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U.S. Congressional Campaign Communications in an Internet Age

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ABSTRACT *New technologies – with perhaps the most notable being radio and television – often change the face of political campaigns. The Internet, and particularly campaign websites with their concomitant technologies (e.g. interactive and multimedia features), has evolved at a faster rate than any other prior innovation. This raises a critical question: have website technologies altered how congressional candidates campaign? We address this question with a novel dataset from 2008. Not only do we chart technological change on sites over the course of the campaign but we also explore how and when candidates use certain technologies. We discover two critical and, to our knowledge, novel points. First, congressional candidates use these technologies to a much lesser extent than one may suspect. Second, their scant usage is driven by how certain technologies limit control of the candidate's message, the candidate's status in the race and other key variables such as the employment of campaign consultants. In sum, the Web 2.0 era (which began around 2008) does not appear to have dramatically altered congressional campaigns.*

The 2008 presidential campaign introduced a range of new web technologies that had the potential to fundamentally alter how candidates campaign. Presidential candidates, especially the Obama campaign, embraced many of these technologies, creating a clear "dividing line" between Web 1.0 and Web 2.0 (Carr & Stelter, 2008: 1; also see Miller, 2008).[1] The relationship between technology and *congressional* candidates has, however, remained unclear. Although virtually every House and Senate candidate now launches a campaign website, to the best of our knowledge, no one has carried out an exhaustive analysis of how and when they use these Web 2.0 features. This is critical because these features have the potential to strengthen the interaction between voters and those who will eventually represent them in the country's central law-making and budgetary body.

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The results of our analysis may surprise many readers. We find that congressional candidates do not employ these technologies widely, despite the fact that most are not overly expensive to institute. To explain this, we offer evidence from a large-scale content analysis of all Senate and a representative sample of House candidate websites from the 2008 campaign. The analysis shows who does and does not use various technologies like personalization features, blog interactivity and external links. It also shows that political calculations, such as message control and technical advice (e.g. from consultants), as well as candidate status, are critical in determining who uses these features.

We start in the next section by explaining why congressional candidate websites are the ideal media for understanding the impact that technological innovations have on congressional campaign behavior. We then discuss how candidates view and use their sites, and the technologies that are most central to their web campaigns. The heart of our analysis then focuses on who is most apt to employ these technologies. We conclude with a brief discussion of implications and avenues for future research.

Congressional Campaign Communication on the Web

Candidate websites have become a central and ubiquitous medium for congressional campaign communications (e.g. Gulati & Williams, 2009: 54). Whereas in 1996, only 22% of major-party House candidates and 66% of major-party Senate candidates were online (D'Alessio, 1997: 491), these numbers jumped to 92% and 99% respectively by 2008, which is widely regarded as when election campaigns moved in to the Web 2.0 era in the United States (although the technologies as noted were present some years prior to then).[2] The proliferation of these sites coincided with growing interest among voters (e.g. Rainie & Horrigan, 2007; Smith, 2011) and journalists who disseminate information to voters (e.g. Ireland & Nash, 2001: 14–15). Evidence is mounting that the number of voters visiting congressional candidate websites increases with each election, and scholars have documented that political sites have notable direct effects on voters and can generate electoral engagement and social interaction (see, for example, Gibson & McAllister, 2006, 2009; also see <http://www.pewinternet.org/Trend-Data/Online-Activities-20002009.aspx>; <http://pewinternet.org/Reports/2012/Election-2012-Donations.aspx>; <http://acme.highpoint.edu/ ~ mkifer/src/19memoC.pdf>).

Congressional candidate websites are the perfect media for us to study. First and foremost, our focus is on whether and how website technology has affected congressional campaign tactics and thus campaign websites are the obvious place to start. This is not to say other Internet venues are irrelevant (e.g. Twitter, Facebook), but they are not our focus, in part given their novelty, especially for congressional campaigns. Campaign websites also provide us with an ideal portrait of campaign strategy that is unmediated, holistic and representative (on the pitfalls of alternatives such as ads or direct mail, see, for example, Lau & Pomper, 2004: 133–134). Even if site construction is outsourced, the content still comes directly from the campaign, and

the campaign can post copious information, including copies of advertisements, speeches or other material, that give a complete sense of their overall strategy. Also, as mentioned, virtually all congressional candidates have websites, which is critical for capturing a representative sample and stands in contrast to alternative campaign measures since many House and some Senate candidates in non-competitive races fail to produce television ads or receive much coverage from major newspapers.[3] In short, there is no other media more ideally suited for understanding the impact that technological innovations have on congressional campaign behavior. Moreover, congressional candidate websites allow us to distinguish how technology is used by congressional campaigns that pale in comparison to presidential campaigns where resources and staff are typically more plentiful.

Before moving to examine our core research questions of the article we set the scene for our analysis by providing some background information about the wider purpose of the sites, as understood by the campaigns themselves. Following the example of other novel technologies used for electioneering such as direct mail, telemarketing and database-driven targeting one might expect their primary focus to be on mobilization. However, we find this is *not* the case for candidate websites. Our October 2008 survey of individuals involved in the design of congressional campaign websites yields some fascinating insights into the rationale behind web campaigns. The sample N of 137 constituted a 36% response rate after excluding many returned e-mails (i.e. e-mails that bounced back to us because of a faulty or discontinued address). This is quite high for a web survey (see Couper 2008: 310; Sue & Ritter 2012: 36). The full methodological details and results of the survey are reported in Appendix A. The key finding that emerges from the responses obtained for purposes of this study (as is clear in the appendix), however, is that across a heterogeneous group of respondents in terms of party, chamber and candidate status,[4] the main purpose of websites, according to the campaigns and their designers, is *not* to mobilize voters but to design website technology and content to provide information to voters and persuade the undecided. These intentions are clear despite the fact that designers recognize the reality that many voters do not visit the sites. In short, as is clear in the appendix results, congressional candidate websites aim to sway voters' opinions more than to mobilize them per se.

Web Technologies and Usage

In this section, we begin by laying out a simple framework, drawing on a set of widely agreed upon premises about congressional (non-website based) candidates' behavior (see Druckman et al., 2009). We then apply this framework to a discussion of the central web technologies, arriving at a set of predictions. Although these premises largely apply to any type of congressional campaign behavior, we obviously focus here on technological implications (see Druckman et al., 2009).

A primary purpose of campaign strategy is to establish the criteria on which voters base their decisions. Campaigns attempt to do this by emphasizing (i.e. priming) their preferred criteria (e.g. Miller & Krosnick, 1996). When it comes to congressional

elections, voters tend to base their decisions on incumbency, as well as other features such as issues, personal background and/or party. Yet, for our purposes, most important is the large incumbency advantage that has been estimated to add 7–10% to vote totals, holding all else constant (e.g. Ansolabehere & Snyder, 2004; Jacobson, 2004).

Voters pay scant attention to congressional campaigns, and base their decisions on a subset of accessible considerations. Thus, in congressional elections, *incumbency serves as a highly accessible basis of vote choice; all else constant, voters favor incumbents* (Abramowitz et al., 2006; Ansolabehere & Snyder, 2004: 487; Gronke, 2000: 140–141). This means that incumbents generally have significantly less incentive to engage in active campaigning and stimulate interest. They do not want to signal that they have a serious, competitive challenger and would prefer voters to fall back on the incumbency cue rather than elaborate on other criteria (see Druckman et al., 2009).

