

# An Observational Study of Voters on the Internet

Scott P. Robertson, Christine E. Wania, S. Joon Park  
*College of Information Science and Technology*  
*Drexel University*  
{ scott.robertson, cew29, sp347 } @ drexel.edu

## Abstract

*Voters in a democracy have the responsibility to learn about the candidates and issues on which they are deciding. The internet offers voters unparalleled opportunities for finding information relevant to elections. Use of the internet for politics is increasing dramatically, yet we know little about the details of what people are doing with it. We describe an observational think-aloud study of people using the internet in a mock-voting situation. Our voters were primarily opportunistic browsers following a non-compensatory search strategy who engaged in simultaneous searching, reading, evaluating, and deciding. Based on our results, we offer ideas for the design of a voter portal.*

## 1. Introduction

### 1.1 Politics and the Internet

According to a Pew Internet and American Life Project study of voter behavior in the 2004 election [17], 52% of internet users in the United States (63 million people) went online to get news or information about the election, 35% (43 million people) said that they used e-mail to discuss the election, and 11% (13 million people) went online to participate in political activities such as volunteering, donating, or finding activities to attend. Politicians and political organizations are increasing their presence on the internet and using more diverse internet resources such as blogs and virtual meeting spaces. While there has been considerable study of the large-scale demographics of this movement primarily using survey methods, there have been few “close up” studies of individuals involved in digital democracy using experimental and observational methods. There has also been a lack of empirical user studies in support of

the design of software interfaces to support digital democracy.

Information retrieval research has largely focused on tasks that involve a distinct information-gathering phase in preparation for a later task such as writing a paper. Models of information seeking behaviors in situations like this include Dervin’s sense making model [2], Belkin’s model of Anomalous States of Knowledge [1], and Kuhlthau’s model [9] which addresses the affective states of information seekers. These models view information seeking as a problem solving activity that depends on communication acts [14]. Wilson [23] provides a good review of information behavior models, and Jansen & Pooch [5] provide an excellent review of web searching studies

In contrast to the models and studies cited above, when people search the internet for information about political candidates or issues, they may not be interested in the same type of learning or use the same strategies. Also, voters encounter persuasive content regularly and are forced to interpret this information alongside factual information [4].

Voters are focused on the need to make a decision, and their search and browsing behaviors may be influenced strongly by this overriding goal. Lodge and his colleagues [12,13] have proposed an “on-line” model of voter decision making in which voters are essentially updating knowledge schemas when they study information about candidates. Robertson and his colleagues [20,21] suggest how various information technologies might fit into different aspects of voters’ decision-making processes and how a thorough understanding of voter decision-making processes could guide the design of voter portals [21].

There have been a number of studies that examine voters’ political information seeking behaviors [7,16] or that ask voters questions about their political information seeking behaviors on the web [8], although these studies do not look directly at voters searching freely for information on the internet. In order to control the information experience, these

studies ask users to look at information that was pre-selected and organized by the investigators.

Some of the most well known studies of this type include those by Redlawsk and Lau [11,18,19]. They used a dynamic information board in which information flows over time in order to simulate the random and haphazard encounters with information that many voters experience as a campaign progresses. While this is an important type of information experience for voters, as they turn more and more to the internet they will become more in charge of their information exposure. Researchers need to understand how voters will *seek* and *filter* information, how they utilize information that they obtain *actively*, and what they remember from such information encounters.

Lau and Redlawsk [11] point out that no complete decision-making framework has been proposed that addresses information search activities and people's cognitive limitations. They state that "most voters, like all good decision makers, hold two overriding but often conflicting goals: the desire to make a good decision and the desire to make an easy decision" (p. 3). Lau and Redlawsk [11] identify four categories of decision making strategies: 1) Classical Rational Choice, 2) Confirmatory Decision Making, 3) Fast and Frugal Decision Making, and 4) Intuitive Decision Making.

Classical Rational Choice is a "compensatory" strategy in which people find and process all available information in order to compare and assign values to all attributes and make all relevant trade-offs. The other three are "non-compensatory" strategies in which people rely on an incomplete search in order to avoid value conflicts and trade-offs. In Confirmatory decision making, people try to evaluate what they have recently learned and make it consistent with what they know. Socialized attitudes and cognitive consistency are important in evaluating information. The last two strategies are cognitively-based. In Fast and Frugal decision making, people consider many alternatives but use simple heuristics and may not pay much attention to consequences. Intuitive decision making involves trading off effort with time. Lau and Redlawsk [11] found that voters who exhibit a Classical Rational Choice decision process were in many circumstances less likely to make a correct decision compared to voters using Intuitive or Fast and Frugal strategies.

