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Abstract

Virtual teams and other online groups can find it challenging to establish norms that allow them to effectively balance task and relational aspects of their discussions. Yet, in our reliance on organizational and team theories, small group scholars have overlooked the potential for learning from examples offered by online communities. Theories of deliberation in small groups offer scholars a way to assess such discussion-centered self-governance in online groups. The study operationalizes the conceptual definition of deliberative discussion offered by Gastil and Black (2008) to examine the small group discussions that undergird policy-making processes in a well-established online community, Wikipedia. Content analysis shows that these discussions demonstrated a relatively high level of problem analysis and providing of information, but results were mixed in the group's demonstration of respect, consideration, and mutual comprehension. Network visualizations

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reveal structural patterns that can be useful in examining equality, influence, and group member roles. The combination of measures has implications for future research in deliberative discussion and virtual teamwork.

Keywords

computer-mediated communication (CMC), deliberative discussion, online communities, virtual teams

Group research has a long history of studying both task and relational communication, and these aspects are interwoven in group life. When work groups collaborate on a project, their success depends somewhat on both task and relational dimensions of their discussions. For virtual teams and other online groups, the balance of task and relational communication can be difficult to achieve, especially when most of their discussions occur through computer-mediated communication. Establishing a shared understanding of the rules that should govern group members' behaviors can be key to the success of an online group. This process of self-governance is especially relevant when groups are spatially and temporally dispersed and have members who may hold vastly different expectations about group work.

The scholarship on virtual teams and online discussion can be informed by recent research that examines social interaction in computer-mediated spaces. In particular, scholars interested in online communities have started to look at wiki systems, which offer innovative collaborative systems for people to work toward project goals. Communities such as Wikipedia offer a wealth of data for group researchers and others interested in understanding how people accomplish successful collaboration through social media. Wikipedia also offers an interesting context in which to study self-governance because members of this online community engage in collaborative policy-making that emphasizes discussion, consensus, and both task and relational communication.

This study investigates policy-making discussions on Wikipedia with an eye toward informing future research on virtual teams and online discussion. We develop a content analysis tool for assessing the extent to which policy-making discussions adhere to idealized models of high-quality group deliberation. We wed that tool to social network visualizations in a way that highlights both the structure and meaning of social interaction. This combination of methods provides an innovative way to assess task and relational dimensions of interactions as well as examine the interactive processes associated with development of both formal rules and informal norms in online groups.

Review of Literature

Deliberative Discussion

A good way to closely examine task and relational aspects of group decision making is to turn to the literature on deliberative discussion. Deliberative discussions are decision-oriented conversations in which a group weighs pros and cons of different options, articulates core values, and makes choices in a way that is respectful, egalitarian, and open. This general definition is based in theories of small group democracy, which has a long history in group research dating back to John Dewey (1910) and Kurt Lewin and his colleagues (Lewin & Lippitt, 1938; Lewin, Lippitt, & White, 1939). Current small group scholars such as John Gastil (1993, 2008) have provided theoretical models and empirical studies of deliberative discussion, and Keith's (2007) recent book chronicles the history of public discussion in the United States.

Some of this history manifests itself in the deliberative democracy movement, which is founded on the idea that policy decisions ought to be made through well-reasoned discussions of groups of people who will be impacted by the policy (Cohen, 1996, 1997; Habermas, 1989). The past 20 years have seen a groundswell of deliberative events such as National Issues Forums, Deliberative Polls (Fishkin, 1991), and Twenty-first Century Town Meetings (Lukensmeyer, Goldman, & Brigham, 2005) that gather citizens together in small groups to discuss public or political issues of relevance to their community.

A burgeoning body of research has examined the theory and practice of public deliberation (for a review, see Delli Carpini, Lomax, & Jacobs, 2004). This scholarship demonstrates a strong theoretical foundation in aspects of group discussion such as problem analysis, rational argument, and consensus (Cohen, 1996, 1997; Habermas, 1989), as well as sociorelational aspects of group interaction such as respect, conflict management, and dialogue (Asen, 1996; Black, 2008; Bohman, 1995; Burkhalter, Gastil, & Kelshaw, 2002; Gutmann & Thompson, 1996; Pearce & Littlejohn, 1997). Gastil's (2008; Gastil & Black, 2008) recent conceptualization of deliberation encourages attention to both the analytic and social aspects of deliberation and offers concrete dimensions of deliberation that can be operationalized for a variety of contexts. This definition is closely tied to democratic theory, but it also parallels the widely accepted distinction between task and relational communication in small group scholarship (e.g., Bales, 1950; Hirokawa & Salazar, 1999; Keyton, 1999).

Gastil and Black argue that people are deliberating if they "carefully examine a problem and arrive at a well-reasoned solution after a period of inclusive, respectful consideration of diverse points of view" (2008, p. 1). The five analytic aspects of deliberation, according to this definition, are *creating*

an information base, prioritizing key values at stake, identifying a wide range of possible solutions, weighing the solutions, and (in situations that call for decisions) making the best decision possible. The analytic dimension of this definition draws explicitly from group decision-making research coming from the functional perspective (Hirokawa & Salazar, 1999; Hollingshead et al., 2005) and offers a way to assess how well groups achieve the problem solving, analysis, and decision-making tasks.

Deliberation also involves four social components. All participants should have *equal and adequate speaking opportunities*, attempt to *comprehend one another's views*, make efforts to *fully consider each other's input*, and demonstrate *respect* for each other. These social dimensions of deliberative discussion embody aspects of relational communication that have been frequently studied in small group research (see Bales, 1950; Keyton, 1999). The analytic and social attributes of deliberation manifest themselves differently in different contexts, but Gastil and Black offer specific suggestions for how each element can be operationalized in small group discussions. Their suggestions, presented in Table 1, form the foundation for the coding scheme used in this research.

Deliberative discussion is clearly relevant for jury discussions, citizen forums, and community groups engaging in self-governance (see Gastil, 2008). Yet, this conceptualization's balance of task and relational communication is potentially relevant to all small groups, and especially highlights some of the challenges faced by work-oriented groups such as teams. We maintain that even those decision-making groups that are not explicitly declared to be democratic can benefit from a better understanding of how to balance the analytic and decision-making tasks with the social and relational aspects of their work. Task groups and teams that must fairly discuss different options, make decisions, and collaborate on projects should still go through processes that are analogous to the analytic components of deliberative discussion. Moreover, the relational aspects of teamwork are similar to the social components of deliberation because of the shared emphasis on equality, respect, and mutual understanding.

Online Discussion and Virtual Teams

This balance of task and relational communication is especially important for virtual teams and other groups whose work primarily or exclusively happens via computer-mediated communication (CMC). Because CMC provides limited access to group members' nonverbal cues and simultaneously draws attention to other communicative cues (Walther, 1996; Walther & Parks, 2002), online groups must learn to communicate in ways that are responsive to their mediated environment. CMC has become a feature of everyday life for many

Table 1. Key Features of Deliberative Conversation and Discussion

	Conversation/discussion behavior
Analytic process	
Create information base	Discuss personal and emotional experiences as well as facts
Prioritize key values	Reflect on your own values as well as those of others present
Identify solutions	Brainstorm a range of different solutions
Weigh solutions	Recognize limitations of your own preferred solution and advantages of others
Make best decision	Update opinion in light of what you have learned. In some discussions, no joint decision need be reached
Social process	
Speaking opportunities	Take turns in conversation or ensure a balanced discussion
Mutual comprehension	Speak plainly and ask for clarification when confused
Consideration	Listen carefully to others, especially when you disagree
Respect	Presume other participants are honest and well-intentioned. Acknowledge their unique experience and perspective

Source: From Gastil and Black (2008).

people (Pew Internet & American Life Project, n.d.) and groups often find themselves collaborating via technologies such as email, discussion boards, wikis, or other web 2.0 technologies.

