EXPERIMENTS IN ONLINE DELIBERATION

A Senior Fellowship Proposal

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Not long after the birth of the Internet, optimists turned toward our new communication technologies, expecting a democratic transformation of the political arena. The speed of information transfer, some thought, would lead to a more educated citizenry. The expansion of publishing access to anyone with a computer would guarantee freedom of the press. Innovations in computer security would make voting easier and verifiable. And, at the core of it all: the possibility of decentralized, peer to peer communication would enable the development of a "deliberative democracy" – a system of discussion-oriented democratic decision-making based on citizens' careful consideration of options and their consequences, situated within an equal, diverse, sincere, and non-coercive communication environment (Fishkin, 2009) (Habermas, 1991) (Hatz-Karp, 2014).

Clearly, this has not happened. Not only have there been few strong examples of the type of discourse situation, but the two axes along which online deliberation were predicted to help the most – increased cooperation and engagement – have deteriorated, causing a slow-motion democratic crisis characterized by polarization, apathy, and corruption.

Attempts to explain the errors of the optimists predictions are numerous. Some rest on the idea that the Internet has made selective exposure to like-minded viewpoints easier (Garrett, 2009), creating echo chambers (Sack et. al, 2005). Others claim that online deliberation simply cannot match the effectiveness of face-to-face deliberation due to the instant gratification tendency of online content and the digital divide (Hartz-Karp, 2014). And of course, there is the possibility that long term sociopolitical trends are responsible for our woes, and while online communication has been a positive influence, it has not been positive *enough*.

The field of *online deliberation* emerges at the intersection of all of these questions, tasked with answering "*normative* (how things should be ideally), ... *descriptive* (how things are empirically), ... and *prescriptive* (how we can change things for the better given real constraints)" questions concerning the design, deployment, use, and adoption of platforms for focused online discussion. Incorporating "communication, information science, computer science", "sociology, psychology, organizational behavior and management science" (Davies & Gangadharan, 2009), the field aims to synthesize understandings of human behavior and apply them to specific computer-mediated social contexts. This accomplishes two goals simultaneously: the development of a set of informed recommendations for developers and practitioners, and the generation of novel environments where theories of human behavior can be tested and refined.

My decision to pursue this field stems from my explanation of why the optimists were wrong. I believe there is no inherent barrier that guarantees the project of online deliberation's failure just as there is no silver bullet that deterministically ensures its success. Human interactions are complicated. The relationship between cause and effect and the metrics by which one would determine success are murky. The technical possibility of a phenomena does not remotely imply its likelihood.

From this murkiness, however, I derive a new optimism. The promise of online deliberation remains an unfulfilled potentiality. It is not that the deliberative democratic dream is impossible: instead, it is that we do not yet know *how* its dynamics function and *how* to use those dynamics to achieve desirable outcomes. In short, we can do it but do not know *how*. It is within these *how's* that all of the beautiful and messy questions worth answering reside.

The Project

I propose some limited but valuable contributions to the study of the relationship between the *structure* of a discussion platform and the *processes* of the discussions that take place on that platform, as well as the methods of uncovering and comparing online discussion *processes*.

Structure and Processes

Definitions. By *structure*, I mean the concrete set of features that vary from platform to platform. These features include: whether user identity is anonymous, pseudonymous, or displayed; whether replies to comments are allowed, the depth of replies to comments (can you reply to a reply?), and the type of specifiable semantic relationships between comments (posting an 'agreeing comment' or a 'disagree comment', or a comment marked as a 'problem' or 'solution'); and the procedure the platform uses to make decisions. Procedure includes the types of comments allowed at a particular time; when, how often, and what type of voting takes place; and which stages must transpire before a decision is considered 'approved'. *Structure* is distinguished from *design* by the former's exclusion of features that do not impact the type of data the program solicits, stores, and displays, such as the layout of the page, colors used, and the nuances of user interaction.

