The Social Life of Social Networks: Facebook Linkage Patterns in the 2008 U.S. Presidential Election

Scott P. Robertson  
University of Hawaii at Manoa  
Information and Computer Sciences  
POST 317, Honolulu, HI USA  
01-808-956-2023  
scott.robertson@hawaii.edu

Ravi K. Vatrapu  
Copenhagen Business School  
Center for Applied ICT (CAICT)  
Frederiksborg, DK-2000 DENMARK  
45-2479-4315  
rv.caict@cbs.dk

Richard Medina  
University of Hawaii at Manoa  
Information and Computer Sciences  
POST 317, Honolulu, HI USA  
01-808-956-7575  
medina@hawaii.edu

ABSTRACT
This paper examines the linkage patterns of people who posted links on the Facebook “walls” of Barack Obama, Hillary Clinton, and John McCain over two years prior to the 2008 U.S. Presidential election. Linkage patterns indicate the destinations to which participants in these social networking dialogues wished to send other participants. We show a strong integration of the Web 2.0 and new media technologies of social networking, online video, and blogs. Outside of video content, users tended to direct others to groups and applications within the Facebook community, but this homophilous behavior was more common for infrequent posters. Ten internet domains accounted for 90% of all links, and the top ten contained a mixture of news, candidate, and blog sites. We offer a discussion of the Facebook candidate walls as a public sphere for political discourse and introduce some design concepts for visualizing and navigating the walls.

Categories and Subject Descriptors
K.4.1 [COMPUTERS AND SOCIETY]: Public Policy Issues.

General Terms
Design, Human Factors.

Keywords
Digital government, social networking, e-participation, e-citizenship.

1. INTRODUCTION
Use of the internet for political purposes has grown dramatically over the last decade. Smith & Raine [6] report that the percentage of American adults who report using the internet to obtain news and information about political campaigns rose from 16% in Spring 2000, to 31% in Spring 2004, and then to 40% in Spring 2008. They also report that internet use for political purposes most recently includes watching online videos (35% of all American adults in 2008) and using social networking sites such as MySpace or Facebook (10% of all American adults in 2008). For young people (18-29 years) the internet has become a primary source of news about politics.

Smith & Raine’s [6] data also show that thirty percent of all internet users have social networking profiles. Forty percent of social network users say that they have used a social networking site to engage in political activity, including discovering friends’ political interests or affiliations (29%), getting campaign or candidate information (22%), signing up as a friend of a candidate (10%), and joining a political group (9%). Twenty seven percent of young people reported using social networking sites as a source of information about the 2008 campaign [13]. As far as politicians are concerned, candidates for House and Senate seats in 2006 were more likely to update their Facebook profiles when they were in competitive races, and their Facebook support was correlated with their final vote share [17,19].

In the 2008 U.S. general election the internet, and social networking sites in particular, played a more significant role than they ever had before [13,17]. Not only did all Presidential candidates have extensive websites, but all were offered and utilized Facebook sites, YouTube channels, and many other new media features of the internet. YouTube and CNN partnered to carry the Presidential debates to a new demographic. Barack Obama’s innovative use of information and communication technologies (ICTs) is credited with his ability to raise record amounts of money from multiple smaller donors. CNN and Facebook partnered to carry the inauguration as an integrated news and comment stream.

Social networking sites can be viewed as a new type of online public sphere [2,3,4,5,7,8], or context that encourages civic discourse and debate. To the degree that social capital is important to a healthy civic environment [14], social networking tools and online communities are seen by some as being a positive augmentation to real life communities and as an antidote to diminishing social capital [15,16,19]. However, other researchers have questioned whether participants in online communities are actually meeting new people and to what degree the discourse in these communities is exposing participants to new ideas or simply reinforcing already held beliefs [10,11,12].

The inter-linkage of internet sites provides a context in which to judge their significance and scope. Studies of interconnections among posts in political blogs have shown that they tend to be polarized and insular, with many links among similar blogs and few posts that move across ideological boundaries [1,11], although this effect might be more pronounced for the handful of so-called “A-list” blogs than for other blogs [9].