In contrast, challengers need to overcome the incumbency advantage, in part, by stimulating voters to attend to the campaign and other factors. Given the ever-growing media market, ads are no longer particularly useful in doing so but websites offer one avenue via interactivity and multimedia. Indeed, it is well established in the web-based general literature that sites motivate users to attend to the online content (i.e. campaign material in our case) by using *interactive features and active updating* (e.g. Endres & Warnick, 2004; Ko et al., 2005; Parkin, 2010; Rettie, 2001; Southwell & Lee, 2004: 645). In fact, campaign websites may be particularly well designed to spur engagement in politics (Boulianne, 2011).

There is a downside, however, of interacting with voters and using multimedia. First, when it comes to interactivity, this creates a *critical tradeoff* between the need to stimulate voter interest in the campaign and getting them to attend to new information with the downside being the potential *loss of controlling the precise message voters receive*. That is, interactivity often allows users themselves to shape the message, which may not be the message the candidate prefers – candidates may lose message control. Second, when it comes to multimedia, another critical tradeoff comes between keeping the media interactive and actively updated (which requires staff) with the downside of signaling that the campaign may be close (e.g. candidates are investing a lot to ensure they win). Recall that all of this occurs within the context of campaigns targeting undecided voters even though they recognize that undecided voters visit less often than highly engaged supporters.

These widely accepted premises lead to two basic predictions:

- *Hypothesis 1: Incumbent candidates are less likely to use interactive and novel technologies than challengers.*

Essentially incumbents prefer that voters do not engage deeply in the campaign and instead rely on the incumbency cue. They want to maintain message control and they do not want to actively update or interact for fear of signaling a competitive race which itself can stimulate interest (e.g. Bowler & Donovan, 2011). The consequence is that incumbents will tend to not use novel technologies relative to challengers.[5]

In contrast, challengers need to overcome the incumbency bias, even at the cost of message control, and thus have an incentive to employ interactive technologies and actively update so as to engage voter interest (i.e. it is a good investment for challengers as it signals a more competitive race). The consequence then is a slight restatement of H1 which places the onus on challengers as the innovators and specifies:

- *Hypothesis 2: Challengers will make more use of interactive and novel technologies relative to incumbents).*

While we do not have hypotheses for open-seat candidates, our inclination and prior work (e.g. Druckman et al., 2009) suggest that they will be more apt to act like challengers since a goal is to stimulate interest in a campaign, although this is uncertain and we do not formally have expectations given extant work. But given that loose expectation (to act as challengers and the distinct incentives of challengers), we have separated out hypotheses 1 and 2 noting they could be combined although if open candidates are like challengers, that makes it a bit distinct, as we will discuss in the results. Also we should note one caveat to hypotheses 1 and 2. This is that we expect incumbents to use more partisan technologies such as partisan links. We suspect this because incumbents are usually relatively safe and highlighting their party is less risky (Druckman et al., 2009), incumbents often possess established partisan records and thus evading or being ambiguous about their partisanship is less useful, and incumbents commonly desire advancement within Congress (given they have already been there), and doing so often requires perceived party loyalty.

One other issue is that although the web is relatively cheap compared with TV ads, personal sites and profiles do require resources to be established and well maintained throughout the campaign to be effective. This creates a need for funds and also advice on how to run the campaign so that it will stimulate interest and generate the "right message" among the target groups. Compared with candidates in presidential elections candidates in congressional races have scant resources and staff. Any new technology that requires updating and active use through the campaign, therefore, will be more feasible for those campaigns that can devote the necessary staff time and resources to keeping the websites fresh (e.g. continually post the most recent ads or interviews). This may place a significant burden on campaigns with limited resources (Parkin, 2010).

The personnel providing this support are usually campaign consultants. Indeed, in-depth interviews with consultants have shown that they represent both a practical resource in terms of maintaining websites and an advisory resource in terms of guiding campaigns on how to use their sites most effectively (Broadbent, 2012: 3; Johnson, 2007, 2011: 57–58).[6] This observation leads to the following hypothesis.

- *Hypothesis 3: All things being equal those candidates employing consultants will be more likely to employ interactive and new technologies that require resources throughout the campaign (e.g. active updates).*

An important additional qualifier here is that this expectation does not hold for simpler web technologies that can be set up at the start of the campaign and then require no additional maintenance or advice (e.g. a link).

Before turning to a description of the web technologies and measures, let us be clear that our theory builds on generations of work on congressional elections and voting (as summarized in more detail in Druckman et al., 2009). Consequently, we view our predictions as having clear directional implications that affect how we will test them (see below). In short, we are unaware of a contrary theory or one that would arrive at opposite predictions given the large literature on which we build, ranging from work on voter accessibility to the incumbency bias to risk aversion.

Web Technologies

We focus on seven technologies that have been studied in the literature and that we found prominent in our exanimation of websites (e.g. Cornfield, 2004; Druckman et al., 2007; Kaye & Johnson, 2006: 149). As we will discuss, these technologies vary in the extent to which they involve content interactivity (whereby users actively engage with site features), inter-personal interactivity (whereby users actively engage others through the site), and presentational features, which allow site designers to vary types of media (e.g. Bucy, 2004a, 2004b; Bucy & Newhagen, 2004; MacNamara, 2010; Sundar, 2011).[7]

The first technology we study is *personalization features for the user* that allow visitors, for example, to input content information that could lead to personalized feedback (e.g. create a personalized page), change the content of a page (e.g. rearrange information), link the candidate's site to one's own site, or engage in other personalized experiences (see, for example, Cornfield, 2004: 42; Nielsen, 2012; Stewart et al., 2002: 368–369). (Importantly, then, we are not looking at the candidate personalizing the message here – the focus is on the user.) Personalization implies forfeiting message control by allowing user input on the site although it certainly can stimulate interest. We thus expect challengers to employ personalization features to a greater extent than incumbents. Personalization also requires resources and advice on how to best enhance a user's experience and thus we expect consultants to matter here as well.

A second novel technology is *external links* that enable visitors to self-select information from other sites (and interact with distinct content). It is important to distinguish among external links that lead to partisan information, since they carry with them distinctive strategic considerations (e.g. *partisan external links* explicitly link the candidate to his or her party and suggest the candidate shares his or her party's points of emphasis). This differs from non-partisan links that often lead to

general news or election information. To elaborate, if a challenger is running in a district or state that does not generally share his/her partisanship (which is the norm), that challenger has scant incentive to emphasize that difference via a partisan link whereas the incumbent has such an incentive. The incumbent has this incentive in part for campaign reasons, but also because it is a sign of party loyalty that may be helpful if re-elected in terms of power in Congress, which is often controlled by party leaders (see Cox & McCubbins, 1993). This is the one aforementioned caveat where we expect incumbents and not challengers to be more likely to use partisan external links. Specifically, although we expect challengers to use all other types of external links more often than incumbents, we expect incumbents to use partisan external links more often than their challengers. All of these external links, however, are relatively easy to identify and only need to be put up once (at the start of the campaign), so we do not expect the use of consultants to affect their numbers.