While there is considerable research on how people understand and consume political messages from television and print, not as much is known about how they behave on the internet in this context or how information from the internet affects their decision making process. When compared with television and

print media, the internet is a very different type of political information provider. The internet requires search, which means that voters are typically goal directed and motivated when they encounter information [8]. The internet is vast and unorganized, which means that voters are potentially exposed to a wide range of material, and that they must actively constrain topics themselves. The internet offers mixed genres ranging from traditional news articles, to blogs and chats, to virtual worlds.

Here we report a close-up study of people using the internet in order to decide how to vote for two real political candidates.

## 2. Method

### 2.1 Participants

The participants included six graduate students, four females and two males, enrolled in the doctoral program in the College of Information Science and Technology at Drexel University. One female participant was eliminated because she did not complete the task (she was unwilling to cast a vote for either candidate). The remaining five participants ranged in age from 31 to 44, with a mean age of 35.8 years old. All participants were Caucasian. Two identified themselves as Republicans and three as Democrats.

### 2.2 Procedure

All participants received the same instructions. Participants were told to imagine that they had recently moved to California and were faced with choosing between two candidates running for state treasurer: Bill Lockyer (a Democrat) and Keith Richman (a Republican). Both candidates were in a real race with the election upcoming in six months from the date of the study. Our participants did not know anything about the California candidates or the treasurer's race. They were told that they must learn whatever they needed to know in order to make a voting decision by searching the internet, and that when they were ready they would cast a mock ballot.

Participants were encouraged to think aloud during the information seeking activity. Software was used to capture and integrate the search behavior and verbalizations of the each participant. At the end of the search activity subjects were asked to vote for one candidate and to rate how much they liked each candidate. A recall test and a paper-based

questionnaire were given to the participants at the end of the voting exercise.

### 3. Results

#### 3.1 Overview

The time participants spent completing the task varied from 20 minutes to 78 minutes, with the average time being 42.8 minutes. Despite the long time, the number of queries executed by participants was small, ranging from three to eight (consistent with [6,23]). By browsing from this small number of queries, however, the participants visited a total of 193 websites, with an average of 11.8 websites per person (ranging from six to 19 websites). Participants often looked at several pages within a website. Participants were cognitively engaged, making an average of 56 comments per person during the experiment, with a range of 24 to 64 comments. They recalled a total of 81 individual items of information, or 16.2 items per person.

#### 3.2 Search Queries

The small number of queries that participants did make were simple, usually just a candidate's name. One participant began by executing general queries about the role of the California treasurer, for example "treasurer" or "California state government," and two other participants executed similar general queries later in their search activity.

After executing these simple queries, participants formulated more complex queries that contained a combination of the candidate's name and an issue, for example "Bill Lockyer abortion."

#### 3.3 Websites Visited and Browsing Patterns

Figure 1 shows different types of websites visited. Half of website visits involved the candidates' own websites, and the number of visits was equal between the two candidates. The next largest category (16%) was news sites. The participants also liked voter guides (12% of sites visited). Wikis (3%) and blogs (3%) were not visited much by our participants.

We examined the websites viewed by the participants to determine whether or not the participants exhibited *candidate-centered* or *attribute-centered* browsing patterns [3]. A candidate-centered search consists of the examination of information of many attributes of a single candidate before any information about a second candidate is viewed. An attribute-centered search consists of going back and

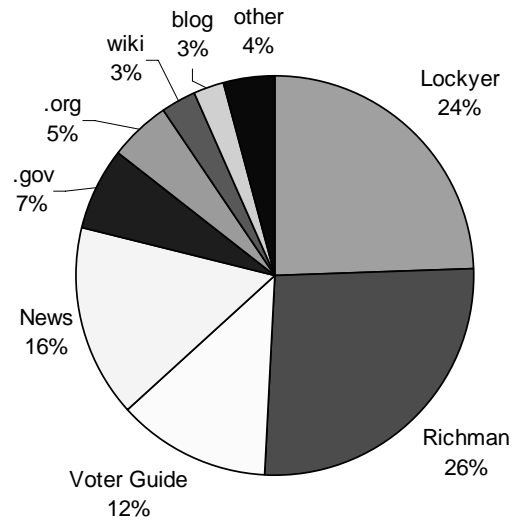


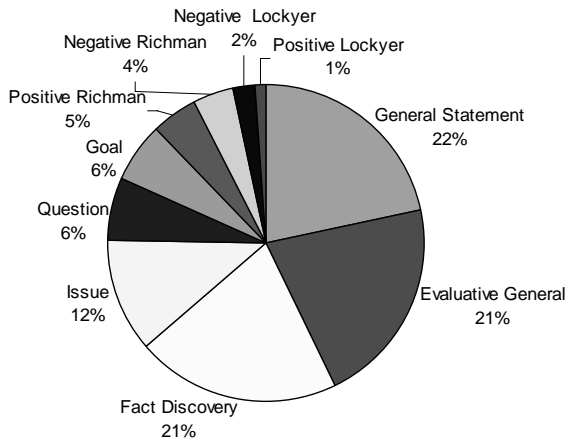
Figure 1. Distribution of visited website types

forth repeatedly between candidates in order to contrast information about some issue before moving on and doing the same thing with the next issue.

