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Designing Networked Publics for Communicative Action

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On-line social network sites are a major organ of civic life. For many, they are a primary source of news and locus of political discussion. Algorithms mediate the online interactions of millions of participants with potentially vast political implications. In such a world, intellectual silos of social theory, systems theory, and engineering must collapse lest political outcomes be driven by unconscious or illegitimate actors.

This paper has two purposes, one nested in the other. In the first major section, I will show how normative claims from social theory can inspire the technical design of public communications infrastructure. I draw political values from work on the public sphere

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by Habermas [1] and Fraser. [2] Their concerns about media power and participatory disparity, respectively, can be articulated with the tools of network science [3] to inform the design of relevance algorithms [4] for networked publics. [5] For the sake of concreteness, I present @TheTweetserve, an open source Twitter bot I built based on these principles.

The second purpose is to justify and extend an invitation to sociologists of technology to join recursive publics, as identified by Kelty: publics that openly design, build and maintain their own communication infrastructure using the Internet. [6] Addressing researchers whose work is itself mediated by networked publics, I present this invitation as a way of managing context collapse between researchers of different disciplines. This paper itself is an attempt at disciplinary collapse modeled on context collusion. [7] I offer disciplinary collapse within recursive publics as an alternative to a pessimism about our ability to contend in a scholarly way with powerful algorithms. [8]

In the final section of this paper, I open the research problem of designing a recursive networked public suitable for our own scholarly communication. We can approach the design of such a system as legal scholars studying social laws, laws that can be implemented as software code. I propose that Habermas's distinction between social *system*, where action is coordinated non-linguistically through steering media like money and power, and social *lifeworld* where action is coordinated through linguistic consensus, is useful for thinking about the goals of such a scholarly, recursive, and networked

public. A public designed to enable mutual understanding through communicative action among scholars could serve as a model for other networked publics.

Networked publics: theory and design

In this paper, I will analyze the workings of social network sites such as Twitter and Facebook as networked publics, following boyd (2010). I will not recapitulate vastness of academic literature on publics and the public sphere. I hope not to build on top of that but rather to demonstrate how one can cut across it towards what those in human-computer interaction (HCI) would call “implications for design.” [9] To this end I will focus on the works of Jürgen Habermas, who originated scholarship on the public sphere in 1962 and has developed his position throughout his career. I anticipate that similar moves from theory to application can be made from others’s scholarship.

I focus on the concept of the public sphere raised by Habermas and in particular his ideal of the public as a space of discourse among participants with equal voice. Elaborating on the challenges of accomplishing such an ideal, I draw on Fraser’s critiques of actually existing publics and their intrapublic and interpublic inequality. Setting discussion of non-networked publics aside as beyond the scope of this paper, I translate these concepts into the domain of networked publics and argue that our understanding of a relevant notion of inequality within them can be articulated using the tools of network science, [10] and particularly through the idea of preferential

attachment, a social mechanism through which the well-connected become even more well-connected. That fact combined with the relevance algorithms [11] that determine what content is displayed as relevant lead some networked publics, such as Twitter, to fall far short of the Habermasian ideal.

The affordances of network publics enable our very specific understanding of this form of inequality. They also allow the construction of actually existing alternatives. I will describe @TheTweetserve, a bot that embeds an alternative algorithmic mechanism within the larger context of Twitter as a public sphere. This intervention is a simple demonstration of how technical interventions and algorithm provision can be motivated by normative social theory and a form of political expression. It also exposes design trade-offs that I argue must be taken into account in critically informed discussion of networked publics.

Ideals and critiques of the public sphere

Jürgen Habermas's early work on the public sphere was originally published in German in 1962, then later translated under the title *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*. [12] It described the development of what he named the bourgeois public sphere, where "bourgeois" refers to its origins in the merchant class in the European Renaissance. As this class grew in political power relative to the old aristocracy, it needed spaces and media, such as salons and newspapers, with

which it could coordinate business and government interests in the interest of global expansion. Habermas named these spaces and media collectively the public sphere.