Our next technology is *inter-personal communications* where visitors can post comments on the campaign's blog or engage in a forum or chat, with their communications appearing on the site. We can also consider the more advanced options available on blogs as another measure of inter-personal interactivity – that is *blog interactivity*. Advanced blog features include allowing visitors to upload pictures, audio and video, to create their own blogs, to attach their blogs to the candidate's blog or to distribute the candidate's blog posts to other users. All of these features are related in their ability to connect the campaign to voters in a personal way. Of course, blog interactivity is only relevant for candidates' sites that actually have blogs to begin with. These features often stimulate interest, as mentioned, but come at the cost of message control and thus again we expect more challenger usage. Importantly, as we will explain, our data only code for the existence of possible interpersonal communication and blog advances and thus could be resource light (i.e. we do not code on whether a candidate responds, etc.). In other words, we do not necessarily expect consultants to matter here given our data may capture the existence but not the updating of these features (if they are updated, it would be captured in our *new information* variable below).

Another important technology in need of updating is quickly uploading new *multimedia* such as videos, audios or podcasts as the campaign unfolds. This might include audio or video of things like campaign stops, speeches, new ads or interviews. One of the biggest foibles of a campaign would be to have dated multimedia that makes the candidate appear as if he/she is no longer actively campaigning; thus multimedia not only can stimulate interest in and of themselves (which would be a challenger goal) but also require active updating *à la* challengers, implying consultants matter here in figuring out what to post and when.

Candidate websites can also provide *new information* in the form of updated text such as scheduling updates and calendars. These online presentation features enable campaigns to get information to voters with unprecedented speed. These are active updating features, as mentioned above, and thus is quite resource (consultant) demanding.

The application of our hypotheses then to our seven technologies is quite straightforward. With the exception of partisan links, all these technologies lead to the loss of message control and/or require active updating. Thus, in terms of hypotheses 1 and 2, challengers should be significantly more likely to employ these technologies, with the one exception, as explained, being partisan links. For hypothesis 3, there are three technologies that clearly need to be watched and updated throughout the campaign and thus we expect campaigns with consultants to employ these significantly more often. These technologies include personalization, new information updates and multimedia (which need updating so as not to appeal stale, as explained). Let us now turn to the description of our data.

Data

We test our hypotheses with data from an extensive content analysis of congressional candidate websites from the 2008 campaign. We assembled the dataset by first identifying the campaign website for every major-party Senate candidate and a random sample of major-party House candidates (stratified by region). The full sample of 402 campaign websites includes 68 from Senate candidates and 334 from House candidates. A team of trained content analyzers coded the sites, including, as we will shortly discuss, identifying the presence or absence of each of our key technologies. We coded all of the sites toward the end of the campaign, during the ten days prior to Election Day. We also took a sample of about one-third of the sites (137) and coded them two additional times earlier in the campaign – once in the early fall, then again near the middle of October.[8] This allows us to assess whether our full coding at the end of the campaign reflects the approaches taken throughout the entire period.

Coders analyzed the entire self-contained site; in most cases, this included a front-page, fundraising area, biography area, issues area and multimedia area. It also often included a blog, and in some instances additional idiosyncratic pages. In Table 1, we describe the exact way we constructed each of our dependent variables. The table also displays the mean (standard deviation) or percentage scores for each technology.[9]

Our *personalization* variable was an additive index that was based on the presence of a series of features that allowed users to engage with site content in ways unique to their particular preferences and/or backgrounds. This included options for visitors to take a quiz and receive feedback, receive tailored information, create a personalized page, enter qualitative information, enter quantitative information, move information on the site and link the site to their personal site. As Table 1 shows, most sites did not include many of these options with the average site including only 0.38 out of a possible seven features.

We created our *external link* variable by counting the number of such links on the site. These links included various connections to news organizations, interest groups, registration websites, social media websites, etc. We again see relatively low average levels given the near infinite number of possible external links. Most sites contained at least one link (86%) and the average site contained 5.11 links. Our *partisan external link* variable counted links to party sites, President Bush's site, or the presidential candidates'

Table 1. Dependent measures

Variable	Measure	Mean (std. dev.)/ Percentage[a]
Personalization	Number of options that allow visitors to personalize their engagement with the site. Options include: taking a quiz and receiving feedback, receiving tailored information (e.g. after entering preferences), creating a personalized page, entering qualitative information (with no guarantee of it being posted), entering quantitative information (with no guarantee of it being posted), moving information on the site to suit personal preferences, and linking the site to a personal site. (Score ranges from 0 to 7.)[b]	0.38 (0.72)
External Links	Number of external links on the site (includes social network links, party links, news links, etc). (Scores range from 0 to 101.)	5.11 (7.62)
Partisan External Links	Number of external links to partisan oriented sites. Includes political party site, president's site, Obama site, and McCain site. (Scores range 0 to 4.)	0.22 (0.50)
Inter-personal Communication	Number of opportunities for visitors to post items to the site, and possibly receive campaign feedback. Options include posting on a blog, visitor forum, candidate forum, and live chat. (Scores range from 0 to 4.)	0.42 (0.70)
Blog Interactivity	Number of options for visitors to post on the candidate's blog. Options include allowing visitors to post on blog, allowing visitors to post pictures, allowing visitors to post audio files, allowing visitors to post videos, allowing visitors to post other information, allowing visitors to create their own blog, allowing visitors to connect to a distinct blog (e.g. their own blog), and allowing visitors to distribute blog posts. (Scores range from 0 to 8.)	0.48 (1.01)
New Information	Dichotomous variable indicating whether the site is updated.	85.82%
Multimedia	Number of multimedia elements (excluding graphics or photos) on the site. Includes the existence of video and audio files in each of the five areas of site (front-page, fundraising, biography, issues, multimedia), on the candidate's blog (posted by the campaign), posted to the candidate's blog (by a user), and podcasts in each of the five areas of the sites. (Scores range from 0 to 24.)[b]	1.77 (1.49)

Notes: [a] N = 402.
[b] Ranges are theoretical. No websites included the maximum number of options for personalization or multimedia. The actual maximums for each, respectively, are 4 and 7.

(Obama and McCain) websites. The average congressional campaign website shied away from any partisan link with only 0.22 out of four possible links, on average.

Inter-personal communication counts the number of opportunities provided within the site for visitors to post items to blogs, chats or forums. This captures novel and interactive features of sites that can promote a loss of message control but that are of minimal cost to the campaign in terms of the resources required to set up and maintain. This is particularly the case if responses are not posted, which proves to be the case on many sites.[10] *Blog interactivity* sums up the range of advanced interactive options available on the candidate's blog which included allowing users to post distinct forms of multimedia, create personalized blogs, connect their own blog and distribute blog posts. Perhaps not surprisingly, given the loss of message control that these features promote most sites did not include many of them. The average site included only 0.42 inter-personal communication options out of a maximum of four, and only 0.48 of a possible eight ways to post information on blogs. This is again an issue of message control (since we do not code per se for candidates' responses on the blog, which would be captured in our next variable: new information).