Payne [15] describes an index to measure how much a person is candidate-centered versus attribute-centered. Specifically, if NW is the number of page moves within a candidate and NB is the number of page moves between candidates, then  $(NW-NB)/(NW+NB)$  provides an index that ranges from negative 1.0 for people who were entirely attribute-centered to positive 1.0 for people who were entirely candidate-centered (we eliminated moves within general information because it was not clear how these moves were related to either browsing pattern). Our five participants scored  $-.60$ ,  $-.40$ ,  $-.33$ ,  $.18$ , and  $.73$ . In other words, most participants were attribute-centered. The participant with the score of  $.18$  actually performed the first half of the browsing session as attribute-centered and then focused on one person for the remaining half of the session. One participant stayed entirely within a candidate, switching only once to browse the other candidate.

#### 3.4 Talk-Aloud Comments

The participants provided a total of 280 comments during their sessions. The comments were coded into ten categories as follows (shown in the order of their frequency, from highest to lowest):



**Figure 2. Distribution of talk-aloud comments**

- **General Statement:** A non-evaluative comment not specifically about a candidate, for example “Endorsements are like a reference letter.”
- **Evaluative General:** A general evaluative comment that is not about a candidate, for example “There’s not really a whole lot here” or “Wikipedia doesn’t give me more than simple biographical information.”
- **Fact Discovery:** A statement of a non-evaluative piece of information about one of the candidates, for example “He is a Democrat.”
- **Issue:** A statement about a particular political issue, for example “He didn’t address immigration.”
- **Question:** An interrogative statement, for example “Who published this website?”
- **Goal:** A statement of something the participant wants to do, for example “I’d like to see his views on things like abortion or reproductive rights.”
- **Positive Comment about Richman:** A good evaluative remark about the specific candidate, for example, “He has a plan that is good.”
- **Negative Comment about Richman:** A bad evaluative remark about the specific candidate, for example “Someone needs to help this guy.”
- **Negative Comment about Lockyer:** A bad evaluative remark about the specific candidate
- **Positive Comment about Lockyer:** A good evaluative remark about the specific candidate

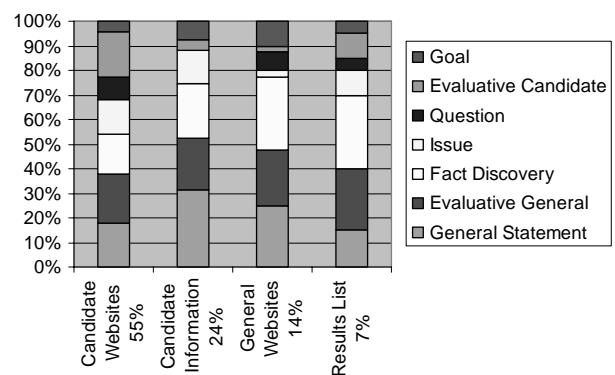
Two coders (Wania and Park) independently coded each comment made by the participants. Cohen’s Kappa was used to evaluate coder agreement. The

resulting kappa value was .54. According to Landis and Koch [10] this value indicates moderate agreement. After evaluating agreement the coders discussed discrepancies and arrived at final category assignments for all statements.

Figure 2 shows the distribution of comments across the ten categories. The majority of comments (33%) were evaluative in some way. About 36% of the evaluative comments were specific to the candidates while the rest were more general, often about the materials. Questions and goal statements, which indicate plans and intentions, were not very frequent (12% of all comments) suggesting that the participants were not highly goal directed in their searching and that they obtained a large amount of information by encountering it opportunistically during passive browsing. In terms of discovering information about the candidates, the participants focused on facts about the candidates (21%) more than where they stood on particular political issues (12%).

Figure 3 shows the relative frequencies of comment types (evaluative remarks for both candidates are combined) during four different browsing activities: candidate websites, candidate-specific information outside of candidate websites, general websites, and the results list. Each bar represents 100% of the comments made during the associated activity, even though the frequency of comments in each activity differed. Participants had the most to say when browsing the candidates’ websites and candidate-specific websites, and the least to say when looking at the results lists.

Comment types were not evenly distributed across activities,  $\chi^2(18)=31.68, p<.05$ . A relatively large proportion of candidate-specific evaluative comments and relatively smaller proportion of fact discovery comments were made while looking at candidate



**Figure 3. Distribution of talk-aloud comments across activities**

websites. Almost no questions were asked when browsing candidate information outside of candidate websites. To our surprise, a large proportion of the comments made while looking through the results lists were in the evaluative and fact discovery categories. Apparently the results lists were not just used to decide what materials to look at, but also as a source of information relevant to the eventual voting decision.

