-based fieldwork, from the spring until the fall of 2008 (starting at the *Philadelphia Daily News* and then moving to *Philly.com* and *The Philadelphia Inquirer).* This fieldwork was preceded by over a year of interviews, attending conferences and Meetups, and conducting historical research, from the fall of 2006 until the winter of 2008. I conducted over 40 interviews during this time as well. My ethnographic research was followed by another year of follow up visits and interviews.

The Madison News Ecology

Anderson explained to me his method at an International Symposium for Online Journalism conference as I was feeling dismayed at the array of methodological choices for my research questions. Like him, I also wanted to document a media ecology as it was being reconstituted by social media, and to understand fully the content and direction of the information flow through a local community. Documenting the actors themselves was straightforward and I'd spent a summer doing so already. But then what? I wanted to explore power dynamics in that flow and how social networks - virtual and real-world -- dictated that ecosystem. I had chosen a topic that would touch on issues of power, be ubiquitous in both mainstream online/offline news sites and alternative media such as ethnic media and blogs. The K-12 racial achievement disparities in Madison, Wisc., was a problem in many communities across the United States. The topic was made more salient in Madison because a non-profit organization called the Urban League of Greater Madison was proposing a public charter school to be funded by the school system but to only educate Black boys and girls. The proposal in the summer of 2011 -- with a deciding vote by the Madison Metropolitan Board of Education in December of that year -- ignited a vigorous community debate about the causes of the racial gaps that were some of the worst in the country as well as disagreement over the best course of action to fix them. The local media wrote extensively about the proposal as did bloggers and those posting to public Facebook pages. The conversation was at times striking for its level of racism and unhelpful diatribes and also thoughtful and deliberative, depending on the platform and individuals participating. I noted that entire groups of people seemed to be left out of the public discussion, while others dominated, influencing the decision.

I already knew that community ethnography combined with textual analysis of the coverage and deep interviews with those writing would give some of what I wanted to know about the information flows. But these techniques on their own did not seem up to the task of also revealing the ways in which the information flow experienced hiccups and diversions because of power dynamics. They did not seem like they would help me identify opportunities in the ecology for subversion and change or to amplify typically marginalized voices. "Network ethnography" seemed to be the answer.

As noted in the literature review above, scholars had widely adopted Howard's original idea according to individual project needs. I knew I needed to start with documenting the networks to understand where to go from there. I hired a team of graduate students, including the brilliant Ho Young Yoon to help me collect and code the entire information flow around the topic of racial achievement gaps in K-12 schools from September 2011 to September 2012. This whole network comprised 1,287 news articles, blogs, websites, and public Facebook posts. We coded each of these for the author and their role in the community (such as politician, expert, teacher, parent, etc.), who was quoted directly, who was mentioned, any links, and what kind of evidence the article used (such as databases, information from a meeting, professional experience, personal experience, etc.). We ended up with 6,331 relationship coding entries. Intercoder reliability was 0.925. In UCINET as well as Node XL, this material became graphs and maps that showed who was citing whom or otherwise connected to whom in the public information exchange of Madison as well as who was most influential in this exchange. In these affiliation, two-mode networks, one node was the authors and the other node was the content. See Table 1 to see how we could see which actors in the flow helped direct the network more than others, such as professional journalists. The visual depiction of the information flow revealed where communities of talk were happening in Madison (See Figure 1) and made stark the not only how much dialogue was happening on digital platforms compared to newsprint, but also how much of that conversation was happening in isolated silos with limited connections. All this information also showed us who was acting as gatekeepers -- that is, those people who can broker information across so-called structural holes in a network where few links exist.[2] The nice thing about this whole network is that we could isolate ego networks (all the relationships of one actor) and compare them to others (see Figure 2); this was useful to see, for example, how our most prolific activists compared to our mainstream journalists in terms of information exchange about K-12 achievement gaps. And most importantly for my research questions, it showed us who might be tapped to help journalists expand their source pool.

I used the list of influential and engaged actors from the network analyses to create my sample for in-depth interviews as well as to target the community entities that I should be observing closely. I was hoping that this kind of fluid sampling would stave off criticism that often comes with snowball interviewing in traditional ethnographies. I hired another team of graduate students to interview 71 journalists, community leaders and activists, teachers, bloggers, frequent commenters in online spaces on this issue, politicians and others who showed up in our analyses. But I was also interested in amplifying those voices we didn't see in this network. And this called for talking to people who were *absent.* So I also conducted three focus groups with parents -- mostly parents of color, but some who had kids of color in the school district -- who did not show up in this network but whose lives were affected by K-12 racial disparities on a daily basis. These interviews and focus groups allowed me to explore my questions of power dynamics as people answered questions about why they acted -- or did not act -- the way they did in the information flow, what the obstacles to public talk about this issue were, and what best practices might be used to improve the often vitriolic nature of this content.[3]

Discussion and Conclusions

[2] For more on brokers and gatekeepers, see Burt (2005).