Habermas's interest in the public sphere is due partly to his interest in the legitimate foundation of democracy. Without a social process where private citizens can discuss their concerns and come to agreement, political or economic power will go unchecked by citizen oversight. In Habermas's philosophical work in the 70's he theorized the conditions under which consensus arising from discussion is a legitimate synthesis of the interests of the participants: the ideal speech situation. [13] Among the conditions of this ideal are that nobody capable of making a relevant contribution is excluded and that they have an equal voice. [14]

Fraser critiques Habermas's conception of the public sphere on several specific points, some of which I will take up here. [15] One critique concerns the role of social status and power within public discourse. In Habermas's conception, social status—such as conferred by class or gender—should be bracketed in public discourse. Fraser contends that this obscures the way status affects discursive outcomes by affecting conversations at the level of turn-taking and to whom responses are directed. Fraser argues that far from being bracketed, within an equitable public this manifestation of social power must be explicitly thematized and counteracted.

Fraser also critiques the singularity of Habermas's conception of the public sphere, noting the historical existence of multiple counterpublics, wherein marginalized groups resolved and articulated their own interests before rejoining the dominant "bourgeois masculinist" public. For Fraser, the existing public sphere in stratified society is a nexus of competing unequal publics, and the ideal multicultural public sphere maintains a multiplicity of publics of different cultures. While "this need not preclude the possibility of an additional, more comprehensive arena in which members of different, more limited publics talk across lines of cultural diversity," for Fraser in 1990, the possibility of such a comprehensive inter-cultural public center is an empirical question.

Fraser's critiques challenged Habermas's conception of the public sphere, while in many ways maintaining the ideal of its being the site of democratic legitimation in society. In the spirit of Habermas's call for an ideal speech situation with participatory parity, she raises issues of interpublic and intrapublic inequality that prevent actually existing publics from achieving this ideal. Other considerations preventing the actuality of an ideal public arise in Habermas's own work, which is critical of the role of consumer-oriented media. Habermas notes that media-driven discussion is not based in interpersonal consensus but rather on factors like who owns channels of mass communication.

Both Habermas and Fraser were observant of historical publics and held them to a higher normative standard of participatory parity. They

set the stage for an evaluation of contemporary networked publics on the basis of how they structure discursive participation, topology (including their singularity or plurality, as well as their interpublic connectivity), and susceptibility to media power.

Networked power in networked publics

Carrying these concepts into the 21st century, we can ask how well contemporary networked publics approximate an ideal speech situation, and to what extent they are beset by the problems of media power and inequality. I argue that the tools of network science [16] give us ways to think rigorously about parity and power within networked publics. This rigorous understanding can then be used to design politically motivated technical interventions.

boyd notes that one of the significant features of networked publics is the existence of friends lists. She explains that choosing whether or not to 'friend' another user is a social and political choice that can be read as an articulation of the public, a statement of the people with whom the user imagines themselves in association. [17] In contemporary networked publics like Twitter and Facebook, the friends list also plays a crucial role in determining information flows within the system. On Facebook, one's friendships are an input to the EdgeRank algorithm that determines what is displayed on one's newsfeed. [18] It is also a means by which users manage who has permission to see their updates at all. In the case of Twitter, a user's timeline consists of updates from all the accounts they follow. To a first

order of approximation, the number of followers one has on Twitter is an indication of one's influence. This is an extreme simplification, one that features so widely in public perception that there is a large market for fake Twitter followers. In practice, not only how many followers a user has, but who those followers are contributes to a user's ability to control public discourse.

Castells gives the name "*networked power*" to the power an agent has because of their place within a network. [19] He uses "*network-making power*" to refer to the power of agents who control the structure mediating the network. These concepts are useful for thinking about networked publics: users with influential followers on Twitter have substantial networked power. The Twitter corporation itself has great network-making power. My own ethnographic research of Twitter [20] has confirmed the role that highly followed accounts—whether they are professional social media personalities like digital journalists or hobbyist micro-celebrities [21]—have in shaping public discourse, especially around what topics go viral.