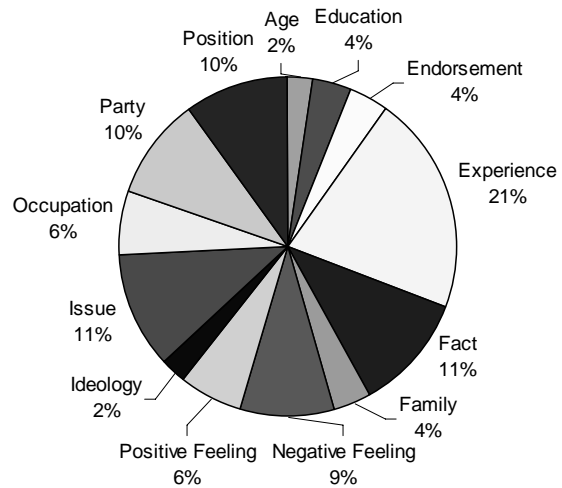
### 3.5 Recall

The participants recalled an average of 18.2 discrete items of information. They recalled approximately equal amounts about each candidate (54% about Lockyer and 46% about Richman), equal amounts about the person for whom they voted (48%) versus the person for whom they did not vote (52%), and equal amounts about the candidate affiliated with their party (51%) versus the candidate from the other party (49%).

Figure 4 shows recalled items in several different categories. Participants remembered a lot about the candidates' previous experience (21%), information such as prior occupations or prior runs for office. Position statements (e.g. "pro-choice" or "ambivalent about gay marriage") and statements of issues without a stated position (e.g. "stressed immigrant and minority populations" or "compared the U.S. economy and education to China") made up another 21% of items recalled. The latter are probably recollections of positions or assumptions about positions, but are just missing an explicit statement of the positions. Basic facts about the candidates, such as the fact that they had run for office in the past or that they were unknown, were common (11%) as were demographic facts such as age, family status, education, and occupation (16% together). Most participants recalled the party of each candidate (10% of the total items recalled). Finally, 15% of the items recalled were evaluative comments which could be both negative (e.g. "I did not really connect with him as a person" and "preaching fear about the future") or positive (e.g. "positive plan to manage CA's financial resources" and "all groups I...share views with" after describing a set of endorsements).

### 3.7 Summary of Results

The participants were very thorough browsers, looking equally and in-depth at information about both candidates regardless of their own prior positions. They did not use active searching by query very much, preferring instead to browse using links between pages



**Figure 4. Distribution of recall items**

that they encountered opportunistically. Participants selection of materials was not very broad, consisting primarily of candidate websites, the materials that candidate websites linked to, and news sources. They made virtually no use of social information from blogs or wikis.

Participants were actively engaged in the decision making process from the very beginning, in all phases of their activity, including during evaluation of search results. They made both positive and negative comments about the candidates, in equal part, both during search and also in their recalls. Participants focused more-or-less equally on three areas: prior experience, personal and occupational information, and issues and positions.

Although many participants expressed an interest in "objective" or "third-party" comparisons and side-by-side charts of candidate's positions on issues, they did not find many materials like this. Partly this is because they did not use the search results much, preferring instead to follow links from the candidate's websites (which typically do not link to the objective and comparative sites).

At the end of the voting part of the study, the participants engaged in an open-ended debriefing with the experimenters. From the debriefings we found that: 1) Participants liked comparative, third-party websites such as *Smart Voter* or similar comparison charts in newspapers, but they often didn't find them. One participant explicitly looked for a comparison chart, but finally said that there was "not much" in the way of objective voter information of this type. 2) Participants wanted more information about the office of Treasurer. 3) Participants had varying levels of trust in the information that they encountered, although they

did not shy away from biased information (e.g. candidate websites). 4) Although they spent more time at candidate websites than anywhere else, several participants said that these were the least helpful. They complained about “superfluous” information and “spin” at these sites.

Two participants took notes while browsing and both organized their notes using categories. When asked how they would like to see information organized or displayed, these participants and others had several suggestions:

- “Biographical, voting record, issue-related accomplishments, endorsements”
- “Background, experience, views, voting [record], endorsements, editorials from the main papers”
- “Philosophy, issues, platform, ‘candidaty’ (sic) junk”
- “Commercial websites on one side of the page and the organization and government sites on the other side”
- “By election, candidate, party, governmental body such as state, fed, and city/town”
- “Pertinent skills, educational background...clearly state their positions on the issues”

Some participants wished for a grid or table that compared candidates side-by-side on issues.

Finally, we should note that Keith Richman won the mock election. He received votes from both Republican participants and one of the Democratic participants.

## 4. Design Ideas

The stated preferences and behaviors of our participants point the way to some design recommendations for systems that might help voters find and consider political information.

