Fall 9-29-2010

Designing Systems that Support the Blogosphere for Deliberative Discourse

David Schuff
Temple University, schuff@temple.edu

Ozgur Turetken
Ryerson University, turetken@ryerson.ca

Asif Zaheeruddin
Institute of Business Administration Karachi, zuasif@gmail.com

Follow this and additional works at: https://aisel.aisnet.org/thci

Designing Systems that Support the Blogosphere for Deliberative Discourse

David Schuff
Temple University
schuff@temple.edu

Ozgur Turetken
Ryerson University
turetken@ryerson.ca

Zaheeruddin Asif
Institute of Business Administration Karachi
zuasif@gmail.com

Abstract

Web 2.0 has great potential to serve as a public sphere (Habermas, 1974; Habermas, 1989) – a distributed arena of voices where all who want to do so can participate. A well-functioning public sphere is important for pluralistic decision-making at many levels, ranging from small organizations to society at large. In this paper, we analyze the capability of the blogosphere in its current form to support such a role. This analysis leads to the identification of the principal issues that prevent the blogosphere from realizing its full potential as a public sphere. Most significantly, we propose that the sheer volume of content overwhelms blog readers, forcing them to restrict themselves to only a small subset of valuable content. This ultimately reduces their level of informedness. Based on past research on managing discourse, we propose four design artifacts that would alleviate these issues: a communal repository, textual clustering, visual cues, and a participation facility for blog users. We present a prototype system, called FeedWiz, which implements several of these design artifacts. Based on this initial design, we formulate a research agenda for the creation of new tools that effectively harness the potential of the growing body of user-generated content in the blogosphere and beyond.

Keywords: Web 2.0, blogosphere, deliberative discourse, text clustering, interface design

WEB 2.0 AND THE PERILS OF SELF-PUBLISHING

Web-based collaborative applications commonly known as "Web 2.0" (O'Reilly, 2005) have been changing the way individuals interact with each other and the public at large. These applications have changed the communication paradigm from a one-to-many to a many-to-many format. Web 2.0 , at its core, is a mechanism for self-publishing user-generated content (Cayzer, 2004), which can be in various forms ranging from online video (e.g., YouTube, Google Video, MetaCafe) to text-based content (e.g., Blogger.com, WordPress, Wikipedia). The intended audience of information shared in Web 2.0 also varies greatly, from narrowly focused content to information intended for a much broader audience. For example, social networking sites such as Facebook and MySpace provide mechanisms for users to share information about themselves with unique and limited networks of individuals. In addition to this kind of "narrowcasting," using Web 2.0 to broadcast to a broader audience is also common. Users of Twitter can publish brief, public "microblog" entries regarding what they are doing at any point in time. Another example is user-created posts sharing reactions to news stories on CNN.com.

Within its many applications, one of the most visible and established components of Web 2.0 is the weblog (or "blog"). The term "blog" is commonly used to describe a web site where an individual (typically the owner or the "main author" of the site) or a group of individuals write about a variety of topics such as the details of their daily lives or their reactions to ongoing world events. New technologies have made it very easy for users of all skill levels, even novices, to add their voices to a publicly shared platform and elicit feedback from a broad audience of readers. This feature has generated an arena for public discourse and set the blog apart from previous incarnations of the personal web page.

It is this interactivity that has made blogging a popular alternative to traditional media for public discourse, so much so that it is a common opinion among many media professionals that the recent decline in traditional newspaper readership is strongly related to the rising popularity of the blogosphere (the entire collection of blogs) and social media. Though this might be the most noticeable (and to many, the most worrisome) consequence of the changing dynamics in media, the pervasiveness of the blog medium manifests itself in other domains as well. For example, sites such Engadget.com and Macrumors.com discuss new consumer technology products, Consumerist.com is a "grassroots" consumer advocacy site, and Lifehacker.com has emerged as a technology-focused site providing "do-it-yourself" tips. Many corporations, such as Dell, Toyota, and Southwest Airlines, also use blogs to communicate with their customers regarding new products and initiatives.

Despite these examples, much of the discourse in the blogosphere is political in nature. According to a 2006 report published by the Pew Internet & American Life Project (Lenhart and Fox, 2006), 11% of blogs have a political focus, making the popularity of political blogs second only to blogs focusing on bloggers themselves. A 2008 survey by Technorati (White, 2009), the leading search engine in the blogosphere, found that 35% of bloggers reported that they write about politics. eTalkingHead.com's directory of politically-oriented blogs[1] now contains over 500 entries from a variety of points of view. Many political campaigns have started using blogs as a method of communicating with their audience. In the United States, both the Democratic and the Republican parties use blogs as a key component of their communication strategy.

Given this broad reach and the wide variety of blog content, the forum created by the expansion of the blogosphere has the unique potential to support the notion of the "public sphere" as described by Habermas (1974, 1989) as a distributed arena of voices where all who want to do so can participate. The public sphere is important to society in many ways. Habermas contends that an effective public sphere is essential to a well-functioning democracy, and is a critical component to the notion of "deliberative discourse," where public deliberation among an informed citizenry is the key phase of political decision-making. While this is the most discussed aspect of deliberative discourse, the concepts of public sphere and deliberative discourse are relevant in other contexts such as an organization or a small segment of society (Asif and Klein, 2009). Research on organizational behavior has long identified the importance of "consensus" in organizational decision-making. According to Kraus (1984), "consensus does not mean that everyone in the organization agrees on a particular outcome. It does mean that everyone has been involved in the process …" (p. 138). He also goes on to argue that consensus is a critical value for organizations because it leads to better quality decisions, and the possible consequences of non-consensus decisions are disgruntlement, disobedience, and even sabotage from those who do not agree with the outcome. McBurney and Parsons (2000) echo these claims, pointing out that deliberation legitimizes the decision-making process – people are more willing to accept decisions made through deliberation whether or not they agree with the decision itself. This idea has already led a number of organizations to adopt intra-organizational blogging as a mode of internal communication (Dearing and Taylor, 2008).

In his book The Assault on Reason, Al Gore (2007) notes that "there is no inherent limitation on the number of entryways to the public forum as it exists on the Internet" (p. 262). He contrasts the Internet with television as a broadcast mechanism by pointing out that television is a one-way medium with high entry barriers, while the Internet and Web 2.0 are two-way media with "low entry barriers" (p. 260). Gore believes that the Internet has the potential to become a "marketplace of ideas" because of its high degree of decentralization among content producers and its

asynchronous, on-demand nature.

Recognizing the importance of deliberative discourse and the blogosphere's potential to facilitate it (Klein and Huynh, 2004), our goal in this paper is to demonstrate how the current state of the blogosphere falls short of its potential to serve as a true public sphere, and how we must design tools that make better use of the blogosphere's vast content in supporting deliberative discourse. We draw upon Habermas' (1996) requirements for public debate and Habermasian critical discourse analysis (Cukier et al., 2009) to formulate guidelines for the design of such tools.

While social media encompasses more than the blogosphere, the blogosphere is the focus of this paper for a number of reasons. The blogosphere is arguably the best-established Web 2.0 space for public discourse; therefore, it is a natural starting point to study Web 2.0 phenomena related to public discourse. Furthermore, many of our observations and postulations about the blogosphere apply to similar emerging Web 2.0 applications (such as Twitter) as well. Finally, it is our observation that with the amount of available material in the blogosphere, it has already become a mainstream and critical part of daily political and social interaction.

The remainder of this paper is organized as follows. First, we discuss how the blogosphere can serve (or fall short of serving) as a type of "public sphere" as defined by Habermas. Then, we discuss the problems associated with the proliferation of content brought about by the blogosphere. Next, we discuss previous efforts to manage deliberative discourse and why these previous efforts cannot simply be applied to the blogosphere. This is followed by a discussion of specific design attributes that can be used to increase the effectiveness of deliberative discourse in the blogosphere to support its role as a public sphere. Finally, we demonstrate how these technologies can be applied by describing a prototype system (FeedWiz) that can leverage the blogosphere to bring it closer to the deliberative ideal.