The field of network science, which combines mathematical graph theory with social network analysis, has flourished because of the availability of data from social network sites. This data has confirmed robust laws of social network formation. One of these regularities is extreme inequality in number of social connections. In mathematical graph theory, the number of connections a node has with others is called its degree. In many graphs generated by social process, such as the friendship graphs from social network sites, node degree is

distributed according to a power law distribution. This is the same sort of distribution as the distribution of global wealth—highly unequal, with a few very rich and many very poor. In contrast, the distribution of personal height is normally distributed—roughly bell shaped, with many people around average height and a few extremes in both directions. [22] Networks that have power law degree distribution are called scale-free networks.

Network scientists Barabási and Albert have sought to explain the prevalence of scale-free networks through a general mechanism called preferential attachment. [23] If when a network grows new nodes are more likely to connect to nodes with high degree than nodes with low degree, then it will grow into a scale-free network. An example of preferential attachment is when Twitter recommends that new users follow celebrities or other well-known figures when they join the network. Empirical studies of social network sites have confirmed that their networks are scale free and that their growth shows preferential attachment, specifically through social recommendation to peers [24] and content sharing. [25] This scientific result has social implications: preferential attachment on social network sites implies large disparities in networked power.

In a networked public, networked power is as useful conceptualization of intrapublic inequality. Operationalizing forms of networked power within the language of network science gives us purchase on how unequal distributions of power are reproduced. If one accepts number of followers as a first approximation of networked power, then when

both media outlets and individuals participate in the same network, it follows from the above reasoning that preferential attachment will compound any initial inequality due to financial investment, social status, or access. These participatory disparities then affect discursive outcomes as those with privileged positions in the network direct information flow.

Another characteristic of social networks, as opposed to biological and technical networks, is assortative mixing, the property that nodes with high degree are more likely to be connected with other nodes with high degree. [26] This is a special case of another common property of network formation, homophily, the tendency of people to connect with others similar to them. [27] Assuming, as we have, that node degree is correlated with networked power, this implies that powerful people within a networked public will be clustered together. An assortatively mixed network looks a lot like the public sphere described by Fraser: not just marked by inequality between individuals, but between publics and counterpublics. [28] Thus, network science provides tools for understanding not just intrapublic inequality, but also interpublic inequality, subsuming these under a broader and more flexible idea of network topology.

Network science paints a bleak picture for equal participation in the public sphere. As social networks grow naturally, they reinforce existing inequality of networked power within them. This process is especially transparent in networked publics because of their explicit representation of the social graph. The implication is that media

power and privileged groups will dominate discourse in networked publics, and so these publics will fail to arrive at democratically legitimate discursive outcomes. However, that networked power is explicit within the social graph is also an opportunity. Rather than bracketing these social differences, in the spirit of Fraser we can design networked publics that counteract them.

Actually-existing alternatives

We need not resign ourselves to the bleak picture of inequality. By acquiring and exercising network-making power, we can alter the algorithmic structures of networked publics for political purposes. As a demonstration of this, I have developed a Twitter bot, @TheTweetserve, which counteracts preferential attachment.

@TheTweetserve is inspired by The Listserve, a project developed by Josh Begley, Alvin Chang, Yoonjo Choi, Greg Dorsainville, and Zena Koo in 2012. The Listserve is a mailing list that is free to join. Once a day, a subscriber is selected at random and given the opportunity to write everyone else on the list. At the time of this writing, The Listserve has over 20,000 subscribers. In light of the preceding analysis, The Listserve's simple mechanism of random selection avoids many of the shortcomings of networked publics. Members are equal before the algorithm that controls the discourse.

@TheTweetserve works similarly. Twitter users "subscribe" to the bot by following it and then mentioning it. They have the option

of following it and not mentioning it if they would rather “lurk”. At regular intervals, @TheTweetserve randomly selects a subscriber and retweets their most recent tweet. All subscribers have an equal probability of being selected.