### 4.1 Uncomplicated searches and limited use of the search tool

Our participants, despite being computer proficient and savvy about information seeking, never ventured beyond queries that were simply the candidate’s name or a name and an issue. They preferred to browse using within-document links instead of using the search tool. By not using the search tool and relying on inter-document links, even our technology-competent participants missed valuable information that they said they wanted (e.g. third-party comparison charts). We

should expect that voters unfamiliar with internet searching will be even less interested in using the search tool and even more prone to inter-document browsing.

**Design Implication: Recognition interface for automated searches.** It is easier to click a link than to type a query and, once inside a document, the links present themselves as easy and obvious paths to other documents. To increase the use of searching, the search capability should be almost as obvious and easy as a link. One design possibility is a recognition search interface that has predefined candidates (the ones on a ballot, for example) and issues (from a user profile or common political issue list, for example), and that launches searches automatically when selections are made. This design choice would help users to be more comprehensive in their searches by utilizing recognition and eliminating the need to formulate a query. If the search interface remained visible during browsing, allowing people to re-search easily at any time, this might also increase use of searching over inter-document browsing.

### 4.2 Ongoing evaluation while searching and browsing

Our participants made evaluative comments and learned information about the candidates while browsing search result lists and while looking at documents. They were deciding while searching and browsing, not collecting facts for comparison at a later time. The participants were uninterested in comprehensive learning, preferring instead to get a general overview of the candidates and then “check up” on some specific issues. Even within issues that they cared enough about to search, they did not seek a comprehensive understanding of candidates’ positions. They were highly focused on making the voting decision, and all activities were carried out with this goal in mind.

**Design Implication: Enhanced result list.** Search results lists usually contain a title and a summary. News results may contain the source information. A political portal that supported search might include more information with each result. Some possibilities include a category identification (e.g. candidate website, news source, government document, blog, etc.), information type (e.g. advocacy, comparison chart), or clues to content analysis (e.g. “endorsements, positions, and background” or “appearances and schedule”).

**Design Implication: Note taking in context.** Evaluation while searching and browsing can be seen

as one way of summarizing the decision-relevant content of the information. Instead of remembering the details of the information, the voter need only remember the evaluative valence. In the end, an overall impression is formed and can be compared across candidates. This view is consistent with the “on-line” decision making strategy described by Lodge and his colleagues [12,13].

Some participants took notes and many said that they would like to keep track of information in some way. To facilitate this in a portal, an interface might allow users to take notes in their searching or browsing context and then retrieve them in the same context. For example, if a voter formed a negative impression while browsing Lockyer’s position on spending, he or she could make a note about the impression. The note would be organized with the search context information (i.e. “Lockyer AND spending”). Notes could then be browsed with the same search interface, or displayed in the categories in which they were originally collected. When reviewing the candidates and issues, the notes would be displayed and the basis for the impressions could be recalled. If notes were saved on a server, they could be used as a social networking and collective decision making aid.

### **4.3 Both candidate-centered and attribute-centered browsing**

Some participants looked sequentially at details of each candidate, some went back and forth between candidates to compare issues, and one did both in turn.

**Design Implication: Support both types of browsing.** A voter should be able to “pin” an issue and then compare all candidates on that issue or “pin” a candidate and explore all issues about that candidate. An interface that separated these two types of search criteria and allowed one to stay constant while the other varied would be useful. Also, voters should be able to toggle easily among information on a candidate only, information on an issue only, and information on candidates and issues combined.

### **4.4 The importance of political party**

Participants were interested in candidates’ party affiliations almost as a prerequisite to the searching phase. This information is clearly important for understanding and interpreting subsequent information.

**Design Implication: Candidate names and parties always together.** It is common practice in media and official voter information, including the

ballot, to always list the political party whenever a politician’s or candidate’s name appears. The same should be true of a portal. For example, any selection list of candidates should always include their party with their names.

### **4.5 The importance of background knowledge**

Participants often launched searches for background information, such as the nature of the offices and the role of the position.

**Design Implication: Automated searches about offices.** In addition to automated searches on candidates and issues, a system should encourage automated searches of offices and political bodies. A search-term drop-down list might be organized like a ballot, for example, with all offices listed with all candidates. In addition to serving as a recognition tool for the offices in contention, selecting an office could launch a search on background information about the office.

### **4.6 Interest in comparative information**

Participants often wished that they could simply compare each candidate on an issue. While some websites explicitly do this, the user must find the relevant website. Also, many such comparative sites depend on the candidate’s providing responses to questions, and are thus incomplete, or they make their own judgment, which raises issues of trust and interpretation bias.

**Design Implication: User-centered comparison and note taking in context.** One way that a system could facilitate issue comparison across candidates is to allow issue search across multiple selected candidates and to organize results by issue and by candidate. Ability to annotate in context would also facilitate comparison since a user could make notes about each candidate in the context of an issue, and then look at all of their notes sorted by issue context.