There has been little attention to the linkage patterns of politically-oriented community networking sites, and so the question of whether they are self referential (“homophilous”) and ideologically bounded is unanswered. Facebook provides each...
user and group with a “wall” on which comments may be posted by friends and group members. These comments may include links.

Figure 1. Part of Hillary Clinton’s Facebook wall

We have begun examining the wall posts on the Facebook sites of the three major 2008 U.S. Presidential candidates – Barack Obama, Hillary Clinton, and John McCain – during a two-year period prior to the election. Wall posts are unthreaded comments from Facebook users who have become “friends” of the wall owner. Only those who have “friended” the candidate may contribute to the wall. Other Facebook users, even those who are not friends with the posters or candidate, may view all wall posts within the candidate site.

In this paper we focus on the links that users posted on the three walls. Our primary purpose was to characterize the distribution of linking in the data corpus. Answering “who links to what and where?” is an important first step in understanding social networking in the context of politics on the internet.

2. Method

The data for this study was gathered from the Facebook Wall pages for each of the candidates. The overall procedure for collecting the postings consisted of running a Java program that connected to and downloaded the wall content as an html page. As each page was downloaded it was parsed to extract the information for each posting. This information was written to a MySQL database and made available for subsequent retrieval and analysis. The following sections detail the steps of the process for collecting and organizing the wall post data.

2.1 Data Source

The Facebook Wall component for each of the candidates is reachable through a direct URL. As there are hundreds of thousands of postings, the Facebook site distributes these postings across multiple Wall pages in descending order by time. Each page displays approximately 20 postings and can be uniquely addressed by the URL of a candidate’s Wall and a numeric index. For example, the URL for the first ever set of postings on Barack Obama’s Wall at the time of this writing is “http://www.facebook.com/wall.php?id=6815841748&page=26736”. The root URL includes the Facebook identifier followed by a unique id for Obama’s Wall, followed by an index, in this case, 26736. For each page that is downloaded, the individual wall postings are extracted by parsing the HTML source code (also

Figure 2. A post containing a link outside of Facebook

The Proceedings of the 10th International Digital Government Research Conference
called scrubbing). The extracted information for each posting was then written to a MySQL database. The extraction program is run once for each candidate and its output is stored. Subsequent runs of the program are designed to only update the database to contain those postings on the Wall that were made since the earlier runs.

2.3 Data Storage
For each posting extracted from the Facebook Wall pages we stored the following.

- **Wall Id** - a unique identifier for each of the candidate's Facebook Wall. This is also used in the root URL for the Wall.
- **User ID** - a unique identifier for the user. This information is not visible on the page but is embedded in the HTML source.
- **Timestamp** - the date and time the message was posted.
- **Message Content** - the text of the posting.
- **Network** - the listed network of the user. In some cases there are multiple networks. These are extracted using a subroutine that downloads and parses user profile pages.

3. Results
3.1 Corpus
We harvested the wall posts from the Facebook sites of U.S. Presidential candidates Barack Obama, Hillary Clinton, and John McCain from September 1, 2006-September 30, 2008. In this time period, a total of 76,045 individuals created 687,626 postings on the three walls. Participation on the three walls was not equal, with Obama’s wall containing 324,780 postings (47.2%), Clinton’s wall containing 316,330 postings (46%), and McCain’s wall containing 46,516 postings (6.8%). For this study, a JAVA program was written to match the regular expression \[Hh][Tt][Tt][Pp]\] (which finds any occurrence of the letters “http” in order, but regardless of capitalization) was created to filter the posts and select only those that contained an active hyperlink that could be clicked on by a reader of the post (URLs lacking the “http” prefix would not appear as active links in Facebook). The resulting corpus of link-containing posts consisted of 39,782 postings (5.8% of all postings) from 7,255 individuals (9.5% of all posters).