By *processes,* I mean the manner and style of the conversation and the norms that emerge to govern the users' interactions. I am not interested in whether a group decides *A* or *B* is the best course of action but rather *how* that group came to such a decision. Different disciplines call this different things. If I were a sociolinguist or linguistic anthropologist, I would invoke the concept of a 'community of practice' (a group of speakers

with sufficient interaction with each other and common identity) and look for 'discourse norms' that emerge from the interactions within such communities (Eckert, 2006). If I were a conversation analyst, a sub-discipline of linguistics that regards conversation as "interactions spewed out by [linguistic] machinery" (Sack, 1995), I would be looking for that 'machinery'. If I were a formalist organizational theoretician, I would be looking for 'procedures' of 'communicability' for the transmission of messages (Stinchcombe, 2001). If I were a management cybernetician, I would be looking for 'feedback mechanisms', 'channels', and the distribution of 'variety reduction' (Beer, 1981). I hope this enumeration has made it clear that when I refer to *processes,* I mean the overlap all of these things.

Thus, the overarching motivating question of the project will be to help determine how differences in *structure* result in the emergence of different communicative *processes.*

Existing Work. Rhee and Kim (2009) were the first to focus explicitly on the relationship between structure and process in online deliberation through field experiments. They tested variables such as the display of social identity cues such as age, race, and gender, anonymity, the inclusion of a moderator, and the inclusion of feedback system which they called 'discussion points'. They found that in constant with anonymity the display of social identity cues increased engagement but decreased overall commenting frequency, and that moderation decreased the amount of comments posted but increased the amount read. Leshed (2009) found similar effects observationally through changes in the moderation policy of a corporate internal network.

To my knowledge, no one has done this type of field experiment with either comment structures or discussion procedures. Although more complex comment structures have been developed and their potential benefits articulated (Pingree et. al, 2009) (a list as

of 2012 can be found in Towne & Herbsleb), there have been no controlled experiments of complex versus standard simple structure or any comparison of two of the infinite possible complex comment structures. Although several programmers have developed systems implementing specific procedural schemas (Schular, 2009)(Towne & Herbsleb 2012), and Shanks and Dahlstrom (2009) even implemented a configurable programming language capable of implementing *any* procedure, the impacts of these systems on discussion have yet to be tested.

Development, Experiments, and Measurement

I propose a novel method of iterating through the various possible structures and several novel methods of evaluating the results.

Configurability. Rather than design several systems – each separately implementing the combination of features the creator thinks is best – I propose to design a fully configurable website capable of implementing any combination, radically simplifying the setup of controlled experiments.

Features like anonymity, feedback mechanisms (upvoting, downvoting, likes, and dislikes) can be parameterized simply enough. For comment structures and procedures, the method of configuration is more complicated but manageable. All comment structures can be expressed through finite-state machines, a directed-graph-like data structure that consists of 'states' and 'transitions' between them. Conceptualizing each comment as a state and each reply as a transition between states allows us to apply known computational methods for storing, manipulating, and visualizing finite state machines, and avoids the need to create a separate comment structure specification language. Each state (type of

comment) can have additional variable properties such as anonymity and feedback mechanisms, so that one discussion can have different types of feedback that can be provided to different types of comments.

Procedures can also be implemented as finite-state machines, where each stage of the procedure is a state and movement between stages are transitions. Each stage of the procedure contains an associated comment structure such that different relationships between comments become available or unavailable as the discussion proceeds. Each transition between stages is based on configurable transition function, which determines whether the transition should happen and what stage should comes next based on attributes of the current discussion (e.g., time elapsed, number of comments, consensus reached).

Trials. With this configurable discussion software, I will carry out a series of experiments testing various configurations. In particular, I will focus on the effects of complexity of comment and procedure structures for groups of different sizes and the use of switch side debate (forcing participants to arguing the other side). To achieve a large sample size, I will use Amazon's Mechanical Turk – a crowdsourcing marketplace in which individuals get paid small quantities to perform tasks – to solicit individuals to participate in discussions on my platform.

However, in order to best simulate the ideal deliberative environment – a situation where participants are knowledgeable actors with some stake in the outcome – I will limit the topic of discussion to focused questions around 'Turker's Rights', a category of issues relating to labor disputes between Mechanical Turk workers, Amazon, and those that use their services.