HABERMAS' PUBLIC SPHERE AND DELIBERATIVE DISCOURSE

Habermas (1974) defines the public sphere as an abstract space made up of actions and interactions among people concerned about issues of common relevance. Its function is to spread general enlightenment through deliberative discourse, which is defined as rational, free, and fair peer-to-peer exchange of ideas. There are several aspects that characterize a public sphere. The more prominent ones are: absence of coercion, universal access, and the public use of rationality. A public sphere, according to Habermas (1974), is "a realm of our social life in which something approaching public opinion can be formed" (p. 49).

Habermas (1996) distinguishes three levels of the public sphere; the *episodic* publics consisting of chance interactions occurring in taverns or on the street, the *occasional* or "arranged" publics such as rock concerts or church gatherings, and finally *abstract* publics formed "of isolated readers, listeners, and viewers scattered across large geographic areas, or even around the globe" (p. 373). In an abstract public sphere, "what matters… is not the physical co-presence of others, but rather the existence of shared social spaces" (Saco, 2002, p. 70). These three levels of public sphere are in constant interaction with each other, and their boundaries remain porous and dynamic. The increasing role of the blogosphere has changed the way abstract public spaces are created, frequented, and integrated with the other levels of public sphere. For example, an array of "citizen bloggers" has used this medium to create forums for information dissemination and dialog outside of the traditional media outlets. These bloggers have an increasingly influential role in the political process, gaining the attention of politicians and the mainstream media. This makes it essential to study the blogosphere as a public sphere, and understand the opportunities and challenges it brings to the next generation of public discourse.

Habermas' theory of communicative action yields further insight into the dynamics of deliberative discourse in the public sphere by examining the role of institutional actors in influencing the public sphere (Habermas, 2006). Cukier et al. (2009) argue that the centerpiece of this theory is the notion of "validity claims." These claims – the *truthfulness*, *legitimacy*, and *comprehensibility* of the messages, and the *sincerity*[2] of the speaker – are tested by the reader who is engaged in (direct or indirect) discourse with the generator of that message. If the reader detects deviations from those four claimed qualities of communicative action (open communication), then she would conclude that the purpose of the communication is oriented towards *strategic manipulation*.

THE BLOGOSPHERE AS A PUBLIC SPHERE

We argue that the principles articulated in the previous section apply to the blogosphere, in which the message would be the blog post and the speaker would be the blogger. It is common to observe both *open communication* and *strategic action* to promote a particular viewpoint in the blogosphere. Thus, a critical aspect of a functional public sphere is a set of mechanisms allowing the reader to assess the intended purpose of discourse.

The problem is that the proliferation of blog content authored by the public makes it challenging to achieve such awareness. It is difficult for blog readers to establish the validity of the vast content. Keen (2006) notes that Habermas himself argues while the Internet encourages "egalitarianism," its price is the proliferation of unedited (and thereby unchecked) opinion. Essentially, Habermas contends that it is difficult for the average consumer of content to discern which sources are accurate and which are not. While this issue of source credibility (i.e. truthfulness) is a critical aspect of a well-functioning public sphere, our foci in this paper are the comprehensibility of blog content and the legitimacy of communication (regardless of its source), and how technology can facilitate discourse by helping users navigate and make sense of the available content.

The very openness of the blogosphere that creates what Gore (2007) calls the "marketplace of ideas" also creates an environment where a rapidly increasing body of public content is likely to become overwhelming. This ultimately weakens the blogosphere's *comprehensibility* and threatens its viability as a public sphere. This view is shared by Cukier et al. (2009), who acknowledge information overload as one of the threats to comprehensibility of online communication.

A common strategy employed by people to cope with information overload is to limit their exposure to only a subset of the information (and viewpoints). The blogosphere's structure as a loosely organized collection of threads maintained independently of one another only exacerbates the problem. Because there is nothing that automatically connects bloggers writing about similar topics to each other, they must make these connections themselves through explicit hyperlinks between blogs (called "blogrolls"). This leads to a myopic view of the blogosphere. Bloggers often choose to link to those blogs with similar points of view, effectively filtering out opposing viewpoints. An analysis of the political blogosphere during the 2004 U.S. presidential campaign found that politically-oriented blogs reference other blogs with similar viewpoints much more often than those with opposing views (Adamic and Glance, 2004). Following one or a few such blogs (and those blogs to which they link) means that one's exposure to content is strongly influenced by a small network of bloggers.

Furthermore, Shirky (2003) contends that blog popularity follows a "power law" distribution, where a few blogs receive a disproportionately high number of sites that link to them ("inbound links"). The majority of sites with relatively lower popularity reside in the "long tail" of the distribution (Anderson, 2008). The implication of this is that one's exposure to the blogosphere can be dominated by only a few sources of information, while it is extremely difficult for blogs that are less popular to be seen at all. This "blogosphere myopia" threatens the *legitimacy* of communication because it violates a fundamental norm of a functioning public sphere by limiting the representation of multiple (and competing) viewpoints (Cukier et al., 2009).

For these reasons, we believe that the inherent challenge of the mechanisms designed to interact with the blogosphere is balancing exposure to blog content with the information overload such exposure creates. In the absence of efforts to reduce overload, its likely impact will be the formation of deeply entrenched "silos" of opinion that work against the notion of the public sphere and deliberative discourse. Sunstein (2004) warns of this problem, suggesting that this filtering of people's "… exposure to topics and points of view of their choosing" (p. 58) is a threat to public discourse and democracy.

Cayzer (2004) states that a "key challenge" presented by a growing blogosphere is the development of tools and techniques to sort through and navigate its content. We propose that addressing this challenge by supporting the better use of blog content would serve both content generators (bloggers) and content consumers (blog readers). Mechanisms that make content more easily accessible help those that contribute to the debate to have their voices heard. Meanwhile, those who read this content to educate themselves will benefit from tools and mechanisms that make it easier to process a larger amount of information and make more informed decisions. Note that what we are referring to here is simply the quantity or volume of content regardless of its quality. We believe blog users are more constrained by the sheer volume of content than its quality. Therefore, it is quite likely that the ability to process larger amounts of blog content would enable individuals to shift their focus to quality when it comes to deciding what content to consume.

PREVIOUS EFFORTS TO MANAGE DELIBERATIVE DISCOURSE IN THE PUBLIC SPHERE

Dahlberg (2001a, 2001b) suggests that in order for the Internet to serve as a public sphere, "rules of discourse" that encourage rational interaction would need to be enforced through active management of forums. Providing a structured mechanism for the exchange of ideas is a common theme in previous work on electronic support for deliberative discourse in the public sphere. For example, the DOTS system (Lonchamp and Muller, 2001) provides such a structure, where users can raise new issues regarding a topic and contribute arguments to the debate. A

moderator, who opens and closes issues for public discussion, controls the course of the debate. Gordon and Richter (2002) describe Zeno, a content management system (also moderated) that provides links between items to facilitate visualization of relationships among contributed content.

Boland et al. (1994) describe Spider, which provides a repository for documents about an issue, as an illustration of their principles of distributed cognition. Users contribute to the system by adding new documents and linking them to existing content. Richardson (2005) extends Boland's design principles by introducing the need for mechanisms that explicitly support "discursive communication," or the ability to explore and verify the validity of claims by the contributors to the discussion. The DISCOMAP system (Richardson et al., 2005) implements this principle through the inclusion of a discussion forum to compliment the more formal documentation provided by users. A similar approach was taken by Heng and de Moor's GRASS system (2003), which facilitates the creation of "group reports," organized as a discussion of a series of issues among its authors.