### **4.7 Critical evaluation of the source:**

Participants were aware of the sources of information and took the source into account when evaluating the message. All participants looked at candidates’ websites even though all participants were also aware of their one-sided nature.

**Design Implication: Identification of sources, organization by source, social filtering.** The interface should always make the source of information visible to users. Users might be able to initiate searches about

the sources themselves in order to determine their nature. It might be beneficial for users to be able to sort and filter results by source. Users may wish to comment on the trustworthiness and other aspects of sources and this information might be shared among users.

#### **4.8 Concerns about privacy, security, and trustworthiness**

Participants were very concerned about their privacy if a political browsing portal were to be developed. From examination of browsing patterns it would be easy for a third-party to determine a user's party affiliation and the issues about which he or she is most concerned. Three of our participants encountered a news website that required a user name and password, and all three refused to provide the information citing privacy concerns. One participant showed concerns about providing her personal information on a campaign website, worrying that she would continuously receive emails from the candidate.

**Design Implication: Password protected secure portal with clear privacy and security policies.** One design choice to address the privacy and trust issue might be to secure a political search portal in a way that a typical search portal is not. Any system that remembered searches, saved notes, or kept profiles would have to involve password-protected user login and other assurance measures. The portal should have a privacy policy and policy statement that promises the security of any personal information or usage patterns that could identify users. Third-party assurance services can help increase levels of trust in services or websites by providing situational normality and structural assurance.

### **5. Voter Search/Browse Interface**

Figures 5 and 6 show how a portal that incorporates some of the design ideas above might look. The interface is driven by three drop-down lists that initiate searches. The first drop-down list selects among different types of materials (web pages, news, blogs, images, video). The second selects among candidates and offices (shown open in Figure 6). The third selects among issues (shown open in Figure 5). Figure 5 depicts the system after "Ed Rendell" has been selected in the candidate drop-down (resulting in a search list on the candidate only) and just before "Education" is selected in the issue drop-down. Figure 6 shows the system after "Education" has been selected (resulting in a smaller search list that

combines the candidate and the issue) and just before "Lynn Swan" is selected in the candidate drop-down box. If a voter selects a document, it will appear in the same pane as the search results, leaving the search boxes in view for easily launching new searches.

Voters may combine candidates and issues or simply search on a candidate alone or an issue alone. In the candidate drop-down box seen in Figure 6, a voter may select an office in order to initiate a search on the office itself.

The drop-down paradigm allows voters to do the comparison browsing that many said they would prefer and it supports both candidate-centered and attribute-centered searches. A candidate such as "Ed Rendell" could be selected in the candidate/office drop-down box, and then the voter could run through a series of issue-related documents related to that candidate. This would be a candidate-centered search. Alternatively, an issue such as "Education" could be selected in the issues drop down box, and then the voter could run through each candidate and see the education-relevant documents for each candidate in turn without reformulating the query. This would be an attribute-centered search. Since we found that our participants are actively thinking about their voting choice while examining the results list, the act of simply contemplating the menu choices and watching the list change could provide a new opportunity for thinking about the candidates.

In another pane, notes can be taken. The notes are saved in the context of the search and can be viewed and retrieved with the search tool itself. A social networking component allows voter to share their notes and view other peoples' notes that have been made in the same search or document context. Considerable research will be necessary to determine the interest of voters in sharing their own notes and in seeing others' notes.

This interface has the simplicity of a "Google-like" search page, but relies on recognition rather than recall. Voters are offered a tradeoff in flexibility (i.e. they can not search for things that are not in the drop-down menus) for potentially more searches. Given that our mock-voters did not type many searches, this trade-off seems acceptable.

Voters would be able to customize the interface to some extent. For example, the issue drop down list should be editable so that users can eliminate issues that they don't care about and add issues that they do care about. The candidate/office list would be populated with different ballot items depending on where the user lived. An initial user profile could be used to collect and maintain this information along with security and sharing preferences.