After performing experiments with Mechanical Turk, I will select a narrower set of configurations to test with members of non-virtual communities, specifically Dartmouth students. In order to simulate the ideal deliberative environment, students will use the platform to discuss campus issues that they likely know and care about. In addition to increasing the sample size, this is a preliminary test of the degree to which any conclusions drawn from the Turk experiments are generalizable to circumstances with less peculiar conditions.

Evaluation. Using a mix of quantitative and qualitative methods, I will process and compare the results of the discussions produced by various configurations of the software. In addition to established metrics used by the existing literature (distribution of comments per user, diversity of that distribution, change in opinions and confidence of opinions before and after the discussion, and various metrics of user satisfaction with the process), I hope to develop a few novel methods of analyzing conversation that I have synthesized from approaches I have learned in my classes at Dartmouth.

Broadly, some discourse based preprocessing of the data such as tagging comments for topic will allow me to computationally map the progression of topics into a network structure. This structure is computer friendly, so a variety of indices can be used to quantify the distribution of power (Kling et. al, 2015), assigning a power index to each individual actor and an equality score to the network. The equality can serve as a proxy for 'deliberative equity', and correlations between the individual power indices and the demographics of participants can serve as an indication of the exclusion of particular demographic groups, political viewpoints, or discursive styles.

Final Result. The final output will take several forms. First, I will write several papers describing my methods and findings which I will submit to peer-reviewed journals, conferences, and practitioners of online deliberation. Second, I will release the software I develop as free and open source, meaning that the code is copyable and manipulable by anyone. The benefit of this is that anyone can then take the software and, with a few commands, be running the same type of experiments. The code will be properly documented, packaged, and distributed using the open source community's best practices. Third, I will to directly integrate my methods, findings, and background research into several online wikis and communities devoted to these topics, such as participedia.net, participatedb.com, and the p2pfoundation.net. Within the online deliberation community, these resources are as widely referenced and read as academic literature.

My Development and the Senior Fellowship

In the Fall of 2015, I received a grant from the Institute for Security and Technology Studies to travel to Argentina to work with a small start-up called DemocracyOS developing a website for discussion and voting on political proposals. There I was exposed to unique questions that bug the industry but typically are not the focus of academic work. I arrived with a set of recommendations for DemocracyOS dutifully translated from the academic literature, and left with the beginning of an understanding of the relationship between theory and practice and a close-to-functional prototype.

This fellowship, alongside previous experiences, would prepare me to ask and answer questions from both sides of the academic-industry coin and to communicate the ideas of others. Whether implementing these ideas in the industry or further researching in graduate

school, I will use the combination of both experiences to advise practitioners based on the current academic principles and to help direct academic research.

My interest in democracy and governance goes back far, but I strongly developed with high school debate. I was an avid and successful policy debater, attending national tournaments and debate camp each summer. Two curious things resulted: first, I was trained in a highly rigid and logical structure of argumentation based on links (how a policy causes an effect), uniqueness (why that effect is not happening now), and impacts (why that effect is good or bad). I learned to look for the resolution of the conflict between two opposing viewpoints the nuance that neither addressed. Over time I became so habituated to these structures that I used them everywhere. In a Facebook comment war, I would mentally recompose friends' comments into organized sets of truth claims and then respond accordingly. From this experience, I have concluded that – although we do not know the effect of rigid frameworks on discourse and thought – I have felt *some important* effect.

The second curious phenomena was that I lost most of my opinions, or at least I lost strong convictions in most of them. Thinking the opposite of what you did three weeks ago, and repeating that on every issue for 4 years, is an experience that I am very grateful to have had. Although my opinions are more stable now, I recognize that certain types of discussion can break and rebuild one's ideology. When I imagine the extrapolation of that process to a national or global scale, I get very excited.