The top ten domain names to which posters linked are shown in Figure 3. In all, 21,467 links (54%) went to these top ten domains. Figure 3 also shows the relative distribution of links to the top ten domains. Forty three percent of the top ten links (23.3% of all links) went to the youtube.com domain. Following YouTube, 19% of the links in the top ten (10.2% of all links) were within Facebook. The remaining 38% of links were distributed across news sites (cnn.com, nytimes.com, and yahoo.com), candidate websites (barackobama.com and hillaryclinton.com, but johnmccain.com was not in the top ten), popular professional news/blog sites and news aggregators (huffingtonpost.com and realclearpolitics.com) and a collection of other blogs (multiple sites within the blogspot.com domain).

3.2 Distribution of Link-Containing Posts
Obama’s wall had 18,945 link-containing posts (48%), Clinton’s wall had 17,601 link-containing posts (44%), and McCain’s wall had 3,054 link-containing posts (8%). These percentages are in line with the relative percentages of all posts across the three walls.

The top ten domain names to which posters linked are shown in Figure 3. In all, 21,467 links (54%) went to these top ten domains. Figure 3 also shows the relative distribution of links to the top ten domains. Forty three percent of the top ten links (23.3% of all links) went to the youtube.com domain. Following YouTube, 19% of the links in the top ten (10.2% of all links) were within Facebook. The remaining 38% of links were distributed across news sites (cnn.com, nytimes.com, and yahoo.com), candidate websites (barackobama.com and hillaryclinton.com, but johnmccain.com was not in the top ten), popular professional news/blog sites and news aggregators (huffingtonpost.com and realclearpolitics.com) and a collection of other blogs (multiple sites within the blogspot.com domain).

3.3 Links to Blogs
Some sites in the top ten included blogs (i.e. cnn.com and nytimes.com), and there were many blogs in the corpus across domains that were not in the top ten. Because of the increasing importance of blogs to political discourse on the web, a search was made for all domain names with the patterns of “blog.*” (e.g. ohiodailyblog.com, time-blog.com, blog.newsweek.com, americablog.com, bizzyblog.com, youthvoteblog.com) and “blogs.*” (e.g. blogs.cnn.com, blogs.abcnews.com, blogs.sfgate.com, blogs.teleseg.co.uk, blogs.usatoday.com) and these sites were aggregated with each other and with...
3.4 Frequency of Posting

Approximately 73% of posters in the overall corpus posted only once (“unary posters”), and there was a very long tail to the distribution of posters in terms of their posting frequency. In this study we were interested in the distribution of links across posts, and so it was possible to include unary posters in the analysis.

We divided the corpus of link-containing posts into five categories: posts from unary posters (a single post, 6.71%), low frequency posters (2-10 posts, 13.6%), moderate frequency posters (11-100 posts, 18.61%), high frequency posters (101-999 posts, 35.86%), and extreme posters (>1000 posts, 25.75%).

Figure 5 shows the relative percentages of links to each of the top-ten domains (with blogs aggregated into one category) across the five posting frequency groups (the percentage of posts in each frequency group adds to 100%). Links to YouTube dominate in all frequency categories and the relative percentages of links to YouTube do not change across the frequency categories. The most dramatic trend was that the relative percentages of links to other sites within Facebook are high for unary posters (30.8%) and low frequency posters (36.1%), but begin to drop for moderate posters (23.7%) and fall precipitously for high frequency posters (11.6%) and extreme posters (9.9%). The drop in percentage of links within Facebook is countered by rises in most of the other categories (excluding YouTube), and in particular with a rise in links to blogs (10.1%, 9.5%, 10.2%, 11.8%, and 19.4% for the low through extreme poster frequency categories respectively).

Figure 6 shows the relative percentages of within-community (to other Facebook sites) versus outside-community (to the other top ten sites excluding YouTube) links for each of the five poster frequency categories.