Table 1: Systems to manage deliberative discourse

System	Features
DOTS (Lonchamp and Muller, 2001)	• A moderator opens issues for public debate • Users contribute to the debate on those issues • Moderator sets the course of the debate and closes issues as she sees fit
Zeno (Gordon and Richter, 2002)	• A moderator generates links between items to facilitate visualization of relationships among contributed content
Spider (Boland et al., 1994)	• Provides a repository for documents that describe an issue (controlled by a moderator) • Users contribute to the system by adding new documents and linking them to existing content
DISCOMAP (Richardson et al., 2005)	• Provides a repository for documents that describe an issue (controlled by a moderator) • Users contribute to the system by adding new documents and linking them to existing content as well as documentation to explore and verify the validity of user claims • Compliments the more formal documentation provided by users with a discussion forum
GRASS (Heng and de (Moor, 2003)	• Facilitates moderated debate • Creates "group reports," organized as a discussion of a series of issues among its authors

A common thread running through all of the above approaches as summarized in Table 1 is a focus on control and imposed structure. We argue that the approach of imposing structure on the debate itself would not be viable in the blogosphere. The solutions described in the examples above support debate in situations where the number of contributors is limited. The blogosphere is an inherently organic, chaotic public environment with no central control. To impose a structure on debate in the blogosphere is impractical – it would require bloggers to abandon their existing blogs, and instead participate in a new, centralized content-management system. Given the current state of the blogosphere, this is extremely unlikely to occur. Instead, it is more likely that bloggers would continue to produce content through their own blogs and formalized systems would go unused. Also, given the scale on which public debate in the blogosphere takes place, any sort of single solution that acts as a repository for all content is infeasible. Further, it would not resolve the information overload problem – users would be faced with the same deluge of information and opinion, it would just be in one place.

As an alternative, we propose a system that organizes already existing blog content. Such a system would not require active participation on the part of blog authors and would not disrupt the existing mechanisms for participation in the blogosphere. It would be feasible even with the ever-growing blogosphere, if it were designed to only present content (from multiple sources) instead of storing and managing it, essentially enabling the content consumers to "hear" the entire blogosphere, not just a few blogs. In the next section, we discuss a set of appropriate characteristics of such a system.

DESIGN TECHNIQUES TO ENCOURAGE DELIBERATIVE DISCOURSE IN THE BLOGOSPHERE

Ó Baoill (2004) suggests that in order for the blogosphere to serve as a public sphere, it should support Habermas' (1997) requirements for public debate: open access and equal stature for all participants while allowing unlimited

discussion. Ó Baoill adapts these into three fundamental principles. First, **the blogosphere should be inclusive**. There are two aspects to inclusiveness: (1) the ability of individuals to easily author and publish blogs and (2) the wide dissemination of information they create. Second, **access to information should not be guided by "rank"** – that is, the casual reader's exposure to content should not be limited only to the most popular sites. Third, **there should be a facility for rational debate** through the exchange of ideas.

Looking at the blogosphere through this lens reveals its shortcomings as a facilitator of deliberative discourse. First, inclusivity is threatened because it is increasingly difficult to gain wide readership given the vast amount of information available. Second, the blogosphere (and the Internet in general) is largely guided by rank. Google's search algorithm is largely based on site popularity, and sites like Digg and Delicious are essentially content ranking mechanisms, making exposure on those sites driven almost exclusively by popularity. Finally, while most blogs allow their readers to leave comments, the distributed nature of these comments create multiple debate "threads" that have little chance of being connected together. This allows for fragments of a debate to take place, but is likely to result in each thread becoming dominated by the interest group behind that source. While multiple points of view may be reflected in both the Huffington Post and The Fox Nation, the opinion on each of these sites is likely to be slanted in the direction of its core readership.
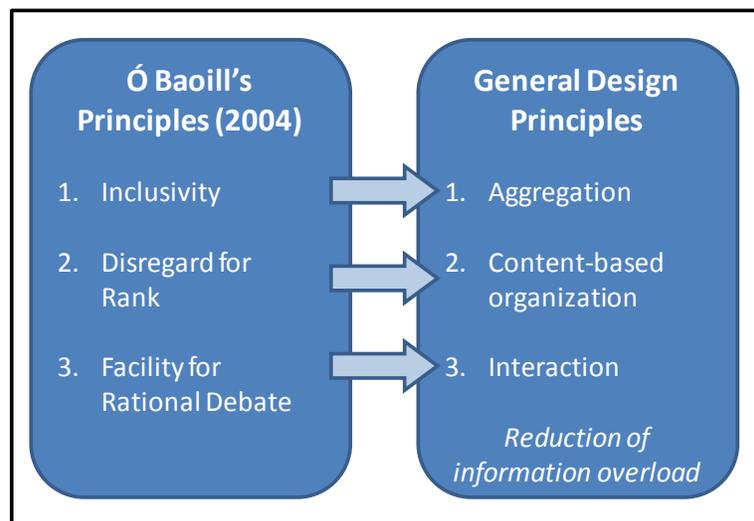

Figure 1: Creating design principles from Ó Baoill (2004)

Based on Ó Baoill's principles, we propose three key aspects systems should possess in order to support deliberative discourse on the blogosphere (see Figure 1). The first is that they should employ **aggregation** to support **inclusivity**. These tools should bring blog posts from multiple sources together so that they appear as a single collection.

A second key aspect of systems that successfully support deliberative discourse is that they use a **content-based** approach for organization in order to support **disregard for rank**. This means that blog posts should be organized by their textual content and not their popularity. Organizing content in this way avoids the problems that exist with Digg and Delicious, where less popular content is unlikely to be seen. The power law phenomenon exaggerates the disparity between popular and unpopular content, making it difficult for blog posts from unpopular sources to "bubble up" to the top of these lists. A content-based approach can break down these barriers.

Third, these systems should integrate mechanisms for **interaction** to support **rational debate**. Blogs are primarily one-way mechanisms for the distribution of content. However, they do have a feedback mechanism through a comment facility. A system that aggregates blog content from multiple sources across the blogosphere should also be able to allow readers to leave comments. In fact, there are additional opportunities for aggregation of content by organizing these disparate comments in a way that can be easily consumed by readers. Here the danger is that few users will have the patience to read the entire comment thread, focusing only on the first few comments. Therefore, part of the responsibility for supporting interactivity is to make it as easy as possible to understand what is being discussed, and then allow as many users as possible to add to the conversation in a meaningful way. This can be achieved by enabling the user to draw high-level conclusions from the content to which she is exposed. The blog reader would form an opinion by abstracting individual topics to broader themes and realizing connections between them. Therefore a desirable characteristic is for a tool to reveal broad (and sometimes non-obvious) relationships across a large number of blog entries.

Underlying all three of these design guidelines is the **reduction of information overload** while still exposing the user to a greater amount of information. As described above, this is not a trivial problem. Simply exposing the blog reader to more information would lead to the *consumption* of less information through the application of arbitrary (and biased) filters. **Aggregation** is important because it keeps the reader from having to scour the Internet for relevant information. A **content-based** approach better organizes the aggregated content, enabling the user to see multiple sources at once, and apply more rational filters (i.e., based on topic). Finally, a single facility for **interaction** would allow readers to leave comments on multiple blogs without actually having to visit the original blog site. This simplifies the interaction and keeps the user from becoming overwhelmed with navigating across multiple sites.