**VotesBy.US** Search: For: On:

Turning Political Dialogue Around Web Pages Rendell, Ed (D) Select an Issue Here

1-10 of 350000 | Next

- [Pennsylvania Office of the Governor](#)  
Information on Governor Edward G. Rendell, cabinet links, and more.
- [Governor: Governor's Biography](#)  
... Upon taking office as Governor, Rendell proposed The Plan for ... at the University of Pennsylvania ... a graduate of the University of Pennsylvania
- [Ed Rendell - Wikipedia, the free encyclopedia](#)  
Ed Rendell From Wikipedia, the free encyclopedia Ed Rendell Successor: ... District Attorney Rendell was elected District Attorney of Philadelphia in 1998 Democratic DA, F. ... Ed Rendell 45th Governor of Pennsylvania Term of office ... run for Governor of Pennsylvania. He was defeated in the Democratic primary
- [Ed Rendell for Governor](#)  
Official site for Ed Rendell, the Democratic incumbent for governor.
- [Governor's Electronic Mail](#)  
Pennsylvania Governor's Electronic Mail. Please fill-in all fields. This e-mail message cannot be sent unless all fields are completed. To submit the form, please click on the "Submit" button at the bottom of the page.
- [Article | Pennsylvania Governor Ed Rendell to Address Garming Issues at Racino 2003, Nov. 10-12.](#)  
Price: \$9.95 | Excerpt: "LAS VEGAS, Oct. 22 /PRNewswire/ -- Pennsylvania Governor Ed Rendell will deliver a keynote speech at Racino 2003 at Mountaineer Racetrack and Gaming Resort in Chester..."
- [Executive Mansion 2](#)  
... Martin was only the third Governor of Pennsylvania to be elected to the U.S. Senate in the company ... perhaps the race against Governor Ed Rendell would have been a little ...
- [PAPower: PENNSYLVANIA GOVERNOR ED RENDELL AND UTAH GOVERNOR OLENE WALKER STRIKE A FRIENDLY WAGER](#)

Select an Issue Here

- Select an Issue Here
- Abortion
- Civil Rights
- Crime
- Drugs
- Defense
- Economy
- Education
- Energy
- Environment
- Gun Control
- Healthcare
- Immigration
- Jobs
- Labor
- Social Security
- Science/Tech
- Taxes
- Trade
- Transportation

Type a note here:

Save Save&Share

My Notes  
None

Other People's Notes

- [If you watch the video...](#)
- [I was in Harrisburg when...](#)

**Figures 5 (above) and 6 (below). A political search-browse-annotate interface with drop-down selection boxes that initiate searches from different sources (first box), offices/candidates (second box), and issues (third box). Notes can be taken in the context of each search and retrieved when the context is re-invoked.**

**VotesBy.US** Search: For: On:

Turning Political Dialogue Around Web Pages Rendell, Ed (D) Education

1-10 of 197000 | Next

- [Governor: Governor's Biography](#)  
... AGENCIES. Education. Environmental Protection Agency. ... proposed The Plan for ... the University of Pennsylvania ... an Army veteran ...
- [Ed Rendell - Wikipedia, the free encyclopedia](#)  
Ed Rendell From Wikipedia, the free encyclopedia Ed Rendell Successor: ... incumbent Contents Philadelphia District Attorney Rendell was elected District Attorney of Philadelphia in 1998, defeating the incumbent Democratic DA, F. ... Ed Rendell 45th Governor of Pennsylvania Term of office ... 30% decrease for homeowners) and included \$687 million in increased education funding. The plan was to be paid for with ...
- [Pennsylvania Office of the Governor](#)  
Information on Governor Edward G. Rendell, cabinet links, and more.
- [Ed Rendell for Governor](#)  
Official site for Ed Rendell, the Democratic incumbent for governor.
- [PAPower: GOVERNOR RENDELL SIGNS 05-06 BUDGET WITH NO NEW TAXES; \\$278 MILLION INCREASE IN PUBLIC EDUCATION](#)  
... GOVERNOR RENDELL SIGNS 05-06 BUDGET WITH NO NEW TAXES; \$278 MILLION INCREASE IN PUBLIC EDUCATION ... Job Ready Pennsylvania initiative ... education system, Job Ready Pennsylvania will ...
- [Article | Statement By AARP Pennsylvania On Governor Rendell's Education Funding/Property Tax Proposal.](#)  
Price: \$9.95 | Excerpt: "HARRISBURG, Pa. -- HARRISBURG, Pa., March 26 /PRNewswire/ -- The announcement by Governor Ed Rendell of his proposal for education funding is of great interest to the 1.8..."
- [PSEA President Comments on Governor's Proposed Budget](#)  
PSEA President Comments on Governor's Proposed Budget. HARRISBURG, Pa., Feb. 8 /PRNewswire/ -- Today Gov. Ed Rendell gave his annual budget address to the Pennsylvania General Assembly. James R. ...

Select a Candidate Here

- Select a Candidate Here
- U.S. Senator
- Casey, Bob Jr. (D)
- Martin, Tom (I)
- Edwards, Carl (C)
- Santorum, Rick (R)
- Governor
- Diamond, Russ (I)
- Rendell, Ed (D)
- Rogers, Marakay (G)
- Smith, Hagan (C)
- Swann, Lynn (R)

Search | Notes | Profile

Type a note here:

Save Save&Share

My Notes  
None

Other People's Notes

- [If you watch the video...](#)
- [I was in Harrisburg when...](#)

## 6. Future Directions

Searching and browsing for political information in order to vote is quite different from many other information retrieval tasks. Voters are not so interested in finding a set of documents in preparation for use in their task. Rather, a voter's task is to decide, and they are engaged in this task from the beginning of their search activities. Search and browsing tools designed for voters must take this decision-making stance into account.

