# Building Shared Environmental Governance for the Future:

## The Case of a Community COIN

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**Abstract**

This case[2] illustrates the use of mixed methods for analyzing structure, content, and sentiment of a city council task force appointed to guide the city[3] in updating their oil and gas drilling ordinance. The novel methods approach integrates linguistic conversation analysis and social network influence to analyze the

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EAGER: Integrating the Analysis of Decision-Making in Meetings with the Analysis of Network Interactions in the Study of Environmental Governance. 2014. Award Number:1408169.
https://www.nsf.gov/pubs/policydocs/pappg18_1/pappg_2.jsp#IIE2
Last accessed on May 24, 2018.

Note: EAGER means EArly-concept Grants for Exploratory Research

EAGER is a type of NSF proposal used to support exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches. This work may be considered especially "high risk-high payoff" in the sense that it, for example, involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives.

[3] Note: “the city’s” name remains anonymous as per research agreement.

interactions among stakeholders over time as they occur both inside and outside formal meetings. The case study also represents a practical example of conducting e-Research where a small team of four researchers shared a cloud-based PC as a collaborative space for cost efficiency, data sharing, and as an educational tool for team members working across mixed PC and Mac operating systems.

Although this research is a single case study of one community, the data sources and methods can be scaled to include multiple communities, or to a larger geographic area that could include a county, state, region or an entire country. The authors identify traditional methods that can take advantage of data analytics enabled by new technologies.

## Introduction

Environmental governance is increasingly shifting from a top-down approach, in which bureaucrats and scientists make decisions, to a 'participatory' approach, in which representatives of diverse stakeholder groups make decisions collaboratively despite the fact they often have competing interests (Buck et al. 2001; Folke et al. 2005; Wondolleck and Yaffee 2000). Implementing the goal of giving all stakeholder groups a voice has proved challenging. Most studies have focused their analysis either on the stakeholder meetings where decisions are negotiated (Dewulf et al. 2011; Dewulf and Bouwen 2012; Roncoli et al. 2011), or on the broader interactions among networks of stakeholders outside of those meetings to influence those meeting decisions (Ostrom 2009; Carlsson and Sandstrom 2008; Lubell 2013; Nagendra and Ostrom 2012). On their own, each of these approaches has serious limitations. The study's overall objective was to develop a new methodological approach that integrates the analysis of meetings and network interactions. This paper is about the community collaborative innovation network (COIN) that worked to create a new city ordinance to build a shared future for environmental governance. We do not attempt to describe all of the methods, tools, analytical strategies, and findings in the study. The case example illustrates two innovative features that contributed to a comprehensive analysis of multi-stakeholder environmental governance: 1) a novel methodological approach to investigate multi-stakeholder dynamics that enabled us to integrate longitudinal analysis of meeting interactions with the email interactions happening outside the meetings; and 2) a practical example of conducting e-Research where a small team of four researchers shared a cloud-based PC as a collaborative space for cost efficiency, data sharing, and as an educational tool for team members working across mixed PC and Mac operating systems. We discuss each of these features and conclude with a discussion of future opportunities for researching networked environmental governance.

## Methodological Integration of Conversation Analysis Data and Email Data

Our case example illustrates conversation analysis combined with network analysis of meetings as well as network analysis of email exchanges outside the meetings. Figure 1 is a graphical summary of all of the study's data sources, study design, methods and the software used in analysis and for the research team to collaborate virtually.