Normally on Twitter those who post most frequently and have the highest number of followers are more likely to be heard. @TheTweetserve follows a different logic. It is indifferent to the number of followers of its subscribers. Infrequent tweeters are not disadvantaged compared to frequent tweeters that may have greater access to Twitter, for example through more expensive smart phone data plans.

I have published the source code, a mere 150 lines of Python, on GitHub, a code hosting and issue tracking site that is itself a networked public. [29] The code has an open source license and I welcome feature requests, including requests for improved documentation. Dear Reader, this is a backstage pass.

It is possible to build such a technical intervention because Twitter has an open Application Program Interface (API). Through this interface, external applications communicate with Twitter’s infrastructure, reading and writing to its database and interacting with objects defined within it. This API is well-documented on Twitter’s website. [30]

At the time of this writing, @TheTweetserve has attracted under fifty followers and has not in my estimation had a significant impact on the topology of Twitter as a networked public. Unlike many automated Twitter accounts, it lacks a growth mechanism; it does not, for example, automatically follow other users to get their attention. Chang notes that @TheTweetserve currently lacks a ‘value’ mechanism, something that would select for or encourage high quality contributions. This could be another reason for its failure to revolutionize networked society. [31] This highlights a concrete design trade-off. Davies points out the tension between social equality and consumer quality. [32] To filter subscriber’s content by algorithmically estimated quality would be to make a political choice that is more distant from the Habermasian ideal.

I present @TheTweetserve as an actually existing alternative to networked publics governed by commercially motivated relevance algorithms. [33] I do so with some measure of irony. Users may not be motivated to use social network sites that expose them to others chosen at random. Thinking beyond a discussion of the available technological options, do the motivation of users preclude these sites from serving as ideal Habermasian public spheres? When people choose to use social network sites organized around logic chosen by site providers, does that not speak to the success of that design? The choice to use Facebook or Twitter is a choice of complicity in these networked publics’ political logic, though alternatives exist.

My invitation and challenge to the scholarly community is to produce a concrete design of something better. @TheTweetserve is a naïve prototype. What would a more advanced version look like? For example, it is possible to build a similar bot that takes positioning within the social network into account when determining relevance. Rather than select subscribers from a uniform distribution, a networked public that was more sensitive to Fraser's critiques could first select a cluster of users—one of many unequal publics and counterpublics—and then retweet a representative selected from within it. This is just one of a vast array of possibilities.

Not all political goals can be articulated using network science and implemented into technical architecture. For example, other conditions of Habermas's ideal speech situation include the lack of coercion and the participant's ability to express their authentic interests free of deception and self-deception. I do not see how these can be addressed directly with social network site design (though this may be due to lack of imagination). I have left these considerations to one side not because they are unimportant but because of the scope of this paper. A more complete science of networked publics, one that I think is well worth aspiring to, would combine both a deep technical understanding of the dynamics of the digital network and a nuanced account of its social context. The following section of this paper discusses how networked publics provide the conditions of such a science and proposes a way forward.

Expanding the recursive public through disciplinary collapse

In the preceding sections, I have provided a concrete example of how historically informed normative social theory can be articulated using network science, then translated into design criteria and implemented as an actually existing networked public. This research takes inspiration from the Values In Design approach, [34] which combines philosophical inquiry, technical implementation, and empirical study into a unified, pragmatic activity. In addition to its value as research in its own right, I intend this work as demonstration against a scholarly attitude that critical political study of networked publics and their technical implementation should or must be separate intellectual disciplines. In the remainder of this paper, I will argue that achieving normative goals in actually existing networked publics requires disciplinary collapse.

Going beyond exclusively sociological inquiry

I have demonstrated above a sociotechnical inquiry into networked publics and the algorithms they employ. I have done so in order to build upon and challenge a prominent scholarly position of which Tartleton Gillespie's "The Relevance of Algorithms" is an exquisite representative. [35] In the interest of clarifying my own position, I will address that article here directly. It is interesting to note that even before its official publication this article has been distributed widely over the Internet as a PDF. As such, it is already a noted intellectual

accomplishment that has inspired many. In more ways than one it is a very relevant article.