3.5 Partisan Activity

Figure 7 shows the distribution of links from each of the candidate’s walls to each of the candidate’s websites (i.e. barackobama.com, hillaryclinton.com, and johnmccain.com). Posters on each candidate’s wall overwhelmingly referred readers to the website of the same candidate (95.3% of candidate links from Obama’s wall to barackobama.com, 90% of candidate links from Clinton’s wall to hillaryclinton.com, and 71% of candidate links from McCain’s wall to johnmccain.com). This data suggests that linkers were highly partisan, interested primarily in sending readers to their candidate’s website. Linkers apparently did not attempt to draw converts by posting on the walls of opponents. One departure from this trend was that 22% of candidate links from McCain’s wall went to barackobama.com.

3.6 Link Context

Links are usually (though not always) accompanied by surrounding text. While the primary goal of this paper is to examine link patterns, here we present a brief and informal analysis of the textual material surrounding links. The example text in this section is quoted verbatim with the exception of user
names or id’s which have been replaced with the text “[Name removed]”.

3.6.1 Evidence

Many users posted links in order to provide evidence for a particular opinion or fact. Often these remarks are directed toward a previous poster:

- (McCain wall) “I am a supporter of McCain and a Democrat, but here are three problems that McCain has that do scare me: http://whalertly.blogspot.com/2008/06/mccain-part-1.html >However, if you look at the post above it, you see three things about Obama that scare me too”
- (Obama wall) “Hillary thinks Lobbyists represent real Americans! http://www.youtube.com/watch?v=24pDGQF6UW8”
- (Clinton wall) “Hillary did a great job in the debate last night! Check out this interesting blog posting about the role of race and gender in the presidential race: http://www.theglasshammer.com/news/2008/01/22/spotlight-on-leadership-hillary-clinton/”
- (Clinton wall) “hahah new poll shows that Clinton is ahead by 2 in the NC primary! http://www.realclearpolitics.com/epolls/2008/latestpolls/index.html”
- (Clinton wall) “find numbers on this website!! http://www.hillaryclinton.com/action/millioncalls/?sc=1601 &utm_source=1601&utm_medium=e”

3.6.2 Rebuttal

Many users posted links as a negative response to others’ comments or to rebut ideas. In many ways these are Evidence posts as well, but they have the additional components of reaction or providing negative evidence:

- (McCain wall) “[Name removed], your comment is without evidence, in fact it’s with evidence to the contrary. I cite http://www.wilsoncenter.org/index.cfm?fuseaction=events.event_summary&event_id =433604 Adnan Pachachi as my source. Watch the interview and learn about Iraq now. No puppet government, in fact it’s been harder since in this Democracy which is so free, leaders of militias have been elected.”
- (McCain wall) “No, McCain does not want to have troops in Iraq for 100 years. However, he thoroughly explained why he previously made a statement on how having troops in Iraq for the next 100 years could be acceptable or essentially a non-issue, during his interview last night on Face the Nation. >Clips of the interview, which was really good, can be found at http://www.cbsnews.com/sections/ftn/main4407224.shtml”
- (McCain wall) “Colin Powell didn’t endorse Obama... http://www.youtube.com/watch?v=aucoSTU8Y9g”
- (Obama wall) “[Name Removed] - >Have to disagree with your previous statement to [Name removed]. See following link: http://www.youtube.com/watch?v=24pDGQF6UW8”
- (Clinton wall) “[Name removed]: I do not like talking against Hillary, but please watch all of this clip (only 3:12) from the Democratic Debates last year: http://youtube.com/watch?v=B0uHybfmmY >Please watch it all, she evades the question by not answering it. She does not take a tough stance on it and never says her stance, is that no cloudiness? >Please let me know”
- (Clinton wall) “AHH here is some proof that clinton was NOT involved http://www.theglobeandmail.com/story/story/RTGAM.20080307.wnaftagate0307/BNSstory/Nationl/home (today)”

3.6.3 Action

Many users posted links encouraging others to take actions either on the internet, such as joining a group or participating in a poll, or in the real world, such as donating money or attending a rally:

- (Obama wall) “If you support Community Organizing join this new group and invite everyone you know: http://www.new.facebook.com/group.php?gid=251193241”
- (Obama wall) “everyone vote for Senator Obama’s approval ratings!!!! http://www.msnbc.msn.com/i/d/18300340/”
- (Obama wall) “Help Support Fair Politics with only a badge click! http://www.avano.com/m/badge/click?ref=650e0f87eb98dde9a4e66d6526e6e4e”
- (Clinton wall) “HEY EVERYONE PLEASE READ THIS AND TELL EVERYONE ABOUT IT!!! the following is an article about how Gov. Palin is part of the AIP(Alaskan independence party). In the AIP their goal is to legally vote for secession of alaska from the USA. Is that what McCain considers patriotism? http://www.cbsnews.com/stories/2008/09/02/politics/animal/main4407224.shtml”
- (Obama wall) “Donate to Barack’s campaign! Just $5 from everyone can make a big difference, guys! https://donate.barackobama.com/page/contribute/demmatch?match_campaign_id=5&source=feature_million”
- (Clinton wall) “If you haven’t already, vot here: http://news.aol.com/political-machine/2008/03/10/aol-straw-poll-march-10-17/ >With 8,086 votes and counting, it’s Hillary 61% and Obama 38%”
- (McCain wall) Hey all! Join my global facebook group 1,000,000 Strong for John McCain http://uiilinois.facebook.com/group.php?gid=10289390986

3.6.4 Joking and Ridicule

Many posts were designed to ridicule a candidate, reveal something fully about them or their behavior, or simply point people to satirical content about the election:

3.7 Summary of Results
In this study we focused on the pattern of posts containing links on the Facebook walls of the three major candidates for U.S. President in 2008. The findings reported here can be summarized as follows:

- A small amount of the activity (5.8%) on the walls of the candidates involved linking.
- A small percentage (9.5%) of individuals participating in the political dialogs are linkers.
- Ten domains accounted for over half of all links in the corpus.
  - The greatest proportion of links by far were to YouTube, followed by Facebook
  - YouTube and Facebook together accounted for 60% of all links
  - When blogs from multiple domains are aggregated as a group, they are the third-largest category of link postings (10%)
  - The remaining top-ten domains are a collection of popular news (cnn, nytimes), political commentary (huffingtonpost), and candidate websites (but not including johnmccain.com)

- Low frequency posters and high frequency posters are very different:
  - Lower frequency posters refer to sites within Facebook whereas higher frequency posters refer more to sites outside of Facebook
  - High frequency posters refer more to blogs. Extreme posters refer more to blogs than anything else except YouTube

- Links are highly partisan
  - When posters provide links to candidate websites, they overwhelmingly refer to the candidate on whose wall they are posting

- Text surrounding links suggests that linkers have at least the following motives:
  - Providing evidence to others for a point of view, belief, or position
  - Offering rebuttals or negative evidence to others against a point of view, belief, or position
  - Encouraging others to engage in political action on the internet and in real life
  - Sharing funny or satirical content with others and ridiculing politicians
  - Influencing a politician by direct request, and encouraging or discouraging a politician by direct statements of support or distaste

A significant next step in our research program is to characterize the context of wall postings and their relationship to different types of posters more thoroughly.
4. DISCUSSION

Social networks are an important part of Web 2.0 technologies which are characterized by user-generated content, multi-way communication, and new media tools such as online video. In this study we have shown that these new technologies are tightly connected by user-generated interlinking. Online video (represented by YouTube) and social networks (represented by Facebook) are especially closely interlinked. For highly active social networkers, blogs are also providing important contexts for comments and opinions. The ecology of political discourse using these tools moves seamlessly among multiple user selected, and often user created, content in multiple forms.

Public discourse is an essential aspect of public spheres and online discussion is an integral component of online public spheres. Facebook holds tremendous opportunities for e-participation and e-democracy. Facebook is not only popular as a social networking site but given the 2008 campaign, it is increasingly an influential socio-technical system for political campaigning, organizing, and fund raising. In prior work, we characterized the discourse on Facebook walls of Obama, McCain and Clinton. In this paper, we sought to understand the nature of embedded links to websites in Facebook walls. Website links embedded in Facebook wall postings are interesting for a variety of reasons:

1. They are the socio-technical means of pointing to other resources, sources and locations in the information ecologies of Facebook and/or the Internet in general. Links are in many ways the only possible concrete way to transcend the Facebook walls to other locations of the internet.