Recent years have seen an enormous growth in the study of CMC and new media use (D'Urso, 2009). A number of researchers have examined democracy online, including studies that assert that CMC has the potential to promote civility and democratic discussion (Papacharissi, 2004; Weiksner, 2005), revive the public sphere (Papacharissi, 2002), and encourage civic participation and engagement (Bucy & Gregson, 2001). Deliberative scholars have begun to turn their attention to online groups (e.g., Coleman & Gotze, 2001; Dahlberg, 2001; Davies & Gangadharan, 2009) and many forum organizers have begun to incorporate aspects of CMC to either supplement or replace face-to-face interaction (e.g., Cappella, Price, & Nir, 2002; Fishkin, 2009; Lukensmeyer et al., 2005). This trend toward online civic engagement can even

be seen in the Obama Administration's recent attempts to engage citizens in discussion of national issues through discussion on the Open Government Dialogue website.

Deliberative discussion as envisioned by group democracy scholars is also suitable to some challenges faced by virtual teams. The growing body of work on virtual teams shows that it is an increasingly common way of organizing small group work within and across organizations (Poole & Zhang, 2005). The larger trends toward globalization, network-structured or matrixed organizations, and flexible work arrangements within organizations make virtual teams very useful. Many scholars have taken up the call to study what makes virtual teams successful by looking at outcomes such as effectiveness (Hardin, Fuller, & Valacich, 2006; Staples & Webster, 2007; Timmerman & Scott, 2006) and team-member satisfaction (Johnson, Bettenhausen, & Gibbons, 2009).

The extant research demonstrates that virtual teams face several challenges in accomplishing their work together. Some of these challenges relate to task dimensions such as making high-quality decisions (see Timmerman & Scott, 2006), but most of the challenges chronicled by the literature have to do with relational aspects of group life. For example, virtual teams need to manage team members' expectations (Bosch-Sijtsema, 2007), establish trust (Rico, Alcover, Sánchez-Manzanares, & Gil, 2006; Kuo & Yu, 2009), manage conflicts (Poole & Zhang, 2005), and build relationships across cultural and global differences (Hardin, Fuller, & Davidson, 2007; Olarian, 2004; Rutkowski, Sanders, Vogel, & van Genuchten, 2007). Although the research argues that trust and other relational variables are important, there is not much work that details how virtual teams establish these shared expectations. Research has suggested that virtual teams ought to deal with relational aspects early in the team development by holding some face-to-face meetings (see Poole & Zhang, 2005), engaging in virtual team-building activities, and discussing and revisiting team members expectations (Bosch-Sijtsema, 2007). Yet to our knowledge no research has closely examined the interactive processes by which team members actually go about establishing rules or norms to govern their own interactions.

Although there is some recognition that virtualness is a matter of degree, rather than simply a dichotomous state (Johnson et al., 2009; Poole & Zhang, 2005, Timmerman & Scott, 2006), much of the literature on virtual teams still contrasts them with face-to-face teams. Moreover, virtual teams research largely relies on organizational theories. This literature has provided a solid foundation for the understanding of how virtual teams work together and accomplish their goals. But it also has limitations. We agree with Poole and Zhang (2005) that small group scholars ought to advance the research on virtual teams

by moving beyond organizational and educational settings to examine interaction in other online contexts. Such an investigation could help small group scholars better understand how online groups establish norms, accomplish their work together, and manage the relational aspects of small group life. To this end, we argue that small group scholars might profitably direct their attention to the study of online communities.

Small Group Research and Online Communities

Online communities are networks of people who gather together around some common purpose or activity and use CMC as one of their primary means of social interaction (Baym, 2000; Rheingold, 2000; Smith & Kollock, 1999). Online communities form around a wide range of interests and goals, relying on technologies with different social affordances that allow people to interact in different ways (Wellman et al., 2003). Even simple systems like email lists or Twitter can foster strong community interaction. Topic-specific forums like FatSecret (Black, Bute, & Russell, 2010) and more general sites like Reddit or Slashdot also generate community through participant-managed interaction (Lampe & Resnick, 2004). However, some of the richest contexts to study small group dynamics emerge within distributed collaborative systems like SourceForge, Wikipedia, or Flickr. In these settings, participants can contribute to collective goals, create projects, and communicate about the nature and direction of those projects. These communities are similar in some ways to organizational settings that are more familiar to small group scholars because they consist of a collection of overlapping groups who work on particular projects with the overall goal to improve the community as a whole. Other online communities are more recreational in the sense that they offer places for people to discuss topics of shared interest, share images or videos, or tell stories about their lives. These communities are not as clearly task oriented. However, participants still need to manage the issues inherent in collective action, including choices about how to govern their own interactions.

There are several reasons that small group scholars ought to pay more attention to online communities. First, although communities can be quite large, for many of them the bulk of the interaction occurs in small groups. This is especially true of wiki systems where people work on smaller projects that complement the vision of the community as a whole, but it is also the case for communities that form around shared recreational interests. These shared interests form the context for group interaction. Like groups in online communities, virtual teams are also embedded in a larger organization or community (Timmerman & Scott, 2006). Many influential small group theories, such

as the bona fide groups perspective (Putnam & Stohl, 1990), adaptive structuration theory (DeSanctus & Poole, 1994; Poole & DeSanctis, 1992), and Jablin and Sussman's (1983) theory of organizational groups, emphasize the importance of understanding groups in relation to their contexts. Small group theories are well positioned to study groups within online communities, and this research could have implications for virtual teams.

Second, the participants in many online communities are experienced at working together virtually to accomplish some purpose. Because their whole community exists in virtual space, group members need to use CMC to accomplish the task and relational goals of their community. They have experience in establishing norms, developing shared expectations, creating a group climate, developing trust, and collaborating on projects through CMC. Extant research has shown that people vary widely in how, why, and how much they participate in online communities (Butler, Sproull, & Kiesler, 2007). Some lurk without contributing much content, others cause problems (Viégas, Wattenberg, & Kushal, 2004), while others make valuable contributions to the community, answering questions (Adamic et al., 2008; Welser et al., 2007) brokering information (Himmelboim, Gleave, & Smith, 2009), and solving problems (Kittur & Kraut, 2010). Related to this, members of online communities typically participate without the promise of financial gain or other external compensation (Beenen et al., 2004). Thus, group members need to deal with issues of member motivation and satisfaction, which are important aspects of virtual teams.

Third, social media systems record the content, context, timing, and structure of interaction in online communities. These digital traces offer some of the richest and most extensive data ever available on small group interaction (Lazer et al., 2009; Welser, Smith, Gleave, & Fisher, 2008). Although much small group research has been advanced through experiments and purpose-built small group settings, researchers now have the opportunity to study the same mechanisms in natural contexts without sacrificing scale, detail, or fidelity of data. The connection between these data sources and theories of small group interaction will only increase as CMC becomes a ubiquitous part of people's work, family, and community lives. The growing variety of online communities can help small group scholars see examples of different interaction formats and structures that enable and constrain a group's ability to meet its goals.

Moreover, small group research could be influential in shaping future scholarship of online communities. Although the study of online community is a growing and interdisciplinary field, a common critique is that the social dimensions of much of this work remain undertheorized (see Beenen et al., 2004).

Many studies of online communities focus on the technological aspects of the community without having a solid foundation in theories of small group research. Our research makes connections between small group research and online communities in an effort to encourage mutual learning.