New information is a dichotomous measure indicating whether there was information on the site that being updated by the campaign. Campaigns scored well on this overall with 86% updating their material. Finally, our *multimedia* measure counts the total number of video or audio files throughout the candidate's website. While about 77% of sites had at least some multimedia, most did not include a lot with the average site having 1.77 multimedia elements. To us, given the ease of posting, the low cost of doing so, and the choice of what to post, the amount posted provided another measure of how much *active updating* a site was doing. Overall, then, sites employed relatively few of these technologies. This coheres with prior practices; indeed, Druckman et al. (2007) report analogous values on most of these technologies for earlier election cycles, with three notable exceptions. First, sites are marginally more likely to provide at least some external links (86% of sites provide at least one external link versus 73% in 2002–2004), but they are less likely to provide partisan links. In 2002 and 2004, nearly 28% of sites included a link to a party site, for example, whereas in 2008, only 18% of sites did so. Second, even though sites do not post many audio and video files, the fact that 77% of sites had at least one is a dramatic increase from the 44% found in 2002 and 2004. We suspect this stems, in large part, from the rise of YouTube (among the sites with at least one video, 54% employed YouTube) and increased bandwidth available to the campaign and users. Third, again, while the number of inter-personal communication options is limited (only 32% of sites had at least one in 2008), it does exceed the number that were provided in 2002 and 2004 (i.e. the pre-blog era) when only 9% of sites had inter-personal interactive technologies. Despite the growth in site content over time, therefore, our findings point to a shortfall in provision and raise the question of "why so little technology?" Addressing this question is one of the key aims of this article. Certainly looking at the general picture of uptake presented so far, what is clear is that the move into Web 2.0 has not driven a dramatic rise in the congressional candidate use of web technology. That is not to say these

technologies do not matter when used, but they certainly do not seem to have radically altered how congressional candidates campaign.

Candidate, Race and District/State Data

We supplemented our web data with information about the candidates, races and districts/states. We describe these variables and present descriptive statistics in Table 2.[11] We will employ these variables in the multi-variate models below that are used to test our hypotheses. As explained, our main independent variables are candidate status (which we measure with two dichotomous variables indicating challengers or open-seat status) and consultants. Candidate status is easily obtainable from various sources (i.e. *The Almanac of American Politics*); we obtained data on the hiring of at least one campaign consultant from *Campaigns & Elections* magazine. About 62% of our sample hired consultants.

We also included a vast array of controls found in the literature on congressional elections that seem to influence behavior. The first of these is campaign funding. Our funds raised variable comes from the Federal Election Commission, which failed to report financial data for 18 of our 402 candidates. Given the importance of funds, we report analyses with the fundraising variable included, although our results are unchanged if we exclude fundraising.[12]

We measure competition with Cook's non-partisan ratings to classify races as solidly Democratic or Republican (0), likely Democratic or Republican (0.33), leaning Democratic or Republican (0.66), and toss-up (1) (see <www.cookpolitical.com>). Scholars commonly rely on Cook scores because they have the virtue of being exogenous to the races themselves (e.g. Goldstein & Freedman, 2002; Gronke, 2000: 100–101; Sulkin, 2001). One thing to note about race competitiveness is that, as is usual given the incumbency advantage, most races are not particularly close. Thus, we find that on the four-point scale, 67% were solid, 13% were likely, 9.5% were leaning and only 10.0% were toss-up.[13]

Other variables for which we have no clear expectations that we incorporate in the analysis given prior work on congressional elections are as follows. First is the candidate's party, since Democrats and Republicans may differ due to differences in their party culture (e.g. Galvin, 2010), emphasis on individualism (e.g. Gerring, 1998), and/or strategies for micro-targeting (e.g. Ubertaccio, 2007). We also control for candidate gender in that it could generate different approaches to campaigning (see, for example, Gulati & Treul, 2003; Puopolo, 2001) and office (a dichotomous variable for Senate) since the larger Senate constituencies may mean greater incentives to offer innovative and personalized technologies (see, for example, Bimber & Davis, 2003: 26–27; Dulio et al., 1999). At the district/state level, demand effects, such as income (median family income), education (percentage of individuals with at least a high school education), urban (percentage of district that is urban) and partisan support as is typically measured with presidential vote in the district/state (percentage Republican), may influence candidates' technology decisions, pushing some to create sites more in line with their constituents' characteristics (see Bimber &

Table 2. Independent variables

Variable	Measure	Mean (std. dev.)/ Percentage[a]
Candidate Status (Challenger, Open-Seat)	Two dichotomous variables indicating challenger status or open-seat status (baseline is incumbent).	40.05% challengers 12.94% open-seat
Funds Raised	Amount of money candidate raised.	$2,043,797 ($2,915,174)
Competition	Four point Cook rating with 0 = solidly Dem or Rep; 0.33 = likely Dem or Rep; 0.66 = learning Dem or Rep; 1 = toss-up.	67.16% solid 12.94% likely 9.45% leaning 10.45% toss-up
Party (Democrat)	Dichotomous variable indicating Democratic Party candidate (baseline is Republican Party candidate).	51.74% Democrats
Gender (Female)	Dichotomous variable indicating female (baseline is male).	16.42% Females
Office (Senate)	Dichotomous variable indicating Senate candidate (baseline is House candidate).	16.92% Senate
District/State Republican Partisanship (District/ State Republican)	Percentage of district/state voters for McCain in 2008.	46.33% (11.85%)
District/State Income	Median family income (1999).	$51,427 ($12,124)
District/State Education	Percentage with high school diploma (1999).	81.79% (6.87%)
Consultant	Dichotomous variable indicating whether the candidate hired a professional consultant (from *Campaigns & Elections* magazine).	62%
Urban	Percent urban population (from census).	75.26%
Ads	Number of television advertisements run (from the Wisconsin Ad Project).	4520.52 (11,130) (*note that 36% had no ads and the median value is 653*)
Age	Age as of 2008 (from the *Almanac of American Politics*, the *National Journal*, and/or Wikipedia and other web sources (particularly for challengers)).	54.44 (10.57)

Note: [a] N = 402, except for fundraising where N = 384 and age where N = 365.

Davis, 2003: 104–107; Foot & Schneider, 2006, 171; also see Druckman et al., 2009 for further discussion as they use many similar controls).[14] Note that for all district/state demographics, we employed the proper level of aggregation (e.g. education by district for the House and by state for the Senate). We also add controls for the candidate's age given it may influence likelihood of adopting technology[15] and the number of television advertisements run by a candidate since it is another central feature of some (particularly Senate and close House) congressional campaigns. (We were unable to locate age for 37 of our candidates.)

We should note that we do not include two controls that could be seen as competing explanatory variables: the holding of prior office and front-runner status (see Druckman et al., 2009 for discussion). Both of these variables co-vary strongly with incumbency, our core variable of interest. A full 85% of incumbents were front-runners (meaning they held at least a 10% lead), while only 12% of non-incumbents were front-runners, and 47% of incumbents had held prior office. To counter this we excluded them although their inclusion does not change our results substantively (see Appendix B for the results of models run including these two variable, available on the publisher's website at <http://dx.doi.org/10.1080/17457289.2013.832255>).

Results

We report our results in two sections. First we offer some descriptive data on over-time trends for each of our dependent variables. We then turn to our main analyses to test our hypotheses.