DESIGN ARTIFACTS FOR MANAGING DISCOURSE IN THE BLOGOSPHERE

To formulate a technology-based solution that incorporates these three design principles, we propose that the blogosphere be thought of as a large collection of documents, where each document corresponds to a blog post. By collecting blog posts from a variety of sources and organizing them based on the relatedness of their content (instead of by author or by site, as most blog posts are currently organized), we can achieve better presentation of content. This way, users are able to more easily discover related entries of which they might not otherwise be aware. For this, we recommend four design artifacts: a communal repository, textual clustering, visual mapping, and a participation facility (see Figure 2).
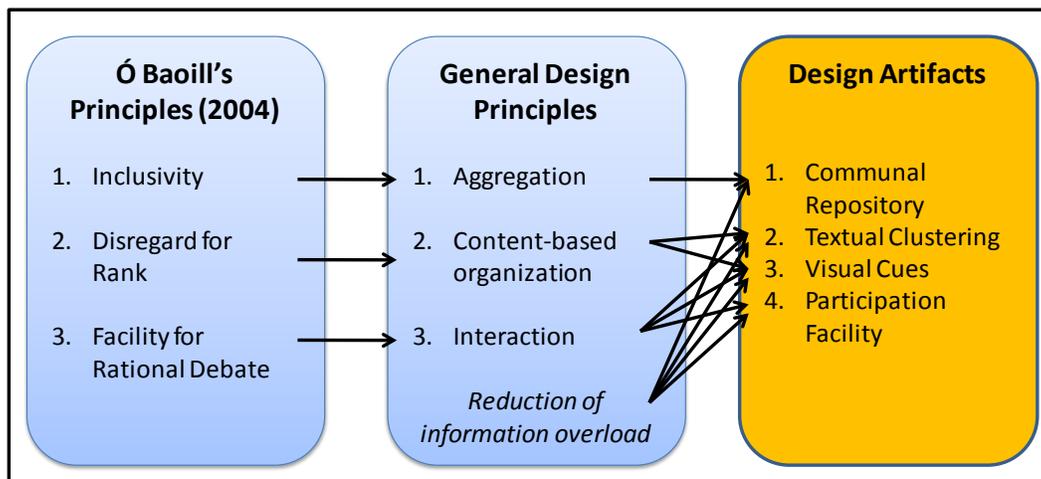

Figure 2: Developing design artifacts from the general design principles

A **communal repository** is essentially a mechanism to store a set of blog URLs, enabling *aggregation* and thereby facilitating *inclusivity*. Aggregation would take place because users of the system would not only have access to the blogs that previous users have collected (typically on a broad topic such as politics or technology), but would also be able to add to that collection. This way, the repository would be an inclusive and evolving collection. Note that only the links, and not the content, should be stored by the system. Also, users of the tool should be able to submit new blogs to be added to the list, or submit a request to remove old blogs that are "dead links."

Once an inclusive set of blogs are aggregated as described above, this collection should be organized based on the content of the blog posts. **Text-based document clustering** is an established technique for summarizing and presenting unstructured textual information such as that found on the blogosphere. The cluster hypothesis (van Rijsbergen, 1979) states that similar documents serve similar information needs. Using clustering to organize information into groups of related documents should assist users in comprehending the information contained within those groups (Roussinov and Chen, 1999). Clustering has been used to organize web search results (Roussinov and Chen, 2001; Roussinov and Zhao, 2003; Turetken and Sharda, 2004), static content on the web (Chen et al., 1996), electronic group meeting output (Chen et al., 1998; Orwig et al., 1997; Rousinnov and Chen, 1999), and e-mail (Schuff et al., 2006; Schuff et al., 2007). Most clustering algorithms compute the similarity between textual documents (Roussinov and Zhao, 2003) based on the number of words and phrases the documents have in common. These algorithms have been shown to generate clusters that are nearly as good as those produced by human experts (for example, Chen et al., 1998). Several studies have shown clustering's ability to improve content presentation while also improving user satisfaction with the resulting presentation (e.g., Hearst and Pedersen, 1996; Pirolli et al., 1996; Spangler et al., 2003; Turetken and Sharda, 2005).

Using document clustering techniques to organize blog posts is helpful in solving some key issues with access to information in the blogosphere. Clustering provides an overall view of the collection, allowing one to discover associations between blog posts that would most likely be otherwise hidden. The reader can choose to focus on a smaller set of clusters, labeled by topic, that are of interest. These groupings are constructed based on the content of the text, not based on meaning assigned to the text by its author (or other readers). This type of filtering, unlike blog rolls and links between posts, is inherently less biased because it is *content-based*. As a result, the user is likely to be exposed to multiple points of view on an issue, but less likely to experience the cognitive burden associated with information overload. This technique also ignores *rank*; we deliberately recommend that the clustering algorithm does not incorporate the relative popularity of a blog post. Content from the most popular blogs should appear alongside content from the least popular ones as long as the textual content is similar. This can mitigate the effects of the "power law" phenomenon as described by Shirky (2003), and reduce the effects of the self-sustaining imbalance in blog popularity. Note that the process of creating a structure within a collection of blogs using clustering is fundamentally different from the idea of the Semantic Web[3], in which a standard Resource Description Framework (RDF) is used to extend the linking capabilities within the World Wide Web. Although a Semantic Web based approach could certainly improve the organization of the blogosphere, such an approach requires content generators or specialized software to define metadata, unlike the automatic organization that content-based clustering facilitates. A clustering-based organization does not require bloggers to change their way of writing blogs or any modifications to the tools that facilitate blogging.

While clustering can help with the organization of blog content, coming up with a truly effective and meaningful presentation is challenging. Since our capacity for simultaneously processing multiple pieces of information is limited (Miller, 1962; Mandler, 1967), **visual cues** such as color, size and orientation are used. These cues can be extracted by people "preattentively," without conscious effort and within milliseconds (Crapo et al., 2000). Without such visual cues, the cognitive processing of the same amount of information would take much longer (Bray, 1996).

Similarly, Card et al. (1986) state that visual cues are effective in reducing information overload by storing visual information in one's short term memory. This shifts some of the work from the cognitive to the sensory system, reducing the cognitive burden of processing information. Applying visualization techniques to data and information has been done for a long time (for example, see Tufte, 1990, 1997). However, the graphical capabilities of early computers limited the use of visualization in system interfaces. Given that modern computing technology does not pose such limitations on design, user interfaces can take advantage of people's ability to process visual information. Shneiderman (1994) asserts that this has important implications for the design of visual computer interfaces, and by appropriately coding properties of information by size, position, shape, and color, people's need for explicit selection, sorting, and scanning operations can be greatly reduced.

Many systems have been developed using these basic principles to support the presentation of various kinds of web-based information through visual cues (Turetken and Sharda, 2007). For example, cues such as color and size can be used to enhance the presentation of a clustered *aggregation* of blog posts, making it easier to find relevant information, especially as the collection becomes large. While clustering limits the amount of information users are forced to see at a time, this organization takes place along the single dimension of textual content. Use of color and size cues can communicate supplemental information about the *content* of the clusters. Color can be used to clearly differentiate one cluster from another, or as an indication of some other measure such as the diversity of the content within that cluster. Size can be used to indicate the activity within the cluster (in this case, the topic area) based on the number of documents in the cluster. For example, clusters containing more blog posts would be represented by a larger icon.

Finally, tools that support deliberative discourse should include a **participation facility**. Two-way communication is necessary to support *interaction* so that blog readers can engage in *rational debate*. Allowing the user to leave comments without leaving the tool can reduce information overload because although the blog posts come from a variety of sites, they appear as a single information repository. In Table 2, we summarize the relationship of the design principles to the specific design artifacts.

Table 2: Mapping design principles to design artifacts

	Communal Repository	Textual Clustering	Visual Cues	Participation Facility
Aggregation	X			
Content-based organization		X	X	
Interaction		X	X	X
Overload reduction	X	X	X	X

Toward a Solution

We have developed a prototype system, called FeedWiz, which supports the management of blog content by synthesizing the design artifacts of a communal repository, textual clustering, and visual cues discussed in the previous section. As noted, these artifacts are neither novel nor unique to the domain of the blogosphere, but it is their specific combination and application to the blogosphere that makes FeedWiz novel. Our system collects individual blog posts and applies a text-clustering algorithm to that entire collection. The clustering algorithm uses the textual content of the posts to create a cluster structure based on term similarity. This resulting structure is then presented in a navigable user interface.