Deliberative Discussion in Wikipedia

In this article, we argue that virtual teams and other online task groups can learn from a close investigation into the policy-making discussions in Wikipedia. Wiki systems are some of the most successful and innovative types of online communities to emerge recently, and Wikipedia is the most well-known and well-established wiki community. Wiki tools are widely available and general purpose systems that allow users to make small but valuable contributions that add up to something more than the sum of their parts (Anderson, 2008; Shirky, 2008, 2010). Many organizations and community groups use wikis and other technologies that allow teams to collaboratively create products (Noveck, 2009), while some scholars have begun to pay attention to Wikipedia as a model for deliberative projects (Klemp & Forechimes, 2010).

Wikipedia has become recognized as an increasingly common source of encyclopedic information as well as a powerful social force that challenges traditional notions of expertise and knowledge construction (Lih, 2004; Stvilia, Twindale, Smith, & Gasser, 2005). What is often overlooked is that Wikipedia is also a vibrant online community that engages in relatively sophisticated self-governance that is founded on group discussion and collaboration. Members of the community, known as *Wikipedians*, do not simply write and discuss encyclopedia articles: they also propose, collaboratively create, discuss, agree on, and enforce the policies that guide their interactions. This stands in sharp contrast to most online communities, where governance resides in the hands of a relative few community leaders (Butler et al., 2007) who have access to the technical infrastructure that allows the creation and deletion of member accounts and content (see Lessig, 2000).

A number of researchers have looked at the problems of online community governance, including the need to address major policy issues, such as who may join, privacy, and anonymity (Preece, 2000), and the principles by which an online community might effectively govern itself (Kollock & Smith, 1996; Ostrom, 2000). This governance work is often taken on by relatively few members (Butler et al., 2007), but in venues such as virtual worlds (Dibbell, 1999), discussion forums (Kollock & Smith, 1996), open-source communities (Lattemann & Stieglitz, 2005), and Wikipedia (Forte & Bruckman, 2008), deliberation over self-governance is an important element in the community's

success or failure. Wikipedia sidesteps the technical problem of allowing members to participate in community governance by treating its policies just as it treats encyclopedia entries, as pages that anyone can discuss or edit directly. Small groups of Wikipedians come together to write policies that establish norms of their community and discuss how these policies should be written and enacted in the larger community.

Wikipedia is also a promising site for research because the Wikipedia Foundation records the full edit history of all pages on Wikipedia and makes this edit history available to download. This wealth of data has not gone unrecognized by social scientists, and a number of studies have focused on the quality of Wikipedia's encyclopedic content and the collaborative knowledge-construction processes that are specific to wiki environments (Chesney, 2006; Lih, 2004; Stvilia, Twindale, Smith, & Gasser, 2005). Early work that used the Wikipedia data set focused on article creation and quality because the collaborative act of writing encyclopedic entries is the most salient aspect of Wikipedia's community. However, Wikipedians also engage in a great number of other communicative acts. For example, they have lengthy discussions about articles they are writing, organize work that needs to be done, form groups around specific topics, arbitrate disputes among other community members, welcome newcomers to the Wikipedia community, and create and maintain personal pages with information about themselves and their edits. They also praise one another's contributions through giving positive recognition on personal pages (Kriplean, Beschastnickh, & McDonald, 2008). Growth in this kind of interaction has outpaced growth in the article namespace over the last few years, suggesting that coordination and management have become an increasingly important part of the community (Viégas et al., 2007). Research on this kind of interaction has examined how Wikipedians change their behaviors as they spend more time in the community (Bryant, Forte, & Bruckman, 2005), how members are recruited and retained (Ciffolilli, 2003), how the community deals with problem behavior (Lorenzen, 2006; Viégas et al., 2004), and how editors settle their article-specific disputes and manage conflict (Kittur et al., 2007; Viégas et al., 2007).

Wikipedians' self-governance occurs as they create, discuss, and make decisions about the policies they rely on to guide their own behavior. Policies are proposed by community members, discussed widely for some period of time, and then either accepted or rejected by Wikipedia's administrators. Proposals can be accepted as policies, which are understood within the community as rules that everyone needs to adhere to, or guidelines, which are somewhat more flexible and prone to exceptions (Forte & Bruckman, 2008). Some

of the policies and guidelines have to do with conventions about writing encyclopedic entries such as maintaining a *neutral point of view* and following procedures to fact check and cite appropriate sources. Other official policies, such as *civility*, *consensus*, and *dispute resolution*, have to do with the rules for communicative conduct among Wikipedians.

The end result of this deliberation is an effective set of policies and a community to enforce them, which has been a key factor in Wikipedia's success. Disputes among editors are often quickly resolved with a reference to a Wikipedia official policy (Kriplean, Beschastnikh, McDonald, & Golder, 2007; Viégas, Wattenberg, Kriss, & van Ham, 2007), whereas the overall set of policies that are cited has changed and stabilized over time (Beschastnikh, Kriplean, & McDonald, 2008). Recent research demonstrates that Wikipedia policies serve a wide variety of functions (Butler, Joyce, & Pike, 2008), and policy citations are employed as communally recognized norms for the resolution of conflicts in the Wikipedia community (Beschastnikh et al., 2008). Yet there is virtually no research examining how these norms themselves emerge through group interaction. However, thanks to the data Wikipedia makes available, we can explore the process by which Wikipedia governs itself, with an eye toward understanding what implications their discussions may have for virtual teams and other online task groups.

Research Questions

In an effort to test our measurement of deliberative discussion, our research addresses the general descriptive question: How deliberative are the policy-making discussions on the English Wikipedia? We divide this overall question into two related research questions. First,

Research Question 1: To what extent are the analytic and social aspects of deliberation evident in the policy-making discussions?

To address this question, we draw on Gastil and Black's (2008) description of deliberative discussion's analytic and social components. Because deliberation is understood as an ideal (Gastil, 2000), studies of actual groups inevitably demonstrate that they fall short of meeting all aspects of deliberative theory. With this study, we examine the extent to which different aspects of deliberation are present in, and can help us understand the process of, the discussions.

Our second research question considers the participants who are central to these policy discussions. Whereas our first set of analyses seek to characterize the deliberative nature of the policy discussion, our second set of analyses asks,

Research Question 2: How are the deliberative tendencies of contributors related to the structure of reply relationships in the group conversation?

These analyses allow us to better understand the larger patterns of interaction in the group and see the roles that different participants play in the discussion. The patterns can give us a sense of which editors are the most powerful in the discussion and the various roles participants play in the deliberative process.

Understanding the characteristics of policy-making discussants and the network structure of their discussions can help assess the deliberative aspect of equality in the policy-making process. Theoretically, the design of the wiki technology, where anyone can edit any page, provides equal and adequate speaking opportunity to anyone who wishes to be part of the community discussion. However, we expect that participants will play different social roles in the policy-making discussions and that these roles may be tied to the nature of their contributions in the larger Wikipedia community. Some roles we might expect to encounter are contributors who raise problems or play the “devil’s advocate,” those who try to find middle ground between opposing camps, and possibly trolls or other types of contrarians. Our hope is that understanding these roles can help us discern interaction patterns that support or hinder deliberative policy-making discussions in online communities.

Method

We examined the analytic and social deliberative components present in the discussion of *no personal attacks*, a representative and commonly referenced Wikipedia policy. We chose this policy for this analysis because it is one of the most frequently invoked policies in managing editing disputes among Wikipedians (see Beschastnikh et al., 2008). The no personal attacks policy is now widely accepted and utilized by Wikipedians as they edit articles and discuss articles and other community business. A cursory look at the discussion pages associated with other policies indicates that the discussion on the no personal attacks policy is very similar to discussions about other policies. Because it is a longstanding policy, the discussions we analyzed were no longer actively being edited by Wikipedians. This meant that the content we were analyzing did not change during the time of our analysis, which made the coding process much more manageable.