2. Given the segmented and sequestered nature of political discourse on the Internet, links provide ways and means to incorporate and integrate converging or diverging opinions.

3. Links are the primary way of doing social sharing of information and digital artifacts.

4. As we have shown, links can be used for informative, entertaining, mocking, persuasive, or abusive purposes.

4.1 Implications for Design

Design of digital government applications is more commonly discussed with respect to government-to-citizen applications, like portals, and government-to-government applications. The design of citizen-to-citizen applications for digital government is seldom discussed, largely because it is not usually considered to be the concern of governments to provide unmediated public spheres. Such online spaces for political discourse have arisen as parts of other applications, for example as subsections of sites with political news and information; as topics in discussion forums, blogs or social networks; and (more rarely) as parts of the websites of political candidates. In fact, the campaign of President-elect Obama hosted unmediated and largely uncensored blog posts from citizens within its member community (my.barackobama.com), which will now apparently continue into the Obama presidency.

Prior research and our present analysis shows that users appropriate social networking technologies for political information, communication, discussion, and organizational purposes. However, popular online social networking tools such as Facebook are not intentionally designed for optimizing political discourse or fostering digital citizenship. If participation in online social networking continues to constitute a significant form of enculturation for social relational aspects in the informational age, then design interventions into online social networking space might be productive in serving pedagogical purposes for digital citizenship, e-participation, and e-government. Our preliminary analysis of the texts around links shows that links are used to serve a variety of discursive functions (evidence, rebuttal, action, direct address, ridicule). However, at present Facebook walls are designed to support neither threaded discussion forums nor artifact-centered discussion. One implication from our preliminary analysis is the iterative design, development, and empirical evaluation of a Facebook application that better supports the intentional purposes (argumentation, deliberation, satirizing, ridiculing, organizing etc.) and measures interactional consequences of the posted links.

4.1.1 Design Features

Certain design features of the Facebook environment make it an interesting public sphere.

Identity

Users of Facebook are not anonymous or represented by avatars. The point of Facebook is to connect people who know each other, and so most users are accurately identified with profiles. Users select how much of their profile to reveal to others who are not their friends, but they always at least reveal their name, network (usually corresponding to a geographical region or school), and profile picture. This is as much information as participants in real face-to-face meetings often have. The fact of being oneself in the Facebook domain leads to “real” political discourse, or discourse that individuals care about and are willing to be identified with.

Embeddedness

Facebook is not designed specifically for political dialog, and most people involved in the discussions on politicians’ walls are also using the application for other social purposes. In this way, political dialog becomes embedded in other contexts, the way a face-to-face political discussion might take place in the context of an office, a vehicle, a sporting event, a meal, a pub or any other public activity. This makes political discourse an extension of other realms of ongoing discourse as opposed to a special event.

Temporality

Facebook walls are organized temporally, and they can be reorganized in any other way. This makes temporally bounded conversations ephemeral, as they are in real life. It is therefore possible to miss a conversation about some topic by not “being there” at the right time. While persistence of information is one feature of digital environments, the temporal nature of the Facebook walls makes ongoing conversation seem more essential and important, and makes the wall a place to go at the time an important event is taking place so as to meet others who are discussing the event.

Strangers and Friends

Like a public sphere, when one looks at a Facebook wall there will be a mixture of people, most of whom are strangers but some of whom might be friends. It is clear from reading posts that
people who did not know each other previously enter into temporally bounded dialogs when they “meet” at the wall. It remains a research question whether these meeting create enduring friendships. Research also suggests that people often find out about their friend’s political views from reading their posts [SR2008].

**Many Voices**

Although our analysis of linkage patterns shows the same homophily that others have reported in social networks [11], the dialog content is often multifaceted. There is often a mixture of pro and con argumentation, which is again a positive feature of public discourse.

### 4.1.2 Design Problems

Certain design features of the Facebook environment make it a difficult public sphere.