Gillespie is concerned with the kind of inquiry that is brought to bear on public relevance algorithms, the algorithms used by networked publics and search engines to determine what information should be seen by users. Arguing against “simplistic technological determinism”, he writes, “we must firmly resist putting technology in the explanatory driver’s seat.... A sociological analysis must not conceive of algorithms as abstract, technical achievements, but must unpack the warm human and institutional choices that lie behind these cold mechanisms.” He goes on to point out many examples of how various features of the user interfaces of social network sites reify socially constructed categories and reflect the commercial interests of algorithm providers despite prevalent rhetoric suggesting these systems’ objectivity.

Gillespie writes critically about both the availability of this commercial technical infrastructure to researchers and the computational techniques using data collected from them as social scientific methods. He notes the difficulty researchers have in understanding the specifics of many commercial relevance algorithms due to lack of “backstage access”. These algorithms are not shared with the public for practical reasons of maintaining profitability and preventing spammers from gaming them.

Because these algorithms and databases created by them are not available to researchers, Gillespie argues that we should be skeptical of the computational methods they enable. He notes that these methods are “alluring” and “seductive” to social scientists but are suspect when the data used by them is created by proprietary systems. He writes, somewhat cryptically, “Computational research techniques are not barometers of the social. They produce hieroglyphs: shaped by the tool by which they are carved, requiring of priestly interpretation, they tell powerful but often mythological stories—usually in service of the gods.”

These considerations lead Gillespie to a pessimism about our ability to understand the powerful algorithms that govern us. “[T]here may be something, in the end, impenetrable about algorithms. They are designed to work without human intervention, they are deliberately obfuscated, and they work with information on a scale that is hard to comprehend (at least without other algorithmic tools).” Gillespie is correct to warn social scientists against simplistic technological determinism and the problems of proprietary search engines and social media pose for our engagement with them as users and researchers. But these impediments are surmountable.

There are alternative algorithms that are not so deliberately obscured, such as the cases of well-documented API’s and open source software. These technologies afford computational methods and understanding that are not hieroglyphic. They are an alphabet

with concrete social interpretation, legible to those with sufficient training or an open mind. So as a productive alternative to purely sociological criticality of proprietary algorithms, I offer an invitation to sociologists of technology to engage in sociotechnical inquiry with algorithm providers that are committed to transparency. There are technologists who are both committed to transparency of their algorithms and invested in the social impact of their work. Many of these belong to the Free Software movement, an example of what Kelty identifies as a recursive public. [36]

An invitation to engage recursive publics

Kelty defines recursive publics as “publics concerned with the ability to build, control, modify, and maintain the infrastructure that allows them to come into being in the first place.” He applies this concept to the communities that build the infrastructure of the Internet, such as Usenet, email, the World Wide Web, UNIX, free and open source software, and web standards. His work shows how these communities are engaged in political activity not primarily as vocal ideologues but in the creation, modification, and maintenance of software, networks, and law. In ways normally unrecognized by political theory, these actions can express ideas about the moral order of society. They can also challenge political and economic power through the creation of actually existing alternatives.

Recursive publics build foundational infrastructure for the Internet and participate in the production of application layer functionality

such as social network sites. Facebook and Twitter both employ developers who work on open source software. Wordpress.com, a commercial social blog host that is built on the open source Wordpress software, and GitHub, which open sources almost all of its code [37] are two examples of networked publics that have deep roots in recursive publics. As a matter of best practice, successful open source communities deliberately put as much of their communication as possible into public and archived fora, [38] alleviating Gillespie's concern about limited backstage access. I have developed and presented @TheTweetserve as a demonstration of these practices and their relevance to networked publics.