The basic outline of the policy achieved consensus some time ago and currently states: “Do not make personal attacks anywhere in Wikipedia. Comment on content, not on the contributor. Personal attacks will not help you make a

point; they hurt the Wikipedia community and deter users from helping to create a good encyclopedia” (Wikipedia: No personal attacks, 2007). It goes on to detail examples of personal attacks in Wikipedia and suggested responses to such attacks. Every Wikipedia page, including pages describing policies, has an associated discussion page. The data for this study are drawn from the posts on the discussion page regarding the no personal attacks policy. These discussion pages are typically broken into archives when they grow long; our analysis covers the first archive of the discussion page for the no personal attacks policy. This archive covers the time period from April 2002, when the first version of the policy was proposed, through August 2005. During this period, the policy was modified 105 times.¹

In these asynchronous discussions, members of the Wikipedia community propose revisions to the policy document, provide feedback on others’ proposed revisions, discuss issues related to the policy (including, for example, defining what counts as hate speech and how that differs from personal attack), and ask and answer questions about the proposal. The discussion is divided into a number of threads.² Each thread is composed of posts made by individual editors, and most consist of a series of posts made by different editors. Thus, the discussion is roughly akin to a threaded discussion board.

Content Analysis Procedures and Measures

Each post was analyzed and coded using the newly developed Online Group Deliberation Coding Scheme, which was developed to directly operationalize variables from Gastil and Black’s (2008) conceptual definition of deliberation in political discussion (full coding scheme available from the first author). The basic unit of analysis for most of the content analysis measures is the discussion post. The posts were examined in the order that they appeared on the talk page, rather than chronologically, so we could consider the reply structure in coding aspects of the deliberation. In addition to coding the individual posts, discussion threads in their entirety were coded for overall summary judgments. Our data contain a total of 282 posts across 35 discussion threads.

Each post was assigned an identifying number and coders noted identifying information such as the name of the participant who made the post and the thread it was posted to. Each post was then coded on eight of the nine dimensions of deliberation: creating an information base, prioritizing values, identifying solutions, weighing solutions, making decisions, comprehension, consideration, and respect. These categories are not mutually exclusive; a single post might show a number of aspects of deliberation. Equality, the ninth dimension proposed by Gastil and Black (2008), requires analysis at the level

of interaction, so this dimension was not included in the post-level coding. However, equality is captured in global ratings that coders made for each discussion thread, and is also addressed by social network measures discussed below.

Coders were trained in the use of the coding scheme and went through several trials to develop an acceptably high level of interrater reliability (see Neuendorf, 2002). After three separate coding sessions, coders achieved at least 70% agreement on all of the content analysis variables. Cohen's kappa levels ranged from 1.0 to 0.63. For the final coding, posts were coded separately by two different coders and discrepancies were addressed by discussion between the coders. The final data set for this study represents negotiated agreement between the coders.

Analytic dimensions of deliberation. The first dimension we coded for was *create an information base*, which was coded as a dichotomous variable. Posts that included *facts, stories, evidence, or otherwise added information* to the group discussion were coded as a 1 and those that offered *no information* were coded as 0. The second analytic variable was *values*, which captures the extent to which a discussion post commented on the participant's values or values shared by the group. This variable was coded in the range from 0 to 2, with an assumption that zero was the *least deliberative* and two was the *most deliberative*. A code of 0 indicated that no values were explicitly commented on in the post. A code of 1 meant that the post included a values statement, but did not link that stated value to the proposal being discussed. A code of 2 meant that the participant not only commented on a value, but also linked that value to some aspect of the proposal or recommendation being discussed.

The third analytic variable measured whether the discussion post identified possible solutions (variable name *solution*). For this data set, the possible solutions identified were typically changes to the policy proposal itself. Posts were coded as 0 if they *did not identify a possible solution*. A code of 1 meant that a post *proposed a new possible solution*, and a code of 2 indicated that the participant made additions or revisions that built on another participant's recommendation. Again, the assumption is that higher values on this variable are indicators of higher levels of deliberation. The final analytic variable measures whether the post *weighs pros and cons* of policy proposals being discussed. This categorical variable assigned a value of 0 to posts that *did not involve any discussion of pros or cons*. A post was given a code of 1 if it *only raised advantages of a proposal*, 2 if it *only raised disadvantages*, or 3 if it *included discussion of both advantages and disadvantages*.

Social dimensions of deliberation. The social components of deliberation involved measures of several different indicators. We coded two variables that

assess what Gastil and Black (2008) call “comprehension.” The first is *clarification*, which measures whether or not the post includes a request for someone else to clarify something. Values ranged from -1 to 1 . A code of 1 indicates that the post included a request for clarification, while a 0 indicates that such a request was absent. Posts that included a request for clarification but did so in an obviously antagonistic or sarcastic way (ostensibly with the goal of discrediting the previous speaker rather than genuinely requesting clarification) were given a code of -1 . The second measure of consideration was *understanding*. This was coded from -1 (demonstrates a lack of understanding) to 1 (explicit demonstration of understanding), with a code of 0 given to posts that had no explicit statement demonstrating understanding.

To measure how well participants were listening to and considering the perspectives of other people we measured *consideration* and *other consider*. Consideration measured the extent to which a post demonstrated that the participant was considering others’ views. Discussion posts were given values ranging from 0 - 3 , with higher scores indicating more consideration. A code of 0 meant that the post contained no evidence of consideration. A code of 1 indicated that the post contained explicit statements that demonstrated consideration. Another way people can show that they value and give consideration to other people’s opinions is to ask others for feedback on one’s contributions. Posts that included requests for feedback were coded as a 2 on consideration, while posts that included explicit evidence of consideration and also a request for feedback were given the value of 3 .

We noticed that participants sometimes commented on whether or not a different member of the group was giving other people’s perspectives adequate consideration. The variable *other consider* measured this by giving posts a negative code (-1) if the speaker indicated that a different group member was not listening or being considerate, or a positive code (1) if the speaker indicated that a different group member was doing a good job of being considerate. Posts that contained no statements about other group members’ consideration were coded as neutral (0).

The final social dimension, respect, was also measured through two variables. The first was a measure of the level of *respect* demonstrated in the discussion post with a negative code (-1) indicating that a post was disrespectful, or a positive code (1) indicating that the post included some explicit evidence of respect. Posts with no evidence of respect or disrespect were coded as neutral (0). As with consideration, we noticed that group members’ sometimes commented on other people’s level of respect. So, the variable *other respect* captures the extent to which a post evaluates some other group members’ behavior as *disrespectful* (-1) or *respectful* (1). Posts that did not

include any comments about other group members' level of respect were coded as *neutral* (0).

General assessments of deliberation. Coders also made overall summary judgments of the deliberative quality of discussion threads. Coders looked at the discussion thread as a whole and rated it on a 5-point scale to indicate how often the discussion demonstrated each of the analytic components of deliberation (0 = *never* to 4 = *constantly*). Coders also rated the thread on how often it demonstrated each of the social components of deliberation using the same 5-point scale. These indicators allowed us to measure aspects of the conversation that might not be captured by individual posts.

Social Network Analysis Measures

To address our second research question, we used exploratory social network visualization (Hansen, Shneiderman, & Smith, 2010; Wasserman & Faust, 1994) to examine characteristics of the participants in our selected policy discussions. Social network visualizations represent relationships as edges between social actors, which are indicated with nodes. Our visualizations combined deliberative attributes coded from content analysis with relationship data collected from the reply structure in the policy discussions. Although Wiki discussion pages do not automatically encode reply structure, their format and content can be used to infer replies.