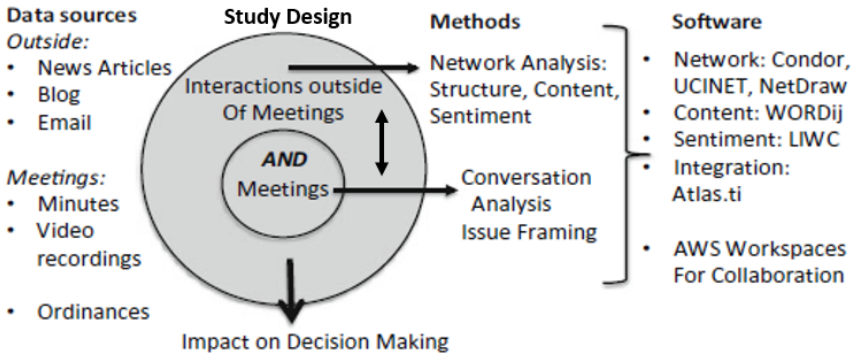


**Fig. 1.** Data Sources, study design, methods, and software utilized in the study

The study site for our research was a city in the United States whose city council had recently decided to update its ordinance on gas well drilling, because of the rise of hydraulic fracturing in the area. The city council appointed a commission of five people to hold a series of eleven public meetings over a three-month period to make recommendations to the city to revise their current gas well ordinance. We were able to gather the personal email archives of three out of the five commission members. There was enough overlap in the commission practice of copying each other on all commission related email that we were able to create an accurate network of the commission's email communication over time. See the endnote[i] for a detailed technical discussion about the email data collection process.

The commission's meetings were open to the public and all the meetings were video recorded. A city staff member took meeting minutes, and they were published on the city's website. We prepared extended transcripts by watching the videos, and using the meeting minutes as a start, we wrote turn-by-turn notes on what meeting participants said. We then analyzed these extended meeting transcripts qualitatively using the principles of conversation analysis in which each turn is noted according to start and end time for each speaker, and the content of the speaker's talk is recorded and coded for type of issue frame (IF), for example, regulation, community concern, benefits of drilling, and for type of

interactional moves or conversational analysis (CA) such as giving information, asking for clarification, and so on (Wasson 2016).

To integrate the analysis of the meeting transcripts and the email network data, we took the results of the conversation analysis and reformatted the sequence of speaker turns as network links, as shown in Figure 2. Each speaker was assigned a unique identification number, A through H. The conversation analysis provided the data to size the nodes by the number of seconds each person spoke during the meeting, and to show the link strength between nodes by referencing the number of turns speakers took in conversation with one another.

**From:**
Conversation Analysis Format:

| Turn | Start Time | End Time | Total Turn Time | Speaker | Content | IF | CA |
|---|---|---|---|---|---|---|---|
| Introduction | | | | | | | |
| 1 | 0:00 | 4:03 | 4:03 | A | Opened Meeting, reviewed agenda | IF coding | CA coding |
| 2 | 4:03 | 4:30 | 0:27 | B | . . . abbreviated transcript . . . | IF coding | CA coding |

**To:**
Network Analysis Format

| Speaker's or Nodes are assigned unique Ids | | Sequence of Speaker Turns are Reformatted as Network Links: FROM this speaker TO this speaker | |
|---|---|---|---|
| Id | Node | From Id | To Id |
| 1 | A | 1 | 2 |
| 2 | B | 2 | 3 |
| 3 | C | 3 | 1 |

**Fig. 2.** Conversion of conversation analysis format to network analysis format

The conversion enabled us to compare the From-To network in a meeting with the From-To email network outside the meeting and apply the structural network centrality measures at the individual and group level to examine interactions and understand the influence of relationships among stakeholders on decisions and how individual social actors might have influenced the decision-making process. Figure 3 is an example of a conversion of meeting interactions into a network graph. The graph is thus a visualization and quantification of the entire meeting. We used the Friedkin and Johnson (2011) social influence network theory and the model for the evolution of social influence networks (Friedkin 2014) to calculate and predict the decision-making, in this case the voting of commission members.