FeedWiz consists of two components. The first is a Flash-based client that runs within a web browser. It provides the interface for the user to select the collection of blog feeds she would like to view. Once the user finalizes the collection to be visualized, the FeedWiz client then facilitates the display of the clustered feeds and navigation of the cluster structure. The second component, the FeedWiz application server, is comprised of the Feed Aggregation Module and the Clustering Module. The Feed Aggregation Module retrieves the blog posts from each feed requested by the client. The Clustering Module uses IBM's Intelligent Miner for Text to create the cluster structure. The client then receives this structure as a file from the server.

In a typical FeedWiz session, the user would start out with a "blank" map (see Figure 3). To populate this map with content from a subset of the blogosphere, the application fetches the set of posts determined by a list of blog feeds (from the communal repository). For our prototype, we added a number of sample lists that bring together diverse points of view, and facilitated a communal repository by creating the "Add a Blog to the List" feature (see Figure 4). A user can either add to a saved blog collection or start an entirely new collection of blog feeds. As an example, we added the RSS feed from the DailyKos weblog[4] to our existing "NewsPolitics2" blog list. The combined use of existing collections of blogs and the user additions to existing collections could lead to the coverage of a substantial portion of the blogosphere in a relatively short time, and enable current users to participate in the formation of what information other blog readers consume.
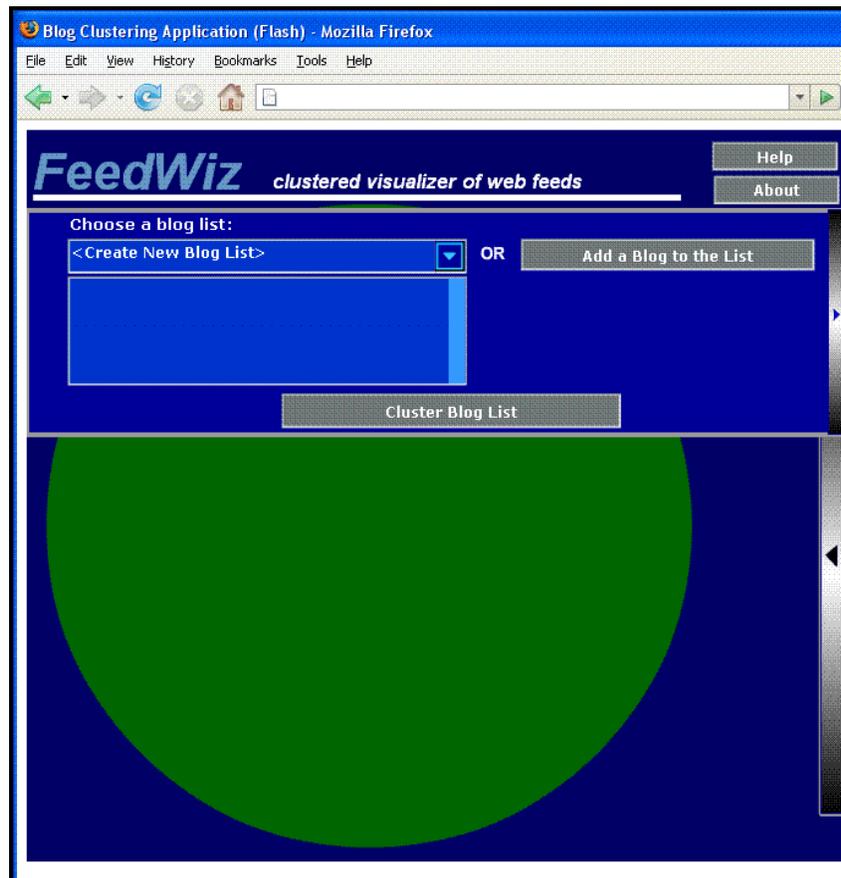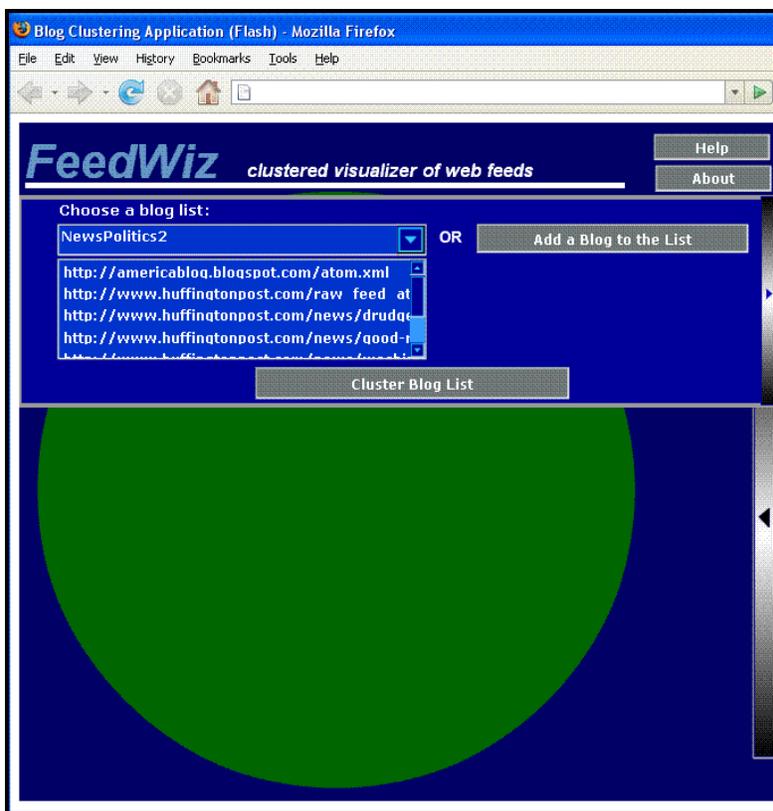

Figure 3: Initial FeedWiz Display
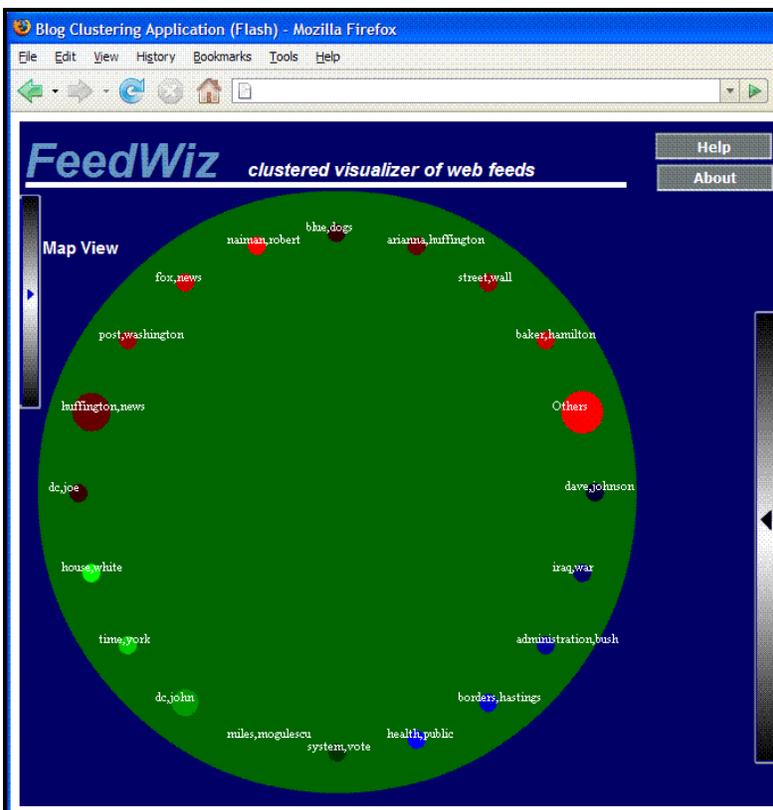
Figure 4: Creating a Blog List

Figure 5: Map View of Clustered Feeds

Once the user has the set of blogs to cluster, she clicks the "Cluster Blog List" button (the button will read "Save and Cluster Blog List" if the list is new or changed). The blog entries from each feed are retrieved and clustered, and FeedWiz displays the labeled clusters in the "Map View" (see Figure 5). The clusters are presented through a Grokker-style map[5], employing several of the visual cues discussed in the previous section. Top-level clusters are displayed as colored circles of varying size (the "Map View"). While color is used to simply represent the different clusters, the size of each circle represents the number of documents contained within a cluster. These circles are labeled with the two most popular terms (automatically detected by the clustering tool) that appear within the documents in that cluster.