Each edit was assigned a *Post-ID* number (ordered according to occurrence on page), *sender* was defined as the editor login ID appended to the edit, time and date stamps were collected. Edits that initiated new topics (indicated by named subsections of the page) were coded as directed to all. Each subsidiary edit was assessed primarily according to content, but determination of Recipient was further assessed using timing, location in subsection, and indentation of the edit. Senders could only *reply* to edits that were temporally prior to their own edit. Edits located immediately subsequent to, and indented from, prior messages were typically found to be directed to the prior message, however content was always used to determine which editors were the intended recipients. A weighted, directed tie from A to B was defined as the number of edits by A that were coded as made in response to an edit by B. An edgelist summarizing all edits to the sampled threads was constructed that included all edge weights of 1 or greater.

Combining Content Analysis and Social Networks

The results of our study rely on both the content analysis and social network visualization. The content analysis provided numeric values for each group

member's contributions, which became the source for our network measures of deliberativeness. Content analysis also showed to whom comments were directed. In this way, the content analysis formed the foundation for our network measures for the nodes and edges. The network analysis provided an exploratory visualization to help us identify relationships and structure in the interaction. After identifying structures that seemed indicative of different types of interactions, we went back to the content analysis to check and deepen our analysis. Finally, we performed a secondary analysis to offer a preliminary test of the relationship between the network structure and the nature of how people contributed to the discussion.

Results

Describing the Conversations

We now turn to the analysis for Research Question 1: *To what extent are the analytic and social aspects of deliberation evident in the policy-making discussions?* This is a descriptive question that is best answered by means of descriptive statistics. The results were separated into three parts. First, we focused on determining how effectively the posts and threads on Wikipedia display analytic components of deliberation. Next, we examined the social components of deliberation evident in the posts and the threads. This was assessed through analyzing the social features of posts as well as the factors that focus on people giving comments about others. Finally, we explored the extent to which the social and analytic components co-occurred at the level of the threads.

Table 2 illustrates the frequency that each analytical component was evident in the 282 posts. Information was provided in two thirds of the posts. This is important to deliberation, as it adds to the knowledge base. Most (72%) of the posts included no statements about values held by the group. However, when values were revealed, over half of the statements linked the values to a solution. Nearly half of the posts included a solution, and half of these built on previous solutions. This indicates that people were considering others' solutions and adding their own ideas to them. Pros and cons of any solution were weighed one third of the time. When evaluating a solution, disadvantages were mentioned more often (20% of total posts) than advantages (7%). Rarely did anyone point out both advantages and disadvantages (5%).

Table 3 presents the frequency of social components evident in the discussion posts. Requests for clarification appeared in nearly 20% of the posts. Almost half of these requests were sarcastic in nature, which we do not view as promoting productive deliberation. Evidence of understanding was evident in only 10% of the posts; however, when it did occur, the user was usually

Table 2. Frequencies of Analytic Components in Posts

Component	Percentage	Frequency
Info		
None	33.7	95
Some	66.3	187
Values		
None	71.6	202
Given; not linked to solution	11.7	33
Given; linked to solution	16.7	47
Solution		
None	53.2	150
New solution	22.0	62
Builds on previous solution	24.8	70
Weigh pros/cons		
None	67.4	190
Advantage only	7.1	20
Disadvantage only	20.2	57
Both pro and con	5.3	15

Note. $N = 282$.

demonstrating understanding as opposed to a lack of understanding. Participants often displayed consideration of others' views (63%). Furthermore, in nearly 8% of the posts, the user asked for feedback, and in 6% of the posts, the user considered others' previous statements and also asked for feedback. Approximately 14% of the posts indicated a lack of respect, and only 10% of the posts included explicit evidence of respect.

The components that included a reference to another user's consideration or respect are shown in Table 4. Most posts did not contain any kind of statement that evaluated other participants' respect or consideration. Eight percent of the posts included statements that indicated that another group member was not considering the ideas of others. In only one instance, a person pointed out that another user did a good job of considering others' ideas. Posts that included someone discussing a user's lack of respect for others were only evident in 10% of the posts. No one mentioned that a participant was being respectful toward others.

Coders also assessed the analytic and social components of deliberation for each of the discussion threads as a whole. The code frequencies can be found

Table 3. Frequencies of Social Components in Posts

Component	Percentage	Frequency
Clarification		
Sarcastic request	7.4	21
Neutral/none	81.2	229
Request	11.3	32
Understand		
Lack of understanding	2.5	7
Neutral/none	90.8	256
Demonstrates understanding	6.7	19
Consider		
Neutral/no evidence	23.0	65
Some consideration	63.1	178
Asks for feedback	7.8	22
Show consideration and asks for feedback	6.0	17
Respect		
Lack of respect	14.2	40
Neutral/no evidence	76.2	215
Show good respect	9.6	27

Note. $N = 282$.

in Table 5. Thirty-one percent of the threads were coded as *rarely* exhibiting analytic components, while 49% exhibit social elements only *rarely*. In 20% of the threads, analytic components were regarded as *constantly* occurring, whereas only 11% of the threads exhibited social components that occurred *constantly*. In general, threads were rated more highly on analytic than social dimensions of deliberation.

Structure of the Conversations

To address our second research question, we use social network visualizations to describe the structure of conversations in the no personal attacks policy discussion. Although social network visualizations are not commonly used in the study of deliberation, this strategy has seen wide and growing utilization in the study of social dynamics in groups (see Hogan, 2008; Katz, Lazer, Arrow, & Contractor, 2004).

Figure 1 displays a graph of reply relationships recorded for all threads in the no personal attacks discussion we analyzed. Participants are depicted as nodes that vary in size, shape, and color. The size of each node represents the

Table 4. Frequencies of Other Related Components in Posts

Component	Percentage	Frequency
Other consideration		
Other person not considering	8.2	23
Neutral/no evidence	91.5	258
Other person showing consideration	0.4	1
Other respect		
Other person not respectful	9.6	27
Neutral/no evidence	90.4	255
Other person showing respect	0.0	0

Note. $N = 282$.

Table 5. Overall Summary Code Frequencies for Analytic and Social Components of Threads

Code	Analytic		Social	
	Percentage	Frequency	Percentage	Frequency
Not at all	2.9	1	2.9	1
Rarely	31.4	11	48.6	17
Occasionally	20.0	7	17.1	6
Frequently	25.7	9	20.0	8
Constantly	20.0	7	11.4	4

Note: $N = 35$.

number of alters replied to by each editor involved in this discussion. The shape and color of each node represents the level of deliberation for that participant based on all of their contributions to this discussion, summing their total analytic and social elements of deliberation, divided by the number of comments. A white circle represents high levels of deliberativeness (scores of 3.5 or higher). A gray diamond indicates a middle level of deliberation (between 3.5 and 2.5), which is centered on the average level of deliberation in the sample. Black squares represent participants whose posts demonstrated low levels (less than 2.5) of deliberation.