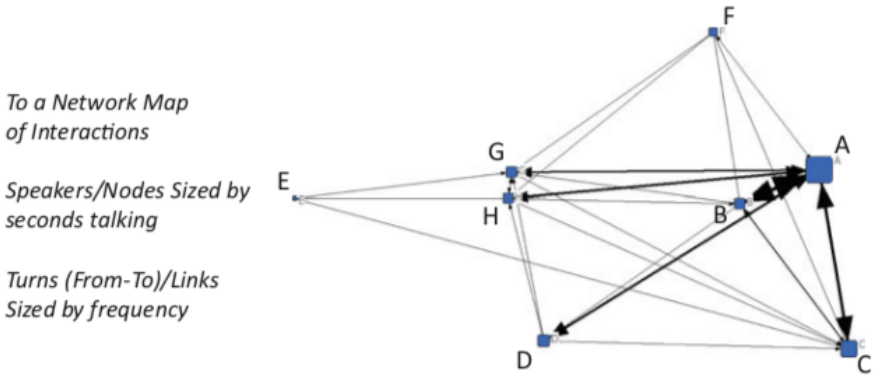


**Fig. 3.** Example of converting meeting interactions from transcript to network graph

## Multi-Stakeholder Dynamics in Environmental Governance

We applied the concept of social influence network theory to the first commission deliberation decision-making meeting and email network data two weeks pre- and post-meeting. Figure 4 shows that there were eight people, labeled A through H, who participated in the commission meeting including five commission members, a city facilitator and two city staff members. The people in the network with the identification numbers P01 through P13 interacted with commission members in the two weeks leading up to the first meeting. In the two weeks after the meeting, three people joined the email network (labeled A01 through A03) who were not part of the network prior to the meeting. There were also three people (P01, P04 and P05) who participated in the pre-meeting email network who did not take part in the email exchange in the two weeks post-meeting.

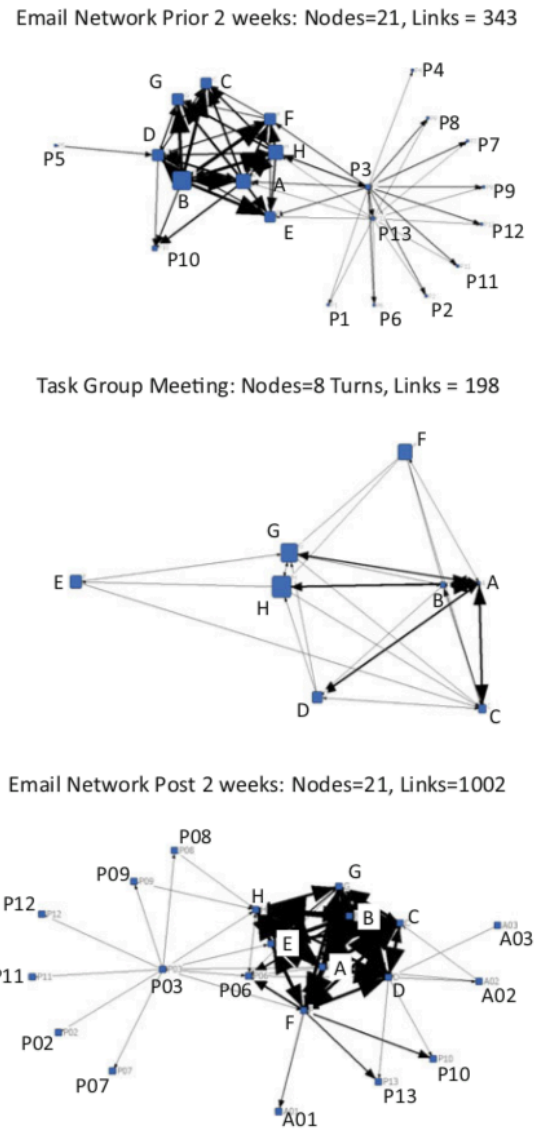


**Fig. 4.** Integration of social influence networks inside the first commission meeting and during the two weeks pre- and post-meeting. All nodes are sized by eigenvector centrality. Links are sized by from-to frequency.

The analysis both inside and outside the meeting led us to several insights about social influence. First, it is clear that the city facilitator, node A, played the most prominent role in the meeting. The facilitator had less of an influence in the interactions pre- and post- meetings, but he was still an important person based upon his eigenvector centrality score. Second, nodes E and F, who represent city

staff that interacted with commission members via email outside the meeting, had minimal influence within the meeting interactions. Third, one industry commission member, node B, had consistent influence both outside and inside the meeting. The two members of the commission who represented the voice of the environmentalists, nodes G and H, were also consistent in their influence pre-, during, and post-meeting, but they had less influence in general than the industry members. Fourth, it is possible to see that there was a wider group of people who interacted with the commission members and city staff prior to the first meeting, labeled P01 through P13, however, their influence on commission members appeared to be minimal. This analysis of meetings and email networks over time represented for us a novel methodological approach to investigate multi-stakeholder dynamics in the case of environmental governance.