Froomkin has studied the practices of the Internet Engineering Task Force (IETF), a committee originally comprised of graduate students that determines the protocols and standards of the Internet. [39] He claims that this group and perhaps others involved in the Internet standards process fulfill Habermas's notoriously demanding standards of consensus legitimizing discourse. This is a noteworthy historical example of a scholarly recursive public self-organized for legitimacy—a legitimacy so complete that for the vast majority of Internet users its influence is unquestioned and invisible.

I invite those involved in the critical study of networked publics to participate in recursive publics and include them in their imagined audience. While there is important and substantial scholarship on open source communities, rarely is work on normative social theory directed to them as an audience. This is due partly because of the

natively technical disciplinary orientation of many recursive publics and the perception that they are not receptive to other forms of inquiry. If scholars accept this invitation, perhaps one day our participation in the networked publics will not be based on ignorance and unfairness, but rather on legitimate consensus about norms and infrastructure. This cannot be accomplished while maintaining clean distinctions between academic disciplines.

Disciplinary collapse

Thinking reflexively about the process of the research I present here, I recall that it began with a conversation on Twitter involving myself and two other researchers whom I had never met in person, Nathan Matias and Brian Keegan. [40] Matias introduced me to Fraser's work; Keegan introduced me to assortative mixing in social networks. Later, while developing @TheTweetserve as an aspiring relevance algorithm provider, I followed a link to where a preprint draft of Gillespie was posted on-line. [41]

This paper is the result of context collapse. Davis and Jurgenson review how the collapse of social contexts is a noted characteristic of interactions in networked publics, and distinguish between context collision, or accidental collapse, and context collusion, or intentional collapse. [42] As more of academic discussion moves to open access journals and more researchers encounter each other online, the mechanism of context collapse plays more of a role in the encounters

between normally contextually separated academic disciplines. These collapses may be disciplinary collisions or disciplinary collusions.

I maintain that these collapses are productive both for scholarly understanding of networked publics and for the pragmatic goal of improving our technical options. We (speaking now to recursive publics generally, inclusive of researchers studying social theory, networked publics, and values in design) stand to gain more if we are, by default, open to each other's ideas. While this process of collapse will not always be easy, it can bear fruit in the form of new technical and political options. [43]

To the extent that networked publics coordinate the interactions between those that research them, we work under conditions of context collapse and preferential attachment. We can take responsibility for the infrastructure we use for scholarly communication, including the relevance algorithms we employ, by joining recursive publics. How then shall we steer the sociotechnical system of our own discourse so that it serves our interests legitimately? For an answer, I will look once again to Habermas.

Communication and law in networked recursive publics

This line of inquiry has come full circle. The study of networked publics and the legitimacy of discourse mediated by them implicates

our scholarly communication about the study. Those of us doing this research in recursive publics take responsibility for the networking infrastructure itself. We cannot escape the normative question: what politics should be embodied in the networked publics that coordinate scholarly communication? How can these publics be designed to fulfill our own intellectual function, let alone their broader civic function, in the face of unequal power and context collapse?

The answer depends on our changing relationship to this infrastructure. As we shift from a position of purely sociological critique of opaque algorithms beyond our control to a sociotechnical engagement with transparent systems we are responsible for, our relationship to this technology changes. It ceases to be the expression of remote powers and becomes an expression of our own interests. This suggests our work should aim at reconciling our own conflicting interests and balancing inevitable trade-offs in the interest of more just design.

Code as law

It may be useful to frame our relationship to technology in this case as one of “code as law.” Lessig has argued that when software regulates society, it plays a role analogous to law. This framing of code as law is especially pertinent to recursive publics. [44] It empowers us to study algorithms and other aspects of networked publics as if we were legal scholars informing a legislature of designers and engineers. It also positions our support and use of networking platforms and services as a democratic choice.

Putting to one side the ambitious goal of designing the networked public sphere of a democratic nation-state, we can consider the humbler but still interesting question of how to design a networked and recursive public of scholars. What system of source code and norms should guide such a public? Such an inquiry raises familiar questions of access, accountability, and power, but in an immediate and actionable way. A public design perfected for our own purposes could serve as a model for other, larger communities.