There are a few notable features about this network graph as a whole. First, although the conversation is asynchronous and multithreaded, there are only two threads that are disconnected from the main component, both near the top of the figure. These threads are isolated due to temporal edge effects: the thread involving LarryS and Claudine was the earliest thread in the archive and

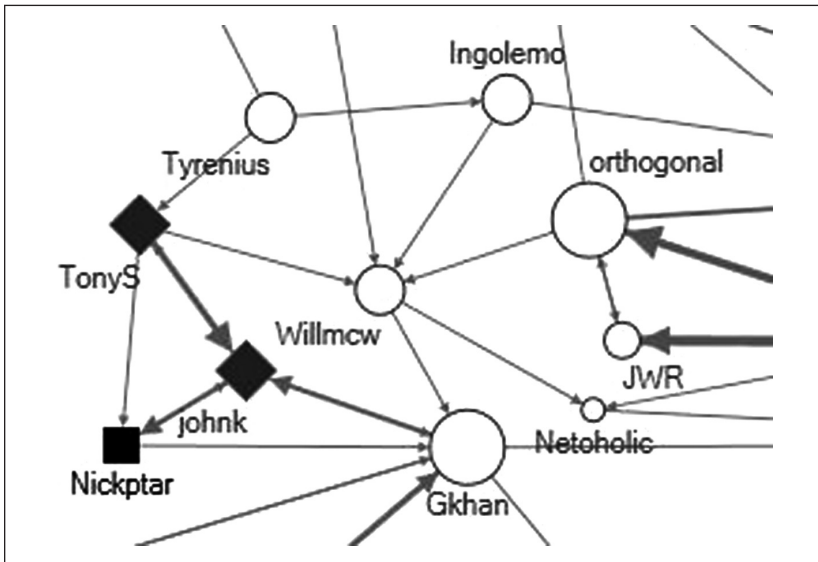


Figure 2. Example of good deliberative discussion

The fourth notable feature refers to participants who deviate from this general pattern of a few low-intensity relationships. There are three salient conversations that involve participants with intense ties: upper right with AL and PaulB, center right with SamS and FredB, and upper left with Snowspinner and Charles. These intense ties range from 6 to 20 posts exchanged between pairs. Overall, in the conversation there is a striking inequality in the intensity of relationships that emerge in the discussions: the great majority are low intensity, whereas a few are quite intense.

The next section highlights three areas of the network graph that illustrate potentially interesting combinations of network structure and levels of deliberation. In each of these cases, we go back to the conversation itself to compare our intuitive judgments from the network visualization to the content of the communication itself during this exchange. Figures 2, 3, and 4 provide closer looks at specific pieces of the larger network presented in Figure 1.

An image of good deliberative discussion? Figure 2 highlights multiway interaction between highly and moderately deliberative actors that may be indicative of a high-quality discussion. Each participant has multiple ties, and there are several triangles, which indicates that the discussion seems to include multiple people who are all talking to each other, rather than a series of disconnected conversations. The following comment from Gkhan offers an illustrative example of some of the communication occurring in this figure.

At the risk of sounding corny, the goal of this project is to do something good for humanity (ahh, crap, I did sound corny), and we all need to take the higher road. Zero-tolerance on personal attacks is the only way to go.

In this post, Gkhan provides an opinion on a proposal, clarifies a value held by the community, and engages in some use of humor that could demonstrate some positive social aspects of deliberation. For these reasons, his post demonstrates a high level of deliberation. The high quality of the contributions and the interactive and inclusive nature of the discussion indicated by this image present one possible model of what good deliberative discussion might look like.

An off-topic conflict. Figure 3 presents an interaction structure that is very different from that described above. Of particular interest is the relationship between PaulB and Tkorrovi, who have mutual and intense ties to one another and who are both coded as making contributions to the discussion that were low on deliberativeness. AL, whose discussion posts were moderately deliberative, also has ties with these two participants. The figure portrays an argument between the two participants, with some kind of interaction or intervention from AL.

Turning to the discussion itself demonstrates that these two participants were largely arguing about a personal dispute that had little or nothing to do with the policy being discussed. An example of some of their comments is below.

Paul: Tk, where do you get this definition from? . . . And are you really going to do nothing on Wikipedia other than follow me around until your 3 month ban on editing artificial consciousness has expired?

Tkorrovi: What definition? No, I don't follow you around, but I found this discussion here important. Do I have a right to write my comment here? I guess I have.

In this circumstance, intense ties do not indicate high-quality deliberative discussion. As these two bicker over their longstanding dispute, they engage in communication that not only fails to further the analytic aspects of deliberation, but also lacks respect, consideration, or real attempts to understand one another. In this discussion, AL steps in to moderate their dispute by indicating that it is not helpful for the overall discussion and they should take their personal conflict elsewhere.

On a methodological note, this dispute points out the importance of context for understanding group interaction. These two Wikipedians clearly have a history of some kind, and it is reasonable to assume that they communicate with one another in other parts of Wikipedia. It would be useful to study the participants and their relationships in other parts of the Wikipedia

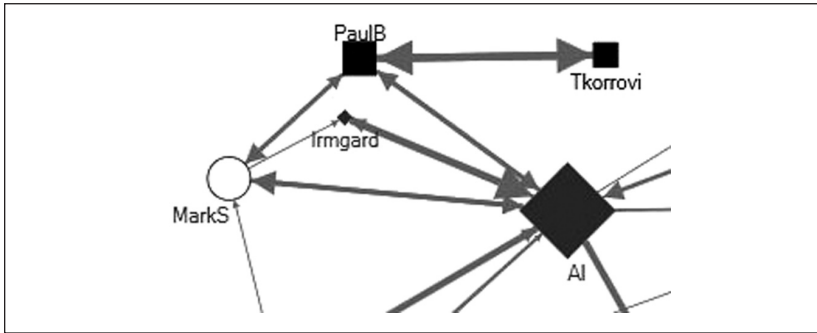


Figure 3. Example of off-topic conflict

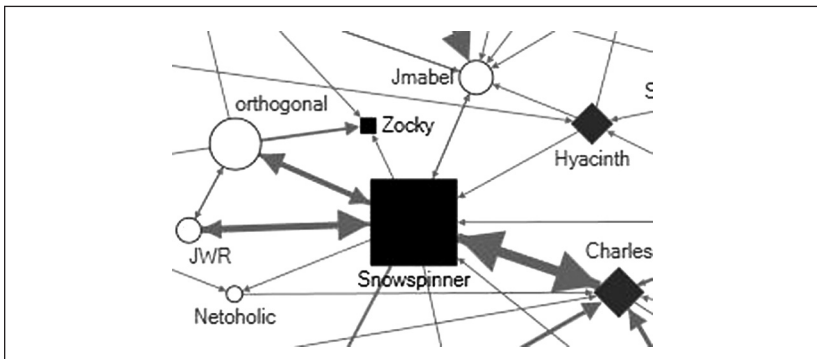


Figure 4. Example of conflict management?

community to better understand the dynamics of the particular policy-making discussion.

Managing conflict? Our final example is displayed in Figure 4. One obvious feature of this figure is the large black square node, representing the participant Snowspinner, who has intense ties with Charles and other participants who have all been coded as making positive contributions to the deliberation. Although the intense ties between Snowspinner and Charles are a central feature of this figure, Snowspinner also has intense ties to several other people who are not strongly tied to each other. These ties, and the size of the node, indicate that Snowspinner is very active in the discussion and is involved in multiple conversations.

We initially saw this figure as representing attempts at conflict management. It appears from the network visualization that Snowspinner was

making many posts to the group, and that they were in some way detracting from the deliberative potential of the discussion. It would appear that other group members were engaging in some kind of conflict management that demonstrated aspects of the deliberative ideal and that Charles was somehow central to this discussion.

Yet when we go back to the discussion itself we find that the situation is a bit more complex. This image represents overall discursive relationships among people, not the flow of one particular conversation. That is, it is important to note that the relationships displayed here occurred throughout several different discussion threads. For instance, Charles and Snowspinner have many interactions across multiple discussion threads. In most of their interactions they are disagreeing with one another about specific aspects of the policy. Many of their contributions are highly deliberative in that they are providing information, weighing pros and cons, and suggesting or weighing alternatives. For the most part, they perform this analytic process in a fairly respectful way, although they do tend to become more sarcastic the longer their discussions go on. In a separate thread, Snowspinner is engaged in a disagreement with orthogonal and JWR in which Snowspinner's contributions were coded as disrespectful and not demonstrating consideration for other views. The codes given to this conversation influenced Snowspinner's average level of deliberativeness, which accounts for the color and shape of this node.