## e-Research Approach

Our team collaborated online as well as face-to-face to conduct the research we describe in this paper, as the research team was mobile and located in different states across the U.S. Our work online fulfilled both social and technical needs. We used an online platform, Amazon Workspaces,[4] which allowed us to share our work across both PC and Mac operating systems and provided an automatic backup of our data. However, only one person could access the Workspace at a time, which we managed by sending each other texts asking to access the online space and to let each other know when our work was concluded. Any one of us could also demonstrate different techniques and discuss issues such as data preparation and coding and resolve technical problems as they arose. We were able to use a Dropbox folder inside the Amazon Workspace to store and share project documents. Dropbox facilitated integration of documents created outside the Workspace into our analysis software that we had installed in the Workspace. Online collaboration accommodated our team members' distributed locations and mobility, reduced our costs because we did not need to purchase dedicated computers, only one software license was required, and the services were free or billed monthly.

The study presented in this paper represents an example of what Myer and Schroeder (2009, 2015) are calling e-Research, "defined as the use of digital tools and data for the distributed and collaborative production of knowledge" (Kindle loc. 91 of 3408). E-Research is based on the understanding that the Internet and its associated infrastructure are enabling collaboration and advances in research

[4] http://aws.amazon.com/workspaces/

practices that cross and connect multiple disciplines and domains (Meyer and Schroeder 2015). The e-Research that supported the collaboration in our own small team has the potential to expand and be extended to a large community of researchers studying environmental governance and governance in general.

## Conclusion and Opportunities for Future Research

In the age of networked governance that crosses both the public and the private sectors and includes multiple stakeholders with differing interests and concerns, it is important to understand how interactions among stakeholders take place over time in multiple ways. Our case example of a community COIN, a commission appointed by a city to help with the creation of a new ordinance to govern oil and gas drilling, illustrates how we can examine both formal and informal interactions. We were able to analyze interactions and social influence among the commission and city officials inside the meetings and pre- and post-meetings among the commissioners and others in the community using publicly available data and the archived emails that commissioners generously granted us permission to use. The methodological approach integrated qualitative and quantitative analysis as well through the conversion of conversation analysis and turn-taking to network data. We suggest that the analysis process illustrated in our example can be scaled to examine networked governance in other multi-stakeholder environments where publicly available data can be obtained at the county, regional, state, or country level.

Our analysis was conducted after the ordinance was officially adopted. However, future researchers might attempt to conduct interaction analysis in near real time and perhaps provide feedback and counsel while the decision-making is in progress. With the advances in artificial intelligence and analytical software, it might be possible to automate some of the qualitative data capture and the analysis of qualitative data as well as the data conversion process we describe in our example.

## References

Buck, L. E., Geisler, C. C., Schelhas, J., & Wollenberg, E. (Eds.). (2001). *Biological diversity: Balancing interests through adaptive collaborative management*. Boca Raton: CRC Press.

Carlsson, L., & Sandstrom, A. (2008). Network governance of the commons. *International Journal of the Commons*, 2(1), 33–54.

Dewulf, A., & Bouwen, R. (2012). Issue framing in conversations for change: Discursive interaction strategies for "doing differences". *Journal of Applied Behavioral Science*, 48(2), 168–193.

Dewulf, A., Gray, B., Putnam, L., & Bouwen, R. (2011). An interactional approach to framing in conflict and negotiation. In W. A. Donohue, R. G. Rogan, & S. Kaufman (Eds.), *Framing matters: Perspectives on negotiation research and practice in communication* (pp. 7–33). Peter Lang: New York.

Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources*, 30, 441–473.

Friedkin, N. E. (2014). Social justice in local systems of interpersonal influence. In J. McLeod, Lawler, & M. Schwalbe (Eds.), *Handbook of the social psychology of inequality* (pp. 229–242). New York: Springer.