Over-Time Trends

As we noted, the relatively low levels of technological usage (see Table 1) cohere with prior year campaign practices. Here we turn to the question of whether the levels change over the course of the campaign itself. We address this question by using the sub-sample of sites (n = 137) that we coded at three points in time: wave 1 between September 1 and September 30, wave 2 between October 1 and October 15, and wave 3 between October 16 and Election Day. In Figure 1, we report the average values of the variables (other than external links; see below note) at each wave.[16] Our wave 3 means differ from those found in Table 1 because the table reports means from all 402 sites coded at wave 3 whereas, to ensure comparability in the sample, the figure reports the means from the 137 sites coded at each wave.

Clearly, Figure 1 reveals a tremendous amount of stability across waves – campaigns display scant over-time change in the features available on their sites. The only exception is multimedia where we find a significant over-time increase in the number of videos and audios available (wave 1 compared to wave 3 gives $t_{273} = 1.92; p \leq 0.05$ for a two-tailed test). This result actually confirms our earlier portrayal of multimedia as a technology that requires resources, since campaigns view multimedia as a technology that needs to be timely. Overall, the over-time results give

us confidence that the upcoming multi-variate tests of our hypotheses, using the full set of wave 3 sites, generalize across the campaign. (The sub-sample coded three times is too small for multi-variate analyses, given the need for the extensive control variables.)[17] It also adds to our above conclusion about relatively scant usage over the course of the campaign, which we will discuss in the conclusion.

Technology Use

We test our hypotheses by regressing each of our dependent variables on our key independent variables – challenger status (and open-seat status) and consultants. All regressions include the aforementioned controls. We report the results in Tables 3 and 4 and in all cases, except with new information, we use simple ordinary least squares regression (OLS); for new information, we use a probit model. We recognize that statistically speaking our models should perhaps be run as ordered probits (or a negative binomial in the case of external links); however, the results are the same regardless (see Appendix C, available on the publisher's website at <http://dx.doi.org/10.1080/17457289.2013.832255>), and thus, for ease of interpretation, we use OLS.[18] Also, note that for our blog interactivity regression, we only include results for candidates who had blogs, which is why the N is notably smaller, although the results are the same if we include those without them.[19]

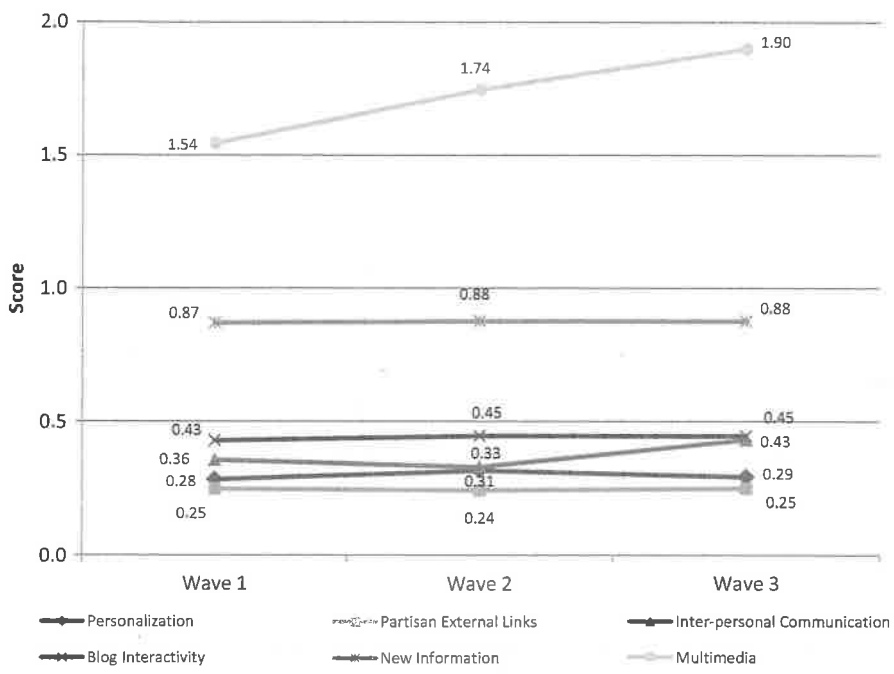

Figure 1. Over-Time Change

Finally, as explained in our theoretical section, we view our theory as a clear framework with directional predictions that builds on a large amount of prior work on campaigning and voting. As such, our predictions are directional and we thus follow Blalock's (1979: 163) suggestion to use a one-tailed test when testing a directional theoretically derived prediction. This also is consistent with other work on web campaigning (e.g. Druckman et al., 2009) and the large literature on public opinion and communication (e.g. Miller & Krosnick, 2000).

We see that, in *every case*, the challenger variable is significant and, except for partisan links, positive. This strongly supports hypothesis 1 in that it reveals that

Table 3. Personalization and links

Dep. Var.:	Personalization	External Links	Partisan External Links
Challenger	0.21**	2.07***	-0.10*
	(0.10)	(0.79)	(0.06)
Open-Seat	0.25**	0.65	-0.13*
	(0.12)	(1.02)	(0.06)
Funds Raised	1.09**	6.32**	0.03
	(0.46)	(2.76)	(0.30)
Competition	0.13	-1.53*	-0.25***
	(0.14)	(1.16)	(0.09)
Democrat	-0.07	-0.65	0.06
	(0.08)	(0.65)	(0.05)
Female	-0.02	0.07	0.04
	(0.11)	(0.91)	(0.07)
Senate	0.04	-0.79	-0.10
	(0.14)	(1.16)	(0.09)
District/State Republican	0.07	-2.24	0.41*
	(0.40)	(3.27)	(0.26)
District/State Income	-0.59*	0.90	0.49*
	(0.47)	(3.84)	(0.30)
District/State Education	0.03	-5.46	-0.60
	(0.81)	(6.67)	(0.52)
Consultant	0.12*	0.43	-0.04
	(0.08)	(0.76)	(0.06)
Urban	0.0001	0.008	-0.001
	(0.003)	(0.023)	(0.002)
Ads	-0.0000005	-0.00002	0.0000002
	(0.0000006)	(0.00004)	(0.000003)
Age	0.0001	-0.002	0.002
	(0.004)	(0.03)	(0.02)
Constant	0.29	8.65*	0.29
	(0.66)	(5.44)	(0.43)
R^2	0.07	0.04	0.08
N	352	352	352

Notes: ***p ≤ 0.01; **p ≤ 0.05; *p ≤ 0.10 for one-tailed tests.
Entries are OLS coefficients with standard errors in parentheses.