**Threading**

As mentioned above, from one point of view it is a feature of Facebook walls that they are temporally organized and have a feeling of ephemeral content. However, the content is not truly ephemeral since posts are archived. While it is possible to search the walls for keywords, it is difficult to find previous discussions, to follow a topic, or to converse with another person or group without interspersed comments. Many discussion forums provide the ability to create threads, which helps to organize material. On the other hand, threaded discussion does not have the same feeling of a true conversation. Facebook offers an instant-messaging style of chat, but it is designed for chatting between friends, not others who happen to be in a discussion at the same time.

**Presence Features**

In a true public sphere, there is a sense of who is present. This gives participants an idea of how many others are present and what discussion possibilities there might be. Facebook provides no visualizations for these “presence” features of the wall environments.

**Topic Visualization**

In real public spheres, people catch phrases and get a sense of the ambient topic environment. This is only possible on Facebook walls by reading each post. A visualization of words or phrases that have been used in the recent post history could provide such information to users.

### 4.1.3 Design Concepts

The design features that are lacking on Facebook walls amount to issues of who, what, and when. Figure 8 presents a concept for a Facebook “Who-What-When Wall Browser” that could allow users to move through time and visualize who was participating and what they were talking about. As a user slides through time along the bottom, a topic cloud appears in one pane and a poster cloud appears in the other. Frequency of the topics and posters’ participation would be evident from the size of the terms and names. Flipping through these periods would give a sense of how many people were present and what they were talking about.

![Figure 8. Proposal for a Facebook “Who-What-When Browser” showing topic and poster clouds representing posts through time](image)

Users should be able to select a topic and see who was discussing it and what they were saying, or they should be able to select a person and be able to see what that person was talking about and what they were saying.

Figure 9 shows a selection of a topic in the topic cloud. Selecting a topic causes a reorganization of the poster cloud to indicate who posted on that topic and how much each poster had to say. It also causes presentation of post snippets (three in the example) and an indication of where they might link to. In the example, one snippet has a link to a Facebook site and another has a link to a YouTube site. Users should be able to then examine each post.

![Figure 9. Selection of a topic causes the poster cloud to reconfigure and shows the first few words of specific posts with any links](image)
Figure 10 shows a selection of one of the posts. Selection of the post causes the actual post to be displayed and the poster cloud to reduce to one member (the poster of the selected post). With one member on the poster cloud, other posts by the same poster on that day can be displayed.

A user should also be able to browse the poster cloud. Selection of a poster in the poster cloud would cause the topic cloud to display topics discussed by the selected poster.

The Who-What-When Wall Browser provides an alternative way to navigate and visualize the social space of Facebook wall postings. The tool could be used to learn about topics or about people from the opinions and dialog of others. This is an important additional feature of public spheres.

4.2 Future Work

Our primary purpose in this paper has been to characterize the distribution of linking in the data corpus. Answering "who links to what and where?" is an important first step in the link analysis. In future work, we analyze the interactional work done by these links and their subsequent impact on Facebook wall posters and readers. A long-term objective of this research program is to generate implications for design of e-participation and e-democracy applications that foster digital citizenship. As mentioned earlier, if social networking sites such as Facebook, My Space, Orkut, and Mixi are sites of enculturation for the so-called “millenials”, then fostering digital citizenship in these applications is a critical issue.

Another direction for future work is to closely observe the sequential unfolding of human-information interaction in online social networks such as Facebook. We are currently studying human-information interaction in the online realm of politics with participants observed while searching and browsing the internet for campaign information in a mock-voting situation while taking notes that were to be shared with others. We are conducting interaction analysis of the empirical data. We are applying Information Foraging Theory to understand participant specific behaviors in searching, and browsing. E-participation has not been investigated in terms of information foraging theory, a new direction in which we will take this work.

5. ACKNOWLEDGMENTS

This material is based upon work supported by the National Science Foundation under Grant No. 0535036 to the first author. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation. The authors would also like to thank Dr. Mara Miller for valuable comments and suggestions.

6. REFERENCES