The examination of the relationships depicted in these figures raises two interesting methodological issues. First, we should be cautioned not to confuse the relationships portrayed in the network figure with the conversational structure of one particular interaction. Second, measuring the deliberativeness of someone's contributions by averaging the scores on all their discussion posts may mask important features of their contributions. Coding contributors by the number or strength of deliberative statements, or coloring edges to show dyadic deliberativeness are additional measurement options that may be of interest to group scholars.

Testing Insights Learned from the Combination of Methods

In an effort to test our combination of content analysis and social network visualization, we performed a secondary analysis comparing the results from each method. Figure 5 renders the network graph from Figure 1 as a scatter plot with number of intense edges predicting average deliberation score (locations are jittered to reduce overlap). This plot highlights only those editors from whom we were able to score at least three edits. Visually we can see evidence that the number of intense edges is negatively correlated with average

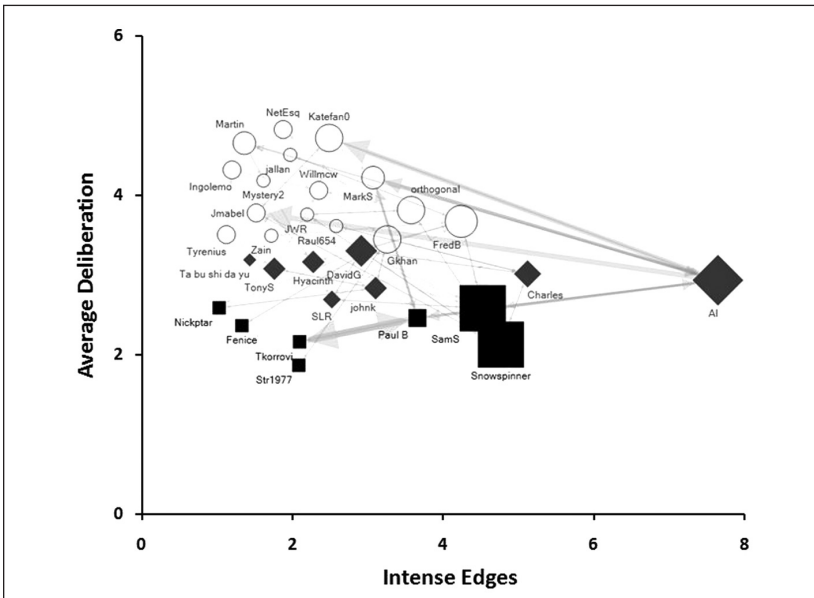


Figure 5. No personal attacks discussion rendered as a scatter plot

deliberation ($r = -.42$). The correlation for the full sample is substantially lower ($r = -.15$), with cases dispersed widely along the left edge of the figure. The pronounced variance introduced by low edit cases suggests that having too few samples of editing behavior introduces substantial uncertainty and that future research should aim for at least three (ideally more) observations of edit behavior.

The correlation between number of intense edges and average deliberation is far from a conclusive test. It should only be considered suggestive of the potential for structural signatures (like number of intense ties) to help identify variation in deliberation. Another preliminary strategy for evaluating the indicator is to apply it to a different discussion. Therefore, we coded an additional policy discussion thread from the archive of a policy called the *three revert rule*.

Figure 6 reveals the conversation structure in the three revert rule discussion thread. Labels for each node (participant) include a nickname and the average deliberation score we coded from the discussion. In this discussion, KM repeatedly advocates for a rule change whereas the others consistently and politely address the merits and detriments of the proposed changes. Similar to our earlier

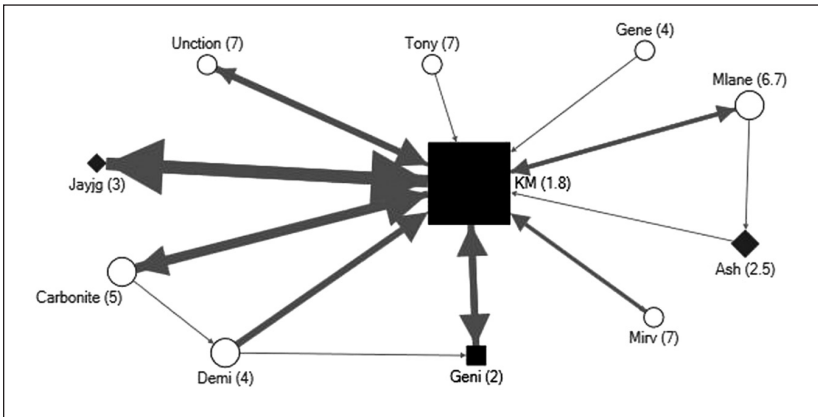


Figure 6. Conversation structure in the no revert rule discussion

observations, the central contributor within a particular thread illustrates the association between less deliberative conversation and accumulation of numerous intense edges. Although it is encouraging to see additional support for this structural signature in identifying less deliberative contributors, we emphasize that we would also want to identify signatures that identify highly deliberative contributors like Uncion, Tony, Mlane, and Miriv. There is little distinctive about their positions in this conversation. However, rereading the participants' comments suggested that several had a history of interaction, therefore, we suspect that it may be necessary to look beyond the current conversation to patterns in prior editing behavior to discover the structural and behavioral signatures of highly deliberative group members.

Discussion

How Deliberative Were These Conversations?

The results of the content analytic measures give us a mixed answer to our first research question. Although group members provided a great deal of information and proposed and built on one another's solutions, they were heavily skewed to finding faults with the proposed solutions rather than raising advantages or weighing both pros and cons. They also very rarely talked about their personal values or the values of the group. This result is not surprising given that overt

discussion of values is relatively uncommon, and members of deliberative groups often find it difficult to talk openly about values, particularly if they are in conflict. Despite the relative lack of conversation about values, coders noted that almost half (46%) of the discussions demonstrated good analysis at least frequently and another 20% provided good analysis occasionally. Remembering that deliberation is an ideal that groups can strive toward and achieve only in degrees (Gastil, 2000), we can say that this Wikipedia policy-making discussion did a reasonably good job at the analytic aspects of deliberation.

Our results show less positive tendencies for the social aspects of deliberation. Coders noted that the discussion threads largely did not provide evidence of high levels of the social aspects of deliberation. Over half of the threads (51%) demonstrated social aspects rarely or not at all and for most of the individual discussion posts there was not adequate evidence to make a judgment about the level of respect or comprehension. The lack of explicit evidence indicates the difficulty of judging social aspects of interaction in an online environment, and this is a difficulty that persists in text-based online interactions. Respect and comprehension are notoriously difficult to measure for deliberative groups (Black, Burkhalter, Gastil, & Stromer-Galley, 2010) in both face-to-face and online environments. Yet some direct evidence of the social dimensions came from our coding of group members' comments about other people in the group. These metacommunicative comments often critiqued another member's lack of respect ("let's play nicely, shall we?") or consideration ("you don't understand what I mean"), and indicate that respect was important to them even though participants were unlikely to type out "I feel respected" in their discussion.

Some (21%) of the threads were coded as frequently or constantly demonstrating high levels of the social aspects of deliberation. Additionally, we saw good evidence of consideration in the discussions as group members responded to each other's comments, built on one another's suggestions, and asked for feedback on their proposed recommendations. This kind of interaction is encouraging and supports research about the potential wiki environments hold for collaborative work and open deliberation (Raynes-Goldie & Fono, 2009). Because any participant in the discussion was able to make edits to the policy and provide new content, there were relatively few barriers to group members' ability to contribute to the conversation. It is encouraging to see that participants often seemed to take other people's suggestions seriously and work collaboratively toward improving the policy as a whole.