Table 4. Inter-personal communication, blog interactivity, new information and multimedia

Dep. Var.:	Inter-personal Communication	Blog Interactivity	New Information	Multimedia
Challenger	0.21**	0.49**	0.75***	0.76***
	(0.09)	(0.29)	(0.28)	(0.18)
Open-Seat	0.11	0.62**	0.36	0.88***
	(0.12)	(0.34)	(0.40)	(0.24)
Funds Raised	0.16	1.79**	3.06	2.46***
	(0.45)	(0.94)	(2.97)	(0.87)
Competition	-0.15	-0.24	0.02	0.71***
	(0.14)	(0.38)	(0.50)	(0.27)
Democrat	0.11*	-0.18	0.01	0.16
	(0.08)	(0.22)	(0.21)	(0.15)
Female	0.08	-0.15	0.26	0.01
	(0.11)	(0.30)	(0.32)	(0.21)
Senate	0.05	-0.02	0.73	0.44*
	(0.14)	(0.33)	(0.62)	(0.27)
District/State Republican	-0.07	-1.74*	-0.26	-0.80
	(0.38)	(1.21)	(0.93)	(0.76)
District/State Income	-0.22	-1.53	1.41	1.90
	(0.46)	(1.41)	(1.33)	(1.55)
District/State Education	-0.64	-2.88	2.49*	-0.28
	(0.79)	(2.40)	(1.89)	(0.89)
Consultant	-0.01	-0.59**	0.49**	0.30**
	(0.09)	(0.28)	(0.23)	(0.17)
Urban	-0.001	0.006	0.007	-0.003
	(0.003)	(0.008)	(0.007)	(0.005)
Ads	0.0000003	-0.00001	0.00003	0.0000005
	(0.000005)	(0.00001)	(0.00004)	(0.0000009)
Age	-0.004	0.01	-0.03***	0.002
	(0.04)	(0.01)	(0.01)	(0.007)
Constant	1.24**	5.32**	-1.33	-0.24
	(0.65)	(1.95)	(1.55)	(1.26)
R^2 (*log-likelihood for new info.*)	0.05	0.20	-110.68	0.25
N	352	134	352	352

Notes: ***p ≤ 0.01; **p ≤ 0.05; *p ≤ 0.10 for one-tailed tests.
All entries, other than new information, are OLS coefficients with standard errors in parentheses. New information is a probit regression.

incumbents do in fact use technologies significantly less often. Clearly, challengers employ technologies to a greater extent than incumbents, reflecting their greater tolerance for risk and incentive to actively campaign and stimulate voters' attention (also see Druckman et al., 2009).

We also see that open-seat status is significant and positive (except for the case of partisan links) in all but three cases (i.e. external links, inter-personal communication and new information). This is somewhat suggestive that open-seat candidates act like

challengers, supporting hypothesis 2 and our expectation that challengers could have been added to hypothesis 2.

The negative coefficients on the partisan links variable are also as we predicted; incumbents have less to fear by tying themselves to their party and may in fact have reasons for doing so that go beyond re-election (e.g. power in Washington). In short, political strategy notably shapes the application of technologies, suggesting that dynamic, interactive technologies are far from a deliberative panacea. Instead, the availability of these technologies varies and, in fact, voters are less likely to have the opportunity to engage with the very candidates most likely to represent them (i.e. incumbents).

Our other main hypothesis (3) is that technological use depends on access to campaign consultants whose job it is to advise candidates on their entire campaign messages including, in many if not most cases, the content of websites. We hypothesized this would matter strictly in cases that require active updates (i.e. personalization, new information and multimedia) since other features simply require one-time set-ups and no staff to recommend changes. Let us be clear that we do not mean to imply consultants "run" the campaign – candidates call the shots, but consultants provide guidance, expertise and assistance to the candidates. The results support the hypothesis. Specifically, we see that the consultants variable is positive and significant for personalization, new information and multimedia (i.e. features that require active updating). Also as predicted, consultants is not significant on the other features other than the negative coefficient on blog interactivity. Specifically, consultants do not have an effect on candidate use of external links, partisan links or inter-personal communication, although they do seem to advise against blog interactivity. We interpret this to mean that consultants advise great caution about what can be posted on blogs given the potential spiral that can result from them. In short, consultants appear to suggest and possibly even help with the use of active update features, although they have a negative effect on features like blog interactivity that could jeopardize message control. We find our consultant results particularly intriguing given the relatively small literature on campaign consultants – clearly they are playing a role in shaping new technologies and further inquiry into the specific dynamics is needed.

In terms of funds raised, we reiterate that it is a distant and rough measure given the number of activities that can be done with these funds and thus our more direct consultant measure is stronger and should be incorporated more in studies of congressional campaigns. Still, we find that funds raised significantly increases personalization, external links, blog interactivity and multimedia use – all functions that may require at least start-up resources. For example, we suspect that the links finding reflects the need for resources to keep tabs on each link's content at least at one point in time, while the blog finding stems from resources being needed to construct and possibly monitor more advanced blogs. In other words, consultants are not enough as a campaign needs the funds for a full staff as well. We otherwise find the occasional control variable to be significant, particularly those involving district/state level demographics. Interestingly, we see virtually no differences for Senate candidates or female candidates and party identification is significant just once. This

suggests incumbency status is more important than partisan affiliation in determining campaign style when it comes to technology use in congressional elections (consistent with general congressional campaigning; see Jacobson, 2004).[20]

Overall, our results leave little doubt that the application of communication technologies is part of a larger campaign strategy. Candidates do not simply use technologies because they are promising and available. Instead, they employ them in fairly small amounts and do so strategically, only when it appears to be in their political interests and they possess the resources (i.e. consultant) to guide their usage. They likely do so due to the relative risks of losing message control and resources of active updating which outweigh the technological advantages (e.g. stimulating interest). We should also mention that when these results are significant, they are also substantial. For example, shifting from incumbency to challenger status or having a consultant can increase usage in the range of 20% or more (specific substantive effects are available from the authors). Clearly, these effects matter.[21]

Conclusion

Perhaps the central point of our findings is that, in congressional campaigns, candidates do not simply employ web-based technologies due to their availability. Moreover, candidates do not appear to alter technological usage over the course of the campaign (see Figure 1). They do so when it is their strategic advantage (i.e. they need to stimulate interest in the campaign) and have the resources/guidance to do so. Technologies, at least in terms of the web, do not seem to have fundamentally changed congressional campaign approaches even if they may have done so in presidential campaigns (although the extent of this change at the presidential level is still an open question).

That said, we have isolated what we believe are the keys to explaining when these technologies will be employed – they depend on candidate status and the availability of consultant guidance. The bottom line is the Web 2.0 era does not appear to have dramatically altered congressional campaigns; at least not yet. This is not to say such technologies do not matter when employed – this is a key question for future research. Indeed, one possibility is that these technologies do matter at least among a subset of voters but then a two-step communication process kicks in and downstream effects exacerbate their effects (e.g. Norris & Curtice, 2007: 11).[22] Another question is to better isolate exactly what consultants do and what types of consultants campaigns hire – do they opt for more technology focused consultants in some cases but other types in other cases? The study of campaign consultants is an area in dire need of more work.

A last question to be answered is an ongoing one. As we stated at the start, new technologies are growing at a stunning rate and how technologies such as Twitter, Facebook and other new web features may affect strategies represent important areas for future work (although see Williams & Gulati, 2009 who find little change due to Facebook). The challenge for researchers is to keep up with the technological changes. Thus far, however, it seems as if web technology is not a panacea for

interactive campaigns and there is little difference among campaigns in how they approach these technologies. However, we now have some understanding from at least one critical campaign of the factors that lead some congressional candidates to use these features more than others.