The user then selects the cluster she wants to view by clicking on its circle. The contents of that cluster are displayed in the "Group View" as a collapsible tree (see Figure 6), with folders representing branches and documents representing nodes. The user can then navigate the postings within that group using an expandable folder structure representing the cluster structure. When an individual post is selected, the text and graphics of that post appear in the "Document View." The user can view the contents of other clusters by collapsing the "Group View" panel (by clicking on the tab – the gray vertical bar – on the far left side of that panel).

Figure 6: Group View of a Single Cluster

FUTURE DIRECTIONS FOR DESIGN

Further analysis of how the general design principles we identified previously are (or can be) supported provides direction for enhancing existing tools and designing better tools in the future. In the particular case of FeedWiz, we can come up with suggestions for the improvement of its design by looking at how the existing tool currently supports the design principles. For example, when aggregation of blog content and formation of communal repositories are concerned, it may be useful to employ additional ways of capturing blog feeds. One option is to integrate a search engine with the tool. Google has a specific search interface exclusively for blog content, and the results of this could be fed into FeedWiz. This technique could also be used to "crawl" sites such as Technorati for blogs on a certain topic, and provide a periodically updated snapshot of the blogosphere through that list. Note that FeedWiz would eliminate the ranked list presentation originally provided by these tools, therefore basically reducing them to mere sources of

content.

As the organization of content is done by clustering, the quality of the output that the clustering algorithm creates is critical. Therefore, alternative text clustering algorithms should be tried and fine-tuned for different content collections to achieve consistent and comprehensible organization of content. Visual cues such as color can also be better utilized to improve FeedWiz's support of inclusivity and rational debate. For example, a red cluster may indicate that there are a small number of different sources (regardless of the actual number of posts) within a group, while a green cluster may indicate that the content of the cluster comes from a wide variety of sources. Future versions of FeedWiz could also use color as a visual mechanism to address source credibility, for example, to indicate the average level of credibility (however that might be determined) of the blogs that comprise a cluster.

Another way in which rational debate can be improved is to allow for the display of multiple blog posts in the same space. While the current version allows for easy switching between posts, this can still make direct comparison of postings within a category difficult. Future versions of FeedWiz could include a side-by-side display of several blog posts selected by the user. To facilitate comparison, we also recommend highlighting common terms in the text of each post.

Finally, future versions of FeedWiz should more directly support the two-way interaction between blogger and blog reader. FeedWiz currently supports rational debate by enabling the user to view a wider variety of opinion than that to which she might normally be exposed. However, the current version only supports the one-way flow of information. The user cannot respond to a blog post within the tool – she must visit the original blog to post a comment.

To better support inclusivity, a mechanism could be added to post a reply to the currently viewed entry. However, implementing this design artifact is particularly challenging because the act of aggregating content and organizing blog posts by content necessarily disassociates a blog post from the site where it originates. New issues are raised about what it means to comment on a post in this context – is the reply to the post itself, or the group of posts that comprise the "conversation" taking place within the cluster? A related challenge is determining the best way to visualize blog comments so that a thread is easy to follow even though they are responses to an array of posts.

CONCLUSIONS: SETTING A RESEARCH AGENDA

In this paper, we argued that the blogosphere falls short of fulfilling its potential as an online forum for public discourse. The literature proposes that when decisions that concern a group are deliberated through such discourse, they are better received by the members of that group. Past work suggests that this observation is valid for relatively small groups such as the members of an organization as well as very large groups such as society at large. If this is the case, then the blogosphere has immense potential as the largest open platform ever constructed to facilitate public discourse. However, in its current form, it falls short of this potential due to the vast amount of loosely organized content that it hosts. While the diversity of viewpoints and the amount of content are not inherently problematic, they pose a challenge when combined with current relatively unsophisticated technology available to the blog reading public.

We see this mainly as a content presentation (rather than content generation) challenge that we attempted to address by formulating guidelines, rooted in past research, for the design of systems that more effectively support public discourse. The result is our prototype "FeedWiz" system, which has the ability to organize a potentially very large collection of blog posts based on their content, and to present those posts through an intuitive visual map. Such a system has the potential to substantially improve individuals' interaction with blog content.

We believe this is the beginning of a significant research stream as we move from simply looking at improving discourse within an organization to the possibility of improving discourse within the larger society. There are several directions future research can take as the information systems community moves forward in this area. We specifically recommend an agenda centered around three issues:

Issue #1: Creation of better, more nuanced blog consumption tools

There is a great deal of work to be done in further improving the way in which information in the blogosphere is aggregated and presented. While FeedWiz is a start, it lacks many of the features necessary for a true public forum to emerge. Some of these enhancements have been discussed in the previous section, but they have focused primarily on coping with the quantity of content. Another important direction for these tools is to help the user assess the quality of content being consumed. Our guiding principle in the design of FeedWiz was that the quality problem cannot be addressed without resolving the quantity (i.e. the overload) problem. Once information overload is

alleviated, the next challenge will be supporting the assessment of validity claims of truthfulness and sincerity – this is a limitation of the current version of our prototype. Much in the way we have attempted to help users assess comprehensibility and legitimacy through FeedWiz, visualization techniques can be used to address this issue.

One possibility is to implement a voting mechanism, where content is rated by users according to its perceived truthfulness and the author of the content according to her sincerity. These scores can accompany the presentation of each blog posts in a cluster. The issue here is that this is at odds with the neutrality in presentation created by text clustering. These online communities often develop their own biases, giving a particular point of view higher ratings and therefore higher visibility. For example, Digg has been accused of a liberal bias (Arrington, 2006; Owens, 2008). Creating an inclusive community that truly rates content based on "truthfulness" and "sincerity" and not agreement may prove challenging. However, we believe that the tension between neutral presentation of content and assessment of its credibility will need to be addressed. One alternative is to provide the blog reader with a link to a third party source (e.g., http://www.factcheck.org/) so that she can check the factual validity of the content she is reading.

Issue #2: Investigating the effects of these new tools on public discourse

A natural next step is to empirically test the proposition that tools such as FeedWiz can impact the way in which people consume Web 2.0 content, and its potential impact on public discourse within a society. We propose a series of quasi-experiments to explore this. There are several interesting points that can be addressed by this type of study. First, one could investigate the differences in consumers of this content with regard to their motivations, intentions, and habits. From this, we expect multiple "user profiles" to emerge. The next logical step is to determine what activities users within each profile are most likely to engage in. The development of typologies of users and the examination of the matches between those users and the activities they perform is a way to build upon our understanding of information consumption in this space, as well as focus future system development efforts.

A further point to investigate is whether tools that help reduce information overload while exposing users to more information can create a more informed public. There is an open question as to what effect the juxtaposition of different viewpoints would have on emergent public spheres such as the blogosphere. One possible outcome is that this may reduce the degree of polarization of public opinion and improve the ability to reach consensus. However, this is far from a certainty – the inherently chaotic nature of these online public spaces may prove unmanageable.