Applying a general scheme for measuring deliberation raises conceptual questions about the underlying need for socially deliberative acts. Although this study indicated that a small proportion of threads rated highly in terms of the social dimensions of deliberation, this cannot be taken as evidence that the remaining discussions were inadequately deliberative. In well-established

communities or virtual teams, a shared mission, familiarity, and good faith could allow analytic attributes of deliberation to advance the discussion without need for overt acts of social or relational communication. In newer teams, however, overt efforts to demonstrate respect, consideration, and equality may be necessary to offset likely conflict. Future coding schemes should consider the demand for deliberation as part of the context for the group interaction. In other words, although we have spoken of an ideal for deliberative discussion, this ideal is context dependent and studies of deliberation should consider this context. Developing a more complete perspective on who the community members are and how they relate is an important direction for deliberative research.

Examining Contributor Characteristics and Relationships

The analysis of network structure suggests that certain types of group member relationships and network structures may help us identify group members who make more or less deliberative contributions. First, intense ties may be a signal of conflict and therefore of low levels of social deliberation in that part of the discussion for one or more parties to the discussion. However, such back and forth discussion may attract the attention of others who are more skilled in deliberation and who may subsequently defuse the conflict. Second, actors' positions in the larger network setting might help indicate variation in deliberative contribution. One possibility is that people who bridge multiple discussions, especially when they lack intense ties, may be more reasoned and deliberative contributors. Finally, a contributor's tendency toward deliberation may actually depend on the number of their relationships, and here moderation may spell greater deliberation: the most deliberative contributors may well be those who are moderate in terms of volume and intensity of relationships. These possible themes will require further investigation, but they suggest ways that structural attributes of contributors may help us predict where we will find greater levels of high-quality deliberative discussion.

Network analysis heightens our attention to measures of relational inequality and increases the range of ways that we can conceptualize participants in interaction as having more or less influence on discussion. For instance, people can have the same number of posts, or even the same number of relationships, and exhibit radically different amounts of influence on the larger conversation. When we look more closely at Gkhan's seven ties to Hyacinth's six, evident in Figure 1, we see that Hyacinth's posts reached several different conversations whereas Gkhan's contributions are concentrated in a relatively small portion of the discussion. The combination of content analysis and network visualization allowed us to identify another type of relational inequality, which seems to

arise from contributors who are being less deliberative in their contributions. These people seem to attract a large number of intense ties and often times the group members on the other side of those ties are actively seeking a solution to the conflict or disagreement. Our initial exploration suggested that this pattern might allow the prediction of levels of deliberation from structural signatures and we hope that corresponding signatures for highly deliberative contributors could be identified.

Implications for Future Group Research

This project makes two methodological contributions to the study of online discussion. First, the content analysis coding scheme utilized here is based on current deliberative theory and provides a way for group scholars to examine the quality of the deliberative discussion and the task and relational contributions of individual group members. Previously published content analysis coding schemes for deliberation have been useful in examining analytic aspects of deliberation (e.g., Steenbergen, Bachtiger, Spordli, & Steiner, 2003; Stromer-Galley, 2007) but do not give adequate emphasis to social processes such as respect and consideration. The coding scheme used in this research provides a way to examine how these social aspects are present in group members' discourse. The social/relational aspects of group interaction are more difficult to see in text-based online discussion, and sometimes it was difficult to get adequate variance on some of the relational measures. However, this coding scheme offers a way to assess some aspects of relational communication and found some interesting results even in a lean, text-based online environment. One particularly useful observation was that group members tended to make metacommunicative comments about each other's contributions to the conversation. These comments were often used to sanction others for being disrespectful or not adequately listening to others. In this way, the comments that judged another participants' statements acted as a facilitating function and thus helped to further the social aspects of deliberation in these discussions. Future research could develop these insights further to assess metacommunicative comments in virtual teams or other unfacilitated online discussions.

As this is the initial study of the coding scheme and combination of content analysis with social network analysis, we chose to focus on one policy. Further research utilizing this method ought to extend this analysis by examining a wider range of policies or self-governance discussions in a wider range of groups. Future research could apply the coding scheme to a wider sample range of different policy proposals, which could allow comparison between discussions to examine whether the quality of deliberative discourse is

influenced by features such as topic, time, or length of discussion. We also encourage further use of this coding scheme on virtual teams and online discussions to examine qualities of deliberative discussion in a range of group contexts online.

The second methodological contribution is our integration of social network analysis with content analysis to identify patterns in how the quality of group members' contribution is related to the structure of communication. A handful of scholars have combined these two methods (Contractor & Ehrlich, 1993; Corman, Kuhn, McPhee, & Dooley, 2002; Danowski, 2008). Yet often the content-analysis processes used in these studies are quite simple (e.g., Welser et al., 2007) and can only provide a limited understanding about the meaning of interactions. A critique of many social network studies is that although they show structure, it is often difficult to understand what the relationships mean. Using theoretically based content analysis as the foundation for our network measures helps us understand the interactions more deeply than structure alone would convey. Moreover, the network visualizations, because they are based on the content analysis data, provide more information about the context and roles people play than would be evident through the content analysis alone. Our combination of methods offers a visible display of the interactions that would otherwise be difficult to see through content analysis, and a depth of meaningfulness that is often obscured in network visualizations. This method could be valuable for virtual team researchers interested in norm development, decision-making quality, conflict management, and the emergence of informal roles that lead to team effectiveness.

Conclusion

This research advances group research and deliberative theory by investigating how deliberative discussion happens in a wiki environment. Wikipedia is known for its collaborative approach to creating and editing encyclopedia entries. Wikipedians' use of the wiki technology to collaboratively create and edit policies to govern their own community could serve as a model for other online communities and virtual teams. This article provides a baseline description of the deliberativeness of one policy discussion. As an exploration of possibilities, it does not attempt to generalize and predict across discussions and communities as a whole. Yet it does point to some potentially interesting implications for virtual teams and other online groups.

Our use of network analysis in this study demonstrates how visualizations can be used for discovery of patterns and relationships in data that would otherwise be obscured (Welser, Lento, Smith, Gleave, & Himelboim, 2008; Welser et al., 2007). The network graphs provide clues for potential relationships between

structural inequality and deliberation, relationships that will require further investigation and testing. Data that will allow that testing emerge from the strongly social character of Web 2.0 applications. As these applications rise in popularity and as more of social life takes place in computer-mediated settings, the need for methods that leverage the rich, socially interactive, and longitudinal nature of these data expand (Lazer et al., 2009; Shniederman, 2008). These authors argue that the new social science will increasingly be defined by methods and strategies that combine strengths of the communication, social, and computer sciences. As such, a general direction for future research will require overcoming technical and disciplinary boundaries. As an interdisciplinary bunch, small group researchers are well equipped for this challenge. We are hopeful that future work will utilize a multimethod approach similar to the one presented here to examine both structure and content of group discussion in a wide range of online settings.

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Notes

- 1 Wikipedia's no personal attacks policy can be found at http://en.wikipedia.org/wiki/Wikipedia:No_personal_attacks. The archived discussion page that provided the data for this study can be found at http://en.wikipedia.org/wiki/Wikipedia_talk:No_personal_attacks/Archive_1
- 2 Wikipedia talk pages are not actually threaded discussions, although they are typically used in a manner that relies on conventions of threaded discussion to simulate that mode of conversation. Basically, editors make edits in ways that are meant to look like posts, and they use page subsections to connote threads, and demarcate their edits with their signature and a time stamp. In principle, every character of every edit on the page could be altered by any user at any time, but in practice, the users tend to edit in ways that look like a threaded discussion. Therefore, we discuss edit patterns in policy discussion pages as if they were threaded discussions.

- 3 Throughout this article, we have altered the potentially identifying names to preserve the anonymity of people involved in these discussions.

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Bios

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