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Notes

1. To be clear, Web 2.0 refers to a second phase in the development of the Internet (with the earliest starting date being around 2000) where the technology moved toward a focus on user collaboration and the sharing of content, and networking. In this analysis we examine both interactive Web 2.0 features as well as those that were part of Web 1.0 such as links and adding new information.
2. These figures are based on our analysis of major-party congressional candidate website use in the 2008 campaign. We used the *National Journal* to identify every major-party House candidate and every major-party Senate candidate. We then used Google and other search options to locate each candidate's website. We were able to identify campaign websites for 745 out of the 808 House candidates (92%) and 68 out of 69 Senate candidates (99%). (Some races were uncontested.)
3. To see the enormous skew stemming from relying on ads or media coverage, see Druckman et al. (2009).
4. Specifically, the heterogeneity comes in terms of office (14% Senate), party (53% Democrat) and status (31% incumbents, 53% challengers, 15% open-seat).
5. In short, these hypotheses suggest incumbents will be significantly less likely to employ web technologies for fear of losing message control and stimulating the appearance of a competitive campaign, which can generate attention to factors other than incumbency.
6. We thank an anonymous reviewer for this excellent suggestion. Also, note that many candidates who otherwise may not be able to afford consultants often receive financial support from their party, interest groups, or family and friends (e.g. Broadbent, 2012; Confessore, 2012; Kolodny & Dulio, 2003).
7. Content interactivity, inter-personal interactivity and presentational features should be seen as general categories and not applicable across distinct technologies that engage in the different functions. For example, inter-personal engagement can be blogs that are unidirectional or e-mail options that are more bidirectional – each is clearly a distinct technology but both allow for inter-personal interactions (in other words, these should not be seen as three latent dimensions per se).
8. Specifically, 137 sites were coded in wave 1, 140 in wave 2 and 402 in wave 3.
9. To assess the reliability of the coding, we randomly sampled approximately 30% of the websites in wave 3 and had one of two reliability coders code these sites. Specific reliability statistics are available from the authors; in general, we found high levels of reliability, nearly always exceeding the 0.80 threshold (see Neuendorf, 2002: 143).
10. As explained, we do not expect consultants/resources to be required for this option as many sites may set this up once to stimulate interest but not actively engage, which if they did would be captured in our new information variable.
11. Unless otherwise noted, our data are measured at the candidate level, and come from either *The Almanac of American Politics* (Barone et al., 2007) (complemented by the *National Journal* website) or the census.

12. We considered using funds instead of consultants as our key variable for hypothesis 3; however; the problem with using funds as a direct measure is that funds can be used for an array of activities (e.g. direct mail, television advertisements, get-out-the-vote drives), and it is unclear how candidates will choose to allocate the funds.
13. Given this lack of variance, it would be difficult to find a substantial impact of competitiveness but, in theory, one might expect competitiveness to play a role. As races tighten, voters will start to pay more attention to campaign rhetoric (Bowler & Donovan, 2011; Chong & Druckman, 2010) and be more likely to visit campaign websites and acquire information. They might, for example, move away from relying on standard criteria (e.g. incumbency) and start to evaluate the candidates' competing messages. As a result, campaigns will worry more about inducing voters to focus on their message. This means that campaigns will be particularly determined to control site content. Campaigns will not want to risk losing control of their message when every vote counts in a tight race and many visit the site. So, sites become in general less likely to feature technologies.
14. We measure District/State Republican Vote with the percentage of votes in the district/state cast for John McCain in 2008 (Carson et al., 2006; Lau & Pomper, 2004).
15. We also coded for tenure in office for incumbents, counting 0 for non-incumbents and the results are the same as when we use age.
16. The figure excludes the external links variable, given that it is on a very different scale; the respective wave means for external links are: 5.00, 4.63 and 4.60. Standard deviations and formal statistical tests for over-time change are available from the authors.
17. When we analyze the smaller sample of sites, our findings are consistent with what we report below on the wave 3 sample; however, statistical significance is less apparent due to the small sample.
18. We do so also at the urging of the editor and anonymous reviewer who sensibly feel ease of interpretation is important. We also ran a regression that used the log of external links as the dependent variable. This alternative specification is consistent with what we report.
19. There are two other modeling possibilities that we do not pursue here. First, we could use an item response model by grouping dependent variables if we believed they captured the same theoretical dimension – such as if we believed personalization and links were both simply dimensions of a latent "content interactivity" variable. We do not believe this to be the case though as personalization is a dramatically distinct technology and experience and thus assuming a single dimension is not appropriate here or in the other cases (as explained). Second, we could use a multi-level model if there was reason to suspect clustering by district/state, for example; however, we have no reason to suspect and basic statistical tests suggest no evidence of such clustering.
20. We recognize our negative finding on age and new information, while small in substance, is somewhat curious; perhaps it is due to the controls.
21. One may expect that as a race becomes more competitive, voters' interest will be stimulated regardless and thus we should see an interaction such that challengers are not more likely to employ the technologies (versus incumbents) in competitive races. We ran interactions between status and competitiveness (and funds raised) and found no significant interactions. We suspect however that there may be such a dynamic at work and part of our lack of significance stems from the lack of competitive races in our sample from one year and thus we encourage further exploration of these types of interactions.
22. As mentioned at the outset, our focus was on persuasion and information dissemination. We ran explanatory regressions on participation variables including links to registration websites and soliciting volunteers and, as we expected, found no significant effects. That said, an important related question is exactly how people do participate online (see Gibson & Cantijoch, 2013).

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Appendix A: Survey of Website Designers

As mentioned in the text, we conducted a survey of web designers to get at their intent. We began by identifying all major party U.S. Senate and House campaigns with websites that provided workable e-mail addresses or online inquiry forms during the course of the 2008 campaign (from October 17 to November 5). We asked that an individual involved in the creation and/or updating of the campaign's website complete a confidential five-minute online survey. Respondents rated the priority of several groups of voters (e.g. undecided voters, supporters) in terms of each being a target audience of the website, on a seven-point scale with higher scores indicating increased priority. Respondents used a similar scale to rate their perception of how often an average member of each group (e.g. undecided voters, supporters) visited the site with higher scores indicating more frequent visits.

The results, displayed in Figure A.1, clearly show that those involved in the creation of the sites view "voters in general" and "undecided voters" as the primary target audiences. These two groups register significantly greater priority scores than all other groups (e.g. comparing "undecided voters" to "journalists" gives $t_{123} = 3.86, p < 0.01$ for a two-tailed test). Interestingly, respondents also recognize that "voters in general" and "undecided voters" visit less frequently than all other groups. Instead, they believe "highly engaged voters" access the site most often (also see Democracy Online Project 1999), even though these voters are not the primary target of the site (e.g. comparing the frequency question for "highly engaged voters" to "undecided voters" gives $t_{112} = 8.97, p < 0.01$ for a two-tailed test). This accentuates the importance of *not* confounding the frequency with which