[3] This was essentially the network ethnographic portion of the project. We did scale the project to complete four additional micro-case studies of other cities in the United States (Chapel Hill, NC, Evanston, IL, Ann Arbor, MI, and Cambridge, MA). In those cities we documented the media ecology but did not conduct any network analysis because resources meant we could not capture an entire, whole network. We did download and code (for themes in traditional textual analysis) all news articles and blogs about the racial achievement gaps in these cities over a five year period and then interviewed those who appeared to be cited the most and who authored the most during that time period. This part of the study resulted in analysis of another 2,479 pieces of content and transcripts for another 49 people. I also interviewed 10 international experts on racial dialogues to help me come up with recommendations for improved information exchange in these cities.

The study of media ecologies should not be limited to qualitative approaches, but qualitative research *does* seem to align particularly well with the turn toward media ecosystem analysis in journalism and communication scholarship. Qualitative methods yield holistic documentation that can help capture an ephemeral, constructed knowledge through in-depth interviews, textual analysis, and other techniques in the ethnographic approach. Such triangulation of method allow for a bricolage of evidence that interprets the mediated, ecological-based phenomenon at hand. Qualitative inquiry investigates richly, deeply, and thickly the landscape of the news ecology, which is ever evolving and as such, a difficult challenge for many researchers. The challenge comes in identifying that landscape to begin with -- with all its corners and dips, its mountains and absences.

But foregrounding such study with a quantitative-based network analysis can help pin down more concretely something like a fickle and fluid, yet also highly structured and hierarchal ecosystem. Such modeling offers a launching pad for deeper understanding of the power dynamics at work, the identity constructions at play, capital being gained and spent, and ideology being exerted in rapidly shifting journalistic spaces. The mapping of the networks forces a spatial dimension to the exercise of media ecology study. One can visually depict the relationships and interactions at work in a way impossible with other methods, qualitative or quantitatively (except other kinds of modeling of course). In other words, the technique establishes for the researcher the landscape, drawing out borders for an otherwise nebulous world and helps us overcome the challenge posed by Hine (2005, p.2): "when we set out to research social interactions we cannot specify in advance just what form those interactions will take, nor how we will be able to participate in or observe them."

The temporal consideration, however, loomed large in these cases: Once captured, the network maps were almost immediately out of date in these media systems, which change constantly. The maps must be worked with as a snapshot in time (unless done periodically throughout the study). And as we stated above, ecologies are far from static systems. Researchers must incorporate this consideration in, for example, the development of the interview template, asking people to remember back to that point of time while also documenting any evolutions through the ethnographic portion of the study.

This limitation was far outweighed by the localized, spatial, boundaried characteristics of the snapshot. For the Philadelphia and Madison case studies, it provided the fundamental geographical essence necessary for these place-based narratives to be discovered and told. For both studies, we could decipher the levels of influence in the flows of information, illuminating the sphere of dominating news organizations and major blogs as well as the startling isolation of other actors not in the mainstream. Furthermore in both studies, these preliminary network maps served as a talisman or guide only -- and individual researchers can determine how much emphasis one wants to place on this phase of the study. The real appreciation of the full scale and operation of these ecologies depends generally on closer ethnographic work.

That said, a number of logistical limitations also revealed themselves in the course of these network ethnographies. Most importantly, ethnographies on their own entail massive amounts of time and resources, and adding on to that something as onerous as network analysis can make such a methodology prohibitive for many researchers. The Philadelphia study lasted more than four years and probably could have only been done by a single researcher who was doing it as a dissertation project with relatively "unlimited" time and few additional research commitments. The Madison project consumed about five years of data collection, teams of 16 graduate students and more than $250,000 in internal and external funding. Such a project requires a commitment not only by the researcher but also by his or her home institution. In addition, qualitative researchers might feel intimidated by augmenting their repertoire of methods with network analysis, which is an entire field of study in and of itself. As we saw in the literature review as well as with the Philadelphia case, the extent of this phase of study can be determined by the researcher and her available resources. Any part of this method can be scaled back, as we see in the various applications in the literature review and indeed, even within these two cases themselves.

An additional limitation lies in the question of what we mean by a "local," "urban," or "geographically limited" when it comes to the digital and nondigital forms of news being produced today. Bruno Latour jokes darkly that you know you have "followed your actors" far enough when you have written a manuscript about the length of a book. A similar question arises when looking at local media ecosystems. What does it mean to say a news source is local? How much of a role do national or even international news sources play in setting the media agenda for a particular place? This question is increasingly important in our current era of "platform politics" (Gillespie 2010) where large global technology companies like Facebook and Twitter dominate so much of our mediated universe. Researchers conducting analyses of news ecosystems should always keep in mind that much of the action might be occurring, as it were, offstage.

Despite these limitations, we remain convinced that the methodology of the network ethnography retains great potential for the investigation of the rapidly shifting dynamics of digital era information environments. The combination of quantitative, network approaches and qualitative ones also speaks very well to our era of big data. Nevertheless, much of this potentiality remains unrealized. We hope that this brief overview will encourage other scholars to follow our methods, and build on them.

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