This project is also the culmination of almost every class I have taken at Dartmouth, as it requires the unique mix of technical, quantitative, and analytical ability I have developed. I have taken mostly computer science, linguistics, and sociology classes, with a particular focus – the computational machinery underlying human communication and

organization – underlining all. Starting freshman year, I took introductory computer science, sociology, and linguistics classes, discovering each field and their connections to each other. Sophomore fall my course schedule had a particular conceptual elegance – I took "organizations and society" and "network analysis", and "computational linguistics" and "syntax". For each of two topics, social organization and language, I had one computational and one non-computational class. For the rest of sophomore year, I continued to take additional classes in linguistics, computer science, and social theory as I also began my outside reading related to online deliberation. During sophomore spring, I completed *Online deliberation: Design, research, and practice* (Davies and Gangadharan, 2009), a compilation of papers which still stands as one of the foundational texts of the field. That summer I worked through *Brain of the firm* (Beer, 1981) written by Stafford Beer, one of the founders of management cybernetics. The book introduces cybernetic vocabulary and concepts, and then details Beer's attempts to implement a form of computer mediated democratic planning at a national scale in Chile.

At times throughout my academic career, my particular niche interests have often felt disconnected. How could my interest in organizations and communication be connected to my passion for programming and data? In the context of this proposed fellowship, such a question becomes nonsense. My two interests converge in a single trans-disciplinary pursuit, each inspiring and enabling the other to ask deeper questions and reach deeper conclusions.

This senior fellowship would serve as an ideal culmination of my undergraduate experience, wrapping up the curricular and extra-curricular, computational and analytical, and theory and practice components of my mind into a neat box that I can bring with me to my next adventure.

Timeline

Term -1, 16S: On Campus, Taking Classes: Finalize faculty relationships and catch up with the literature and progress in the field. Take discourse analysis, which will enable me to properly analyze the data I collect.

Term 0, 16X: Off Campus, Working: Spend a few hours a week developing the software. By the end of the summer, I would like to have decided on the technologies I will use and set up the basic skeleton of the software. Also by the end of the summer, I will have received ISRB approval for both the Mechanical Turk experiments and experiments with Dartmouth students.

Term 1, 16F: On Campus, First Term of Senior Fellowship: This term will mainly be focused on developing the software so that I can immediately begin experiments the next term. By Week 6, I would like to have completed a functional prototype that I can perform some initial user testing with. By Week 8, I would like to have incorporated results from that user testing into a refined product. I will spend the last two weeks of the term deploying my software and integrating it with Amazon's Mechanical Turk environment.

Term 2, 17W: On Campus, Second Term of Senior Fellowship: Beginning in winterim until Week 7 of the term, I will conduct experiments with Mechanical Turk, managing any problems that arise with the software and partially analyzing the data as it is created. Starting Week 7 I will transition to field experiments with Dartmouth students.

Term 3, 17S: On Campus, Last Term of Senior Fellowship: This term will focus on analyzing my data, synthesizing its conclusions with those of other experiments in the literature, and writing, publishing, and promoting my work and software.

Budget

Mechanical Turk fees for 17W: *$20,833*. The primary expense of my project is the money to pay the mechanical turk workers to participate in the online experiments. I calculated $20,833 by supposing that each discussion group will have an average of 50 participants, and I would like to have 50 such discussions, each involving around one hour of a Turk worker's time. These calculations would allow me to pay each worker $8.33, which Amazon would take a %40 cut of, leaving the individual with $5.

Typically, Mechanical Turk workers are paid well below the minimum wage, and $5 is at the upper range of what they typically receive for an hour of work. I believe that in order to ensure meaningful participation in the discussion, workers must not feel as if the experiment is short-changing them as they discuss the potential of Amazon and other Mechanical Turk requesters doing so.

Deviations from this amount, either higher or lower, will directly affect the experimental validity of the results by increasing or decreasing my sample size.

Compensation for Dartmouth Students during 17W: *$750*. Just like with the Mechanical Turk workers, compensation for time is required for students that participant in the study. $750 is based off of 5 trials with 30 participants getting paid $5 per hour.

Travel Expenses for Conference Attendance: *$1,000*. Additionally, I request $1,000 to aid with travel expenses (plane tickets, hotel rooms) to attend conferences whether I can publicize my work and interact with the work of others. Any money in this category not used can be returned or funneled towards more Mechanical Turk experiments, as requested by the funder.

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