We are engaged in a long-term project to understand the behavior of voters as they use the internet to make decisions. We intend our results to guide the design of a political information browsing portal. We are taking a user-centered, iterative design approach to understanding this problem. We will, in turn, collect data about political information browsing and then use the data for prototype design. We will observe voters using the prototypes in various conditions in order both to develop a theory of political information gathering on the internet and to refine portal design.

## 7. Acknowledgements

This work is supported by the National Science Foundation under grant number IIS-0535036 to the first author.

## 8. References

[1] N.J. Belkin, "Anomalous states of knowledge as a basis for information retrieval," *The Canadian Journal of Information Science*, 5, 1980, pp. 133-143.

[2] B. Dervin, "An overview of sense-making research: concepts, methods and results to date," In: *International Communications Association Annual Meeting*. Dallas, Texas, 1983.

[3] L. Huang and V. Price. (2001). "Motivations, goals, information search, and memory about political candidates," *Political Psychology*, 22(4), 665-692.

[4] L. Huddy and A. H. Gunnthorsdottir, "The persuasive effects of emotive visual imagery: Superficial manipulation or the product of passionate reason?," *Political Psychology*, 21(4), 2000, pp. 745-778.

[5] B. J. Jansen and U. Pooch. "A review of web searching studies and a framework for future research," *Journal of the American Society for Information Science and Technology*, 52(3), 2001, pp. 235-246.

[6] B. J. Jansen, A. Spink and T. Saracevic, "Real life, real users, and real needs: a study and analysis of user queries on the web," *Information Processing and Management*, 36(2), 2000, pp. 207-227.

[7] L.L. Kaid, "Effects of political information in the 2000 presidential campaign: Comparing traditional television and Internet exposure," *The American Behavioral Scientist*, 46(5), 2003, pp. 677-691.

[8] B. K. Kaye and T. J. Johnston, "Online and in the know: Uses and gratifications of the web for political information," *Journal of Broadcasting & Electronic Media*, 46(1), 2002, pp. 54-71.

[9] C.C. Kulthau, "Inside the search process: Information seeking from the user's perspective," *Journal of the American Society for Information Science*, 42(5), 1991, pp.361-371.

[10] J. Landis and G. Koch, "The measurement of observer agreement for categorical data", *Biometrics*, 33(1), 1977, pp. 159-174.

[11] R.R. Lau and D. P. Redlawsk, "How voter's decide: Four strategies of voter decision making and their consequences," Paper presented at the Political Psychology and Behavior workshop at Harvard University, March 17, 2006.

[12] M. Lodge, K. McGraw, and P. Stroh, "An impression-driven model of candidate evaluation," *American Political Science Review*, 83(2), 1989, pp. 399-419.

[13] M. Lodge, M. Steenbergen, and S. Brau, "The responsive voter: Campaign information and the dynamics of candidate evaluation," *American Political Science Review*. 89(2), 1995, pp. 309-326.

[14] G. Marchionini, *Information seeking in electronic environments*. Cambridge Series on Human-Computer Interaction. Cambridge University Press, 1995.

[15] J.W. Payne, "Task complexity and contingent processing in decision making: An information search and protocol analysis," *Organizational Behavior and Human Performance*, 16, 1976, pp. 366-387.

[16] J.W. Payne, J.R. Bettman and E.J. Johnson, "Adaptive strategy selection in decision making," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 14(3), 1988, pp. 534 - 552.

[17] L. Rainie, M. Cornfield, and J. Horrigan, *The Internet and campaign 2004*. Pew Internet and American Life Project, 2005. Available at [http://www.pewinternet.org/pdfs/PIP\\_2004\\_Campaign.pdf](http://www.pewinternet.org/pdfs/PIP_2004_Campaign.pdf).

[18] D. P. Redlawsk, "What voter's do: Information search during election campaigns," *Political Psychology*, 25(4), 2004, pp. 595-610.

[19] D.P. Redlawsk, "You must remember this: A test of the on-line model of voting," *The Journal of Politics*, 63(1), 2001, pp. 29-58.

[20] S. Robertson, "Voter-centered design: Toward a voter-centered decision support system," *ACM Transactions on Computer-Human Interaction*, 12(2), 2005, pp. 263-292.

[21] S. Robertson, P. Achananuparp, J. Goldman, S.J. Park, N. Zhou, and M. Clare, "Voting and political information gathering on paper and online," *Extended Abstracts of CHI '05: Human Factors in Computing Systems*. New York: Association for Computing Machinery, 2005, pp 1753-1756.

[22] A. Spink, D. Wolfram, M.B.J. Jansen and T. Saracevic, "Searching the web: The public and their queries," *Journal of the American Society for Information Science and Technology*. 52(3), 2001, pp. 226-234.

[23] T.D. Wilson, "Models in information behavior research," *Journal of Documentation*, 55(3), 1999, pp. 249-270.