Issue #3: Moving beyond the blogosphere

The focus of our paper was the emerging public forum of the blogosphere, but this is only a portion of the user-generated Web 2.0 content. Twitter, Facebook, and LinkedIn are some of the examples of the communities in this space. These all have potential as public forums – many people publish their personal thoughts and opinions on Twitter, and Facebook has many groups built around social and political issues. What is interesting about these communities is that they are formed around proprietary services, unlike the blog, which is a type of technology. However, they do represent repositories of content, and some of this content can be published beyond the service in an open form, usually RSS.[6] The challenge will be innovating ways to include this content making it part of a public sphere, and facilitate two-way interaction with those communities. We envision increasingly sophisticated programmatic interfaces to the services, allowing developers to create tools that tie these communities together.

There are also opportunities to apply this technology to other types of content beyond the discussion of political and social issues. Many types of deliberation take place online. One prominent example is online product reviews; as in the political blogosphere, opinion is distributed across many different sources. One can find online reviews through retailers like Amazon.com, review sites such as TripAdvisor.com, consumer news outlets like cnet.com, and personal blogs where consumers simply offer their opinion on what interests them. We believe our tool has applications in this space. Future studies could examine the impact on the purchase decision of an adapted version of FeedWiz that exposes consumers to a greater diversity of product opinion.

We believe that a research agenda that explores these issues will bring us closer to realizing the promise of Web 2.0, and specifically the blogosphere, as a forum that enables the free exchange of ideas. It is the rapid rise of these technologies and the phenomenon of user-generated content that adds urgency to the agenda we have outlined in this paper. Until proper mechanisms are in place, we risk losing the ability to take advantage of this resource, resulting in millions "shouting into the well" with few, if any, of us actually listening.

ACKNOWLEDGEMENTS

REFERENCES

Anderson, C. (2008) *The Long Tail, Revised and Updated Edition: Why the Future of Business is Selling Less of More*. New York: Hyperion.

Arrington, M. (2006) "Troubles in Diggville," retrieved March 6, 2010, from techcrunch.com/2006/09/06/troubles-in-diggville/.

Asif, Z. and H.K. Klein (2009) "Open and Free Deliberation: A Prerequisite for Positive Design," *Information and Organization* (19) 3, pp. 186-197.

Adamic, L.A. and N. Glance (2005) "The Political Blogosphere and the 2004 U.S. Election: Divided They Blog," in *Proceedings of the Third International Workshop on Link Discovery*, New York: ACM Press, pp. 36-43. Chicago, IL, August 21, 2005.

Boland, R., R. Tankasi, and D. Te'eni (1994) "Designing Information Technology to Support Distributed Cognition," *Organization Science* (5) 3, pp. 456-475.

Bray, T. (1996) "Measuring the Web," in *Proceedings of the Fifth International World Wide Web Conference on Computer Networks and ISDN Systems*, P.H. Enslow (Ed.), The Netherlands: Elsevier Science, p. 993-1005. Paris, France, May 6-10, 1996.

Card, S.K., T.P. Moran, and A. Newell (1986) "The Model Human Processor: An Engineering Model of Human Performance," in J. Thomas (Ed.) *Handbook of Perception and Human Performance*. New York: Wiley, pp. 1-35.

Cayzer, S. (2004) "Semantic Blogging and Decentralized Knowledge Management," *Communications of the ACM* (47) 12, pp. 47-52.

Chen, H., J. Nunamaker, R. Orwig, and O. Titkova (1998) "Information Visualization for Collaborative Computing," *Computer* (31) 8, pp. 75-82.

Chen, H., C. Schuffels, and R. Orwig (1996) "Internet Categorization and Search: A Self-Organizing Approach," *Journal of Visual Communication and Image Representation* (7) 1, pp. 88-102.

Crapo, A.W., L.B. Waisel, W.A. Wallace, and T.R. Willemain (2000) "Visualization and the Process of Modeling: A Cognitive-Theoretic View," in *Proceedings of the International Conference on Knowledge Discovery and Data Mining*, New York: ACM Press, pp. 218-226. Boston, MA, August 20-23, 2000.

Cukier, W., R. Bauer, O. Ngwenyama, and C.A. Middleton (2009) "A Critical Analysis of Media Discourse on Information Technology," *Information Systems Journal*, (19) 2, pp. 175-196.

Dahlberg, L. (2001) "Computer-Mediated Communication and the Public Sphere: A Critical Analysis," *Journal of Computer-Mediated Communication* (7) 1, retrieved August 19, 2010, from jcmc.indiana.edu/vol7/issue1/dahlberg.html.

Dahlberg, L. (2001) "The Internet and Democratic Discourse: Exploring the Prospects of Online Deliberative Forums Extending the Public Sphere," *Information, Communication, & Society* (4) 4, pp. 615-633.

Dearing, G. and C. Taylor (2008) "Creating the Next Generation Intranet," retrieved August 19, 2010, from telligent.com/resources/m/white_papers/1330690.aspx.

Gordon, T. and G. Richter (2002) "Discourse Support Systems for Deliberative Democracy," in *Proceedings of the First International Conference on Electronic Government*, London: Springer-Verlag, pp. 248-255. Aix-en-Provence, France, September 2002.

Gore, A. (2007) *The Assault on Reason*. New York: Penguin Press HC.

Habermas, J. (1974) "The Public Sphere: An Encyclopedia Article," *New German Critique* (3), pp. 49-55.

Habermas, J. (1989) *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*. Cambridge, MA: MIT Press.

Habermas, J. (1996) *Between Facts and Norms: Contributions to a Discourse Theory of Law and Democracy*. Cambridge, MA: MIT Press.

Habermas, J. (2006) "Political Communication in Media Society – Does Democracy Still Enjoy an Epistemic Dimension? The Impact of Normative Theory on Empirical Research," *Communication Theory* (16), pp. 411-426.

Hearst, M. and P. Pedersen (1996) "Reexamining the Cluster Hypothesis: Scatter/Gather on Retrieval Results," in *Proceedings of the 1996 Conference on Research and Development in Information Retrieval*, New York: ACM Press, pp. 76-84. Zurich, Switzerland, August, 1996.

Heng, M. and A. De Moor (2003) "From Habermas' Communicative Theory to Practice on the Internet," *Information Systems Journal* (13) 4, pp. 331-352.

Keen, A. (2006) "Jurgen Habermas on Web 2.0. On Media, Culture, and Technology: The Future with a Twist," retrieved November 11, 2008 from andrewkeen.typepad.com/the_great_seduction/2006/04/jurgen_habermas.html.

Klein, H.K. and M.Q. Huynh (2004) "The Critical Social Theory of Jurgen Habermas and its Implications for IS Research," in J. Mingers and L. Willcocks (Eds.) *Social Theory and Philosophy for Information Systems*. Chichester, West Sussex: John Wiley and Sons, pp. 157-237.

Kraus, W.A. (1984) *Collaboration in Organizations – Alternatives to Hierarchy*. New York: Human Sciences Press.

Lenhart, A. and S. Fox (2006) "Bloggers: A Portrait of the Internet's New Storytellers," *Pew Internet & American Life Project*, retrieved November 11, 2008 from www.pewinternet.org/pdfs/PIP Bloggers Report July 19 2006.pdf.

Lonchamp, J. and F. Muller (2001) "A Generic Support System for Distributed Deliberations," in *Proceedings of the Ninth International Conference on High Performance Computing and Networking*, L. O. Hertzberger, A. G. Hoekstra, and R. Williams (Eds.), Berlin/Heidelberg: Springer, pp. 221-230. Amsterdam, the Netherlands, June 25-27, 2001.