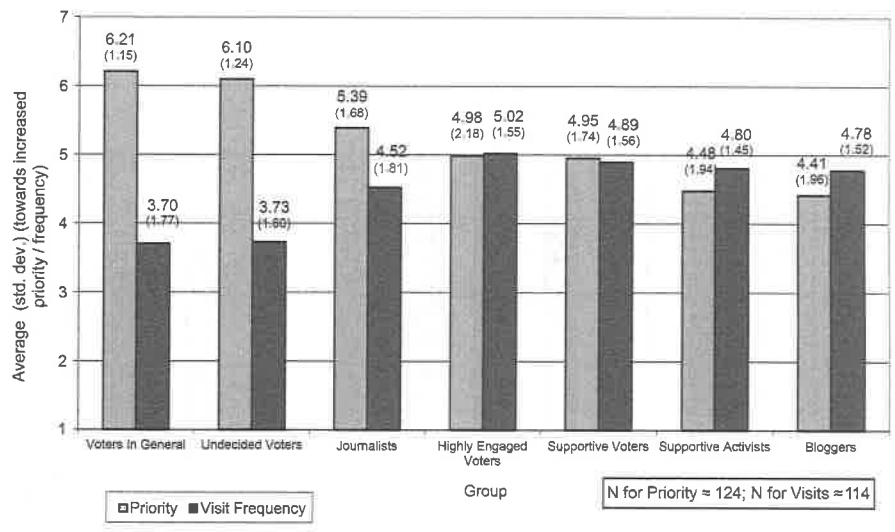

Figure A.1 Website Visitor Priority and Visit Frequency

particular voters visit websites with the intentions of those designing the sites. In other words, certain groups may be more important even if they visit less often (cf. Trent & Friedenberg, 2008: 402–404), and it is the intent of the designers that is critical to us as a window into campaign strategy. We also asked respondents the extent to which different media best capture the "entire campaign" and websites registered the highest average by a significant margin. While exploring distinct phenomena (e.g. adaptation of various distinct technologies and diffusion), our results are consistent with Gulati and Williams' (2011) interviews, which find that candidates have strategic competiveness in mind when they provide content and make adoption decisions.

On the other mentioned issue – the goal of the website – we asked respondents to rate on a similar seven-point scale the importance of various goals with seven indicating greater importance. The results in Figure A.2 further highlight the perception of congressional candidates as viewing their websites as mechanisms to inform and reach undecided and independent voters. Indeed, the highest scoring goal of the site is to provide information on the candidate's issues positions (6.20) and this significantly exceeds all other goals (e.g. comparing that to candidate background gives $t_{116} = 2.71, p < 0.01$ for a two-tailed test). The next most important goal – providing background – does not significantly differ from persuading undecided visitors, but a very large drop then is to any goal that may involve mobilization efforts, even broadly defined, including the goals of soliciting donations, publicizing events, signing up volunteers, distributing material or getting out the vote (e.g. comparing persuading undecided voters to soliciting donations gives $t_{114} = 2.94, p < 0.01$ for a two-tailed test). Notably, these later categories (after persuading undecided voters) are not significantly different from one another until we get to "get out the vote" which is even significantly

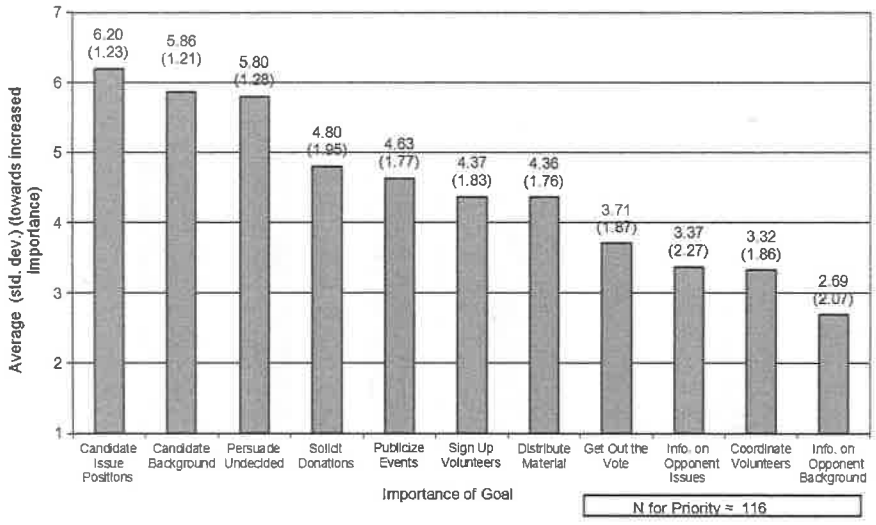

Figure A.2 Importance of Goals for Campaign's Website

lower than distributing material ($t_{115} = 3.63, p < 0.01$ for a two-tailed test). We then see no difference of significance until the last goal of informing voters about the opponent's background.

We recognize this may come as a surprise to some readers given that many presidential candidates have publicized using electronic media to mobilize. That said, it is critical to recall that presidential websites garner much larger audiences and have enormously more resources to coordinate. Our results on information and persuasion cohere with prior work on lower level campaigns that make the same point. For example, Foot et al. (2007: 94) state in their analysis of 2004 congressional websites that "information was the most prevalent practice and mobilization was the least prevalent practice" (also see Cardenal, 2011; Foot & Schneider, 2006: Gulati & Williams, 2009: 67; Norris, 2006).

In sum, all of this evidence supports the claim that websites offer an unmediated, holistic and a representative measure of technology use in congressional campaign behavior. Perhaps most importantly, it shows that the goal for congressional candidates – in contrast to massive presidential sites where funds are free flowing – is to provide information to voters and persuade the undecided (even if via journalists), despite the reality of how often individuals visit the sites. Moreover, the sites aim to sway voters' opinions more than to mobilize them per se. This is not to say mobilization is irrelevant but only that our survey results suggest the website designers do not view it as a primary purpose. This further justifies our focus on the persuasive aspects of how technology influences the message.

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Internet Search Data and Issue Salience: The Properties of Google Trends as a Measure of Issue Salience

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ABSTRACT *This article examines the conditions required for using Internet search data as measures of aggregate issue salience. Internet data have clear advantages over survey data in terms of cost, availability and frequency. These advantages have led the media and some researchers to use Internet search data as proxies for public opinion. However, these analyses do not present systematic evidence that search data tell us about the general public's views rather than those of an unrepresentative subset. This article outlines a general method for assessing the validity of search data against existing measures, including content validity and criterion validity. To this end, weekly Google search data are tested against Gallup's "most important problem" question. The article finds the salience of four issues, fuel prices, the economy, immigration and terrorism, can be measured in the United States using search data. Weekly measures of issue salience are generated for these issues, from 2004 to 2010, for empirical analysis. The search indices performed less well outside of these domains.*

Measures of issue salience are used widely in political science, particularly in agenda-setting research (Soroka, 2002); and research on issue voting. However, these studies have often been restricted by the limitations of available data. Almost all research on issue salience in the public uses the "most important problem" question (MIP)[1] or close variants of it. In the United States data for these questions are only available monthly, at irregular intervals and usually only at the national level. In most other countries the situation is worse, with only sporadic survey data obtainable.

Using data from Internet searches to measure issue salience could potentially solve these problems, as weekly search data are available for free from Google between 2004 and 2010 for almost every country, state and city in the world – and for any possible search term. The data from Google are available as indices that represent the number of Google searches that include a given search term in each period (aggregated either daily for a 90-day period or weekly for up to eight years).

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