Friedkin, N. E., & Johnsen, E. (2011). *Social influence network theory: A sociological examination of small group dynamics*. Cambridge: Cambridge University Press.

Lubell, M. (2013). Governing institutional complexity: The ecology of games framework. *Policy Studies Journal*, 41(3), 537–559.

Meyer, E. T., & Schroeder, R. (2009). The world wide web of research and access to knowledge. *Journal of Knowledge Management Research and Practice*, 7(3), 218–233.

Meyer, E. T., & Schroeder, R. (2015). *Knowledge machines: Digital transformations of the sciences and humanities (infrastructures)*. Cambridge: MIT Press.

Nagendra, H., & Ostrom, E. (2012). Polycentric governance of multifunctional forested landscapes. *International Journal of the Commons*, 6(2), 104–133.

Roncoli, C., Orlove, B. S., Kabugo, M. R., & Waiswa, M. M. (2011). Cultural styles of participation in farmers' discussions of seasonal climate forecasts in Uganda. *Agriculture and Human Values*, 28(1), 123–138.

Wasson, C. (2016). Integrating conversation analysis and issue framing to illuminate collaborative decision-making activities. *Discourse & Communication*, 10(4), 378-411.

Wondolleck, J. M., & Yaffee, S. L. (2000). Making collaboration work: Lessons from innovation in natural resource management. Washington: Island Press.

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[i] **Documentation: Collecting Email for Automated Network Analysis**

There were three ways that we collected email for network analysis using Condor (available at http://guardian.galaxyadvisors.com/) and to export data to other network analysis programs:

1) Using the Condor network analysis software itself to gather email from a web server, for example Yahoo or Gmail programs.
2) Locating a Microsoft Outlook .pst file on a hard drive and converting it for analysis using Condor
3) Obtaining email in another type of software program, such as Winmail that was built into the Windows Vista operating system.

**1) Condor and Collecting Email**

The Condor software program has a mail collector built into it which allowed for retrieving email that is stored on an imap or pop server. To retrieve email using Condor there are basic steps:

1. Open the Fetch Mail function in Condor
2. Complete the mail form. It is possible to collect just structure (From-To) or both structure and content.
3. Once the "start" is clicked, authentication to the mail server is accomplished and mailboxes can be selected for download into Condor. It might take a while to download the mail if there are thousands of emails. See the instructional video available on YouTube at: http://youtu.be/BFo57cz9Jx0

**2) Collecting email from Outlook on a PC:**

There are multiple versions of Outlook. They all use .pst files. The goal was to archive a .pst of the email and then move it to a usb drive.

1. Create a new .pst (e.g. Name_EAGER.pst)
2. Create a new folder to save the email in the new .pst

3. Search for emails in Outlook using key words or just by scrolling through the email box on Outlook. Ideally there is a specific folder (Inbox, Sent, Project) and it is possible to copy the contents of the folder to the newly created .pst.
4. Use Windows Explorer to copy the new .pst to a USB drive.
5. Note: Condor does not analyze any attachments to email, only the email itself.
6. Convert the Outlook .pst emails to a Eudora format that Condor will analyze. For more information about saving data to .pst files see: http://office.microsoft.com/en-us/outlook-help/create-an-outlook-data-file-pst-to-save-your-information-HA010355677.aspx

**3) Collecting Email from a Winmail program on a PC running Vista on older PCs, which is often the case in small community governments:**

1. Open Winmail and locate the mailbox(es) with the email to be collected for analysis.
2. Create a new folder on the PC's desktop to store the emails that will be copied for analysis.
3. Scroll through the emails in the Winmail folders and copy each of the relevant emails into the new desktop folder simply using the "copy" and "paste" commands. The emails will have the extension .eml. Copy the desktop folder to a usb drive.
4. On another PC with Winmail installed and running Microsoft Outlook, copy the folder from the USB drive to the PC's desktop. Using the import functions, import the emails first into Winmail and then from Winmail into Outlook. Then follow the steps to collect email from Outlook in item number 2 above.