Mandler, G. (1967) "Organization in Memory," in K.W. Spence and J.T. Spence (Eds.) *The Psychology of Learning and Motivation* (1). New York: Academic Press, pp. 327-372.

Miller, G.A. (1962) "Information Input Overload," in *Proceedings of the Conference on Self-Organizing Systems* M.C. Yovits, G.T. Jacobi, and G.D. Goldstein (Eds.), Washington: Spartan Books, pp. 61-78. Chicago, IL, May 1962.

P. McBurney and S. Parsons (2000). "Intelligent Systems to Support Deliberative Democracy in Environmental Regulation," in *Symposium on Artificial Intelligence and Legal Reasoning, Conference on Artificial Intelligence and the Simulation of Behaviour (AISB2000)*, D. Peterson (Ed.), Birmingham, UK, April 2000.

Ó Baoill, A. (2004) "Weblogs and the Public Sphere," in L.J. Gurak , L. Antonijevic, C. Johnson, C. Ratcliff, and J. Reyman (Eds.) *Into the Blogosphere: Rhetoric, Community, and Culture of Weblogs*. Retrieved November 11, 2008, from blog.lib.umn.edu/blogosphere/weblogs_and_the_public_sphere.html.

O'Reilly, T. (2005) "What is Web 2.0?" retrieved November 11, 2008, from www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html.

Orwig, R.E., H. Chen, and J. Nunamaker (1997) "A Graphical, Self-Organizing Approach to Classifying Electronic Meeting Output," *Journal of the American Society for Information Science* (48) 2, pp. 157-170.

Owens, S. (2008) "Digg Puts Focus on Politics, Bringing Charges of Liberal Bias," retrieved March 6, 2010, from www.pbs.org/mediashift/2008/09/digg-puts-focus-on-politics-bringing-charges-of-liberal-bias248.html.

Pirolli, P., P. Schank, M. Hearst, and C. Diehl. (1996) "Scatter/Gather Browsing Communicates the Topic Structure of a Very Large Text Collection," in *Proceedings of the Conference on Human Factors in Computing Systems*, New York: ACM Press, pp. 213-220. Vancouver, BC, Canada, April 13-18, 1996.

Richardson, S. (2005) "Knowledge Management and the Design of Distributed Cognition Systems," in *Proceedings of the 38th Hawaii International Conference on System Sciences*, Washington: Computer Society Press, p. 242a. Island of Hawaii, HI, January 3-6, 2005.

Richardson, S., J. Courtney, and G. Wagner (2005) "DISCOMAP: A System to Support Distributed Cognition in Inquiring Organizations," in *Proceedings of the Eleventh American Conference on Information Systems*, Atlanta: Association for Information Systems, pp. 1620-1625. Omaha, NE, August 11-14, 2005.

Roussinov, D.G. and H. Chen (1999) "Document Clustering for Electronic Meetings: An Experimental Comparison of Two Techniques," *Decision Support Systems*, (27) 1-2, pp. 67-79.

Roussinov, D.G. and H. Chen (2001) "Information Navigation on the Web by Clustering and Summarizing Query Results," *Information Processing and Management* (37) 6, pp. 789-817.

Roussinov, D.G. and J.L. Zhao (2003) "Automatic Discovery of Similarity Relationships through Web Mining," *Decision Support Systems* (35) 1, pp. 149-166.

Saco, D. (2002) *Cybering Democracy: Public Space and the Internet*. Minneapolis, MN: University of Minnesota Press.

Schuff, D., O. Turetken, and J. D'Arcy (2006) "A Multi-Attribute, Multi-Weight Clustering Approach to Managing 'E-mail Overload,'" *Decision Support Systems* (42) 3, pp. 1350-1365.

Schuff, D., O. Turetken, J. D'Arcy, and D. Croson (2007) "Managing E-mail Overload: Solutions and Future Challenges," *Computer* (40) 2, pp. 31-36.

Shirky, C. (2003) "Power Laws, Weblogs, and Inequality," retrieved November 11, 2008, from www.shirky.com/writings/powerlaw_weblog.html.

Shneiderman, B. (1994) "Dynamic Queries for Visual Information Seeking," *IEEE Software* (11) 6, pp. 70-77.

Spangler, S., J.T. Kreulen, and J. Lessler (2003) "Generating and Browsing Multiple Taxonomies Over a Document Collection," *Journal of Management Information Systems* (19) 4, pp. 191-212.

Sunstein, C.R. (2004) "Democracy andFiltering," *Communications of the ACM* (47) 12, pp. 57-59.

Tufte, E.R. (1990) *Envisioning Information*. Connecticut: Graphics Press.

Tufte, E.R. (1997) *Visual Explanations*. Connecticut: Graphics Press.

Turetken, O. and R. Sharda (2004) "Development of a Fisheye-Based Information Search Processing Aid (FISPA) for Managing Information Overload in the Web Environment," *Decision Support Systems* (37) 3, pp. 415-434.

Turetken, O. and R. Sharda (2005) "Clustering-Based Visual Interfaces for Presentation of Web Search Results: An Empirical Investigation," *Information Systems Frontiers* (7) 3, pp. 273-297.

Turetken, O. and R. Sharda (2007) "Visualization of Web Spaces: State of the Art and Future Directions," *DATABASE for Advances in Information Systems* (38) 3, pp. 51-81.

van Rijsbergan, C. (1979) *Information Retrieval, 2nd Edition*. London: Butterworths.

White, D. (2009) "Day 2: The What and Why of Blogging," retrieved June 15, 2010, from http://technorati.com/blogging/article/day-2-the-what-and-why.

---

[1] Available at http://directory.etalkinghead.com

[2] These four aspects of validity are generally defined as follows: *Truthfulness* refers to the factual accuracy of the content. *Legitimacy* is the degree to which the communication is consistent with socially accepted norms. A message's *comprehensibility* refers to its understandability. Finally, *sincerity* is the degree to which the message genuinely reflects its author's opinion (Habermas, 2006).

[3] See W3C technologies – http://www.w3.org/2001/sw/

[4] Available at http://feeds.dailykos.com/dailykos/index.xml.

[5] See http://www.grokker.com.

[6] RSS stands for Really Simple Syndication, and is a method of publishing a collection of articles as a single document. RSS formatting standards allow any compliant application to read and parse an RSS feed.

ABOUT THE AUTHORS

David Schuff is Associate Professor of Management Information Systems in the Fox School of Business at Temple University. He holds a BA in Economics from the University of Pittsburgh, an MBA from Villanova University, an MS in Information Management from Arizona State University, and a Ph.D. in Business Administration from Arizona State University. His research interests include the application of information visualization to decision support systems, data warehousing, and the assessment of total cost of ownership. His work has been published in MIS Quarterly, Decision Support Systems, Information & Management, Communications of the ACM, and Information Systems Journal.

Ozgur Turetken is an Associate Professor and a member of the Institute for Innovation and Technology Management at the Ted Rogers School of Management at Ryerson University. His research interests are decision modeling and human computer interaction with an emphasis on information organization and presentation. His previous work has appeared, or is scheduled to appear, in ACM Database, Communications of the ACM, Decision Support Systems, IEEE Computer, Information & Management, Information Systems, and Information Systems Frontiers. Dr. Turetken holds a BS in EE, an MBA (both from Middle East Technical University – Ankara, Turkey), and a PhD in Management Science and Information Systems (Oklahoma State University).

Zaheer Asif holds a PhD in Management Information Systems from Temple University in Pennsylvania. USA. His research interests include societal and strategic aspects of ICTs, Web 2.0 technologies and their interaction with the public sphere. He lectures on IS management, programming languages, database design and social computing at Institute of Business Administration, where he is also serving as the MIS Program Director. He also has industry experience of working with multinational corporations in various capacities. He conducts research for various government agencies including Central Board of Revenue, Export Promotion Bureau, and Software Export Board. His academic research has been published in international journals and conferences.