Designing systems for the lifeworld

What should such a public be designed to accomplish? I submit that if we are to navigate the complexity of our own disciplinary collapse, we should design publics to enable what Habermas calls “*communicative action*”—action oriented towards mutual understanding, as opposed to strategic actions motivated by individual gain. Habermas made this distinction almost 20 years after his early work on the bourgeois public sphere in *The Theory of Communicative Action*. [45] In these works, he leaves behind the concept of the ideal speech situation. He shifts from considering legitimacy as the product of a situation to legitimacy as the outcome of the human intention to reach agreement. He then draws out the implications of his theory of action for the interaction between civil society and political and economic power.

In this work, Habermas draws a distinction between the *lifeworld*, those social backgrounds and contexts where it is possible to

coordinate action through linguistic consensus, and *system*, where action is coordinated non-linguistically through other media such as money and power—or “steering media”, in Habermas’s terminology. Habermas gestures at civil society institutions as the site of the lifeworld, in contrast with state bureaucracies and the market as examples of systems. [46] [47] He elaborates on the relationship between the steering media and lifeworld-coordinated action in this passage from *The Theory of Communicative Action, volume 2*:

“The transfer of action coordination from language over to steering media means an uncoupling of interaction from lifeworld contexts. Media such as money and power attach to empirical ties; they encode a purposive-rational attitude toward calculable amounts of value and make it possible to exert generalized, strategic influence on the decisions of other participants while bypassing processes of consensus-oriented communication. Inasmuch as they do not merely simplify linguistic communication, but replace it with a symbolic generalization of rewards and punishments, the lifeworld contexts in which processes of reaching understanding are always devalued in favor of media-steered interactions; the lifeworld is no longer needed for the coordination of action.” [48]

For Habermas, the interaction between lifeworld and system is mediated by law, which is intelligible to civil society but also a controlling force upon or function within the steering media. [49] In

networked publics, I submit that lifeworld and system are mediated by source code, the intelligible and mutable specification of non-linguistic control mechanisms. In recursive publics, that source code is available for discursive consideration and there are norms for changing it in light of decisions made in the lifeworld. I challenge scholars to design a recursive networked public that is a viable and legitimate system for supporting our scholarly communicative action. Fraser's critiques of the public sphere noted above are some of the reasons why design of such a public is not a trivial task but rather one that requires subtle thinking about, for example, social network topology. Participatory disparity is an example of what a recursive networked public's code can regulate against.

I have in this paper traced a movement from social theory (Habermas, Fraser) to abstract operationalization (Watts, Castells) to open technical implementation. This implementation shows how abstract theoretical ideas can be made concrete but also exposes design tradeoffs that must be considered in responsible criticism of technology. This work serves as a demonstration to ward off pessimism about researcher's ability to understand critical social algorithms (Gillespie) and invite other researchers to join and write for recursive publics that build, control, and maintain their own communications infrastructure (Kelty). An open and actionable problem facing researchers today is the design of a recursive networked public that supports scholarly communicative action about its own goals and the implementation of appropriately chosen algorithms as this public system's code or law.

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[47] The value of the concept of “lifeworld” has been challenged by Baxter (2011) in light of Habermas’ recent work and critical analysis. Baxter points out that since the term has its roots in phenomenology, and because there is undoubtedly a phenomenology of bureaucracy and the market, the contrast between “lifeworld” and “system” is misleading. However, in the case of systems of software and network infrastructure, the distinction between lived and linguistically mediated experience and interacting material structures is even more vivid than in the context of Habermas’s original use of the term. Whereas the sense of “system” of interacting components was once a metaphor for certain structurally determined social worlds, networked publics are characterized by systems of operating machines without human phenomenology or linguistic capacity, yet. See: Baxter, H. (2011) *Habermas: The Discourse Theory of Law and Democracy*. Stanford University Press. Stanford, California.

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