Chapter VII

Measuring and Explaining the Quality of Web Sites in the (Virtual) House of Representatives

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Abstract

To date, research on e-government has devoted relatively little attention to how legislators use the Internet to enhance the representative function. In this chapter, we develop a general method to evaluate the quality of legislative Web sites and apply the method to the Web sites of members of the U.S. House of Representatives. We use a dichotomous latent variable model that combines a measurement model with a structural model to explain the variation in the quality of Web sites. We find the correlates of high quality Web sites include shorter tenure in office and closer electoral margin; the percentage of constituents who are connected to the Internet; and higher socio-economic status of the district. We propose this latent variable measurement approach as a general method for estimating the quality of Web sites for e-government research.

Introduction

As Richard Fenno demonstrates in his landmark work, *Home Style: House Members in Their Districts*, Members of Congress tend to be very good at interacting with constituents face-to-face. Digital interaction, however, is inherently new terrain for many Members, and any new activity entails uncertainty and risk. Furthermore, implementing and making effective use of innovations requires new knowledge and new operating procedures. As a consequence, adoption of Web technologies is neither automatic nor effortless. As Dawes, Bloniarz, and Kelly (1999, p. 21) write, "Throughout our history, developments in technology have emerged much faster than the evolution of organizational forms."

Communication between legislators and constituents is fundamental to effective democratic representation, and devising the institutional means for citizen/legislator communication stands as one of the core and persistent problems in the practice of democracy. A legislator needs information about the preferences, ideals, norms, and beliefs of her constituents in order to do her job well. Similarly, citizens need information about the actions and decisions of their representative in order to maintain appropriate accountability. But as national problems become more complex, and as the political process grows more and more dominated by experts and organized groups, it is becoming more difficult for interested citizens to understand the very meaning of government action, much less to find an effective voice in the process.

Recent developments in interactive information technology create new possibilities for establishing communication links between citizens and their representative. Bianco (1994) has shown that when citizens have better knowledge of the hard choices Congress often has to make, and the rationale legislators have for making them, many citizens may reinvest their trust in government. The widespread adoption and use of Web-based technologies among citizens creates the potential for greater citizen participation in, and knowledge and trust of, their government (Chadwick, 2006; Hamlett, 2002; Shane, Muhlberger, & Cavalier, 2004). Web technologies in principle allow citizens access to the government irrespective of their geographic proximity to the seat of government, and increasingly, irrespective of their wealth and educational level (Thurber & Campbell, 2003). Wisely used, the Internet may re-connect citizens and Congress in very meaningful ways.

Much of the scholarly research on e-government throws a cautionary light, however, on strong assertions of techno-optimism. Studies of politics and the Internet, for example, suggest the impact of the Internet has been to reinforce existing tendencies of citizens (Norris, 2002), and to create a "winner take all" system of information dissemination to citizens (Hindman, 2004). Further, e-government rarely reaches its theoretical potential, in large part because of the constraints of existing processes

representatives in the U.S. Congress have greatly improved the quality of their official Web sites in a variety of ways, but there is still a large disparity among the offices. Some members of Congress have high quality Web sites, while others have yet to take full advantage of the capabilities for communication that the Internet has to offer (CMF, 2003). It is thus an open question how much the Internet can affect the representative process, and whether members will seize this opportunity even if it can.

In this chapter, we examine the correlates of the adoption of effective Web sites in the U.S. House of Representatives. Our central question focuses on the determinants of the quality of legislators' Web sites. One major challenge in the study of online representation, and for e-government research of Internet practices more generally, is devising a measure of the intrinsic quality of Web sites useful for statistical analysis. In the next section, we outline a measurement model approach that makes use of relevant coded indicators of the quality of sites, and combine this measurement model with a structural model to uncover the political and institutional correlates for the adopting best practice Web sites among members of Congress.

Statistical Analysis: Measuring and Explaining the Quality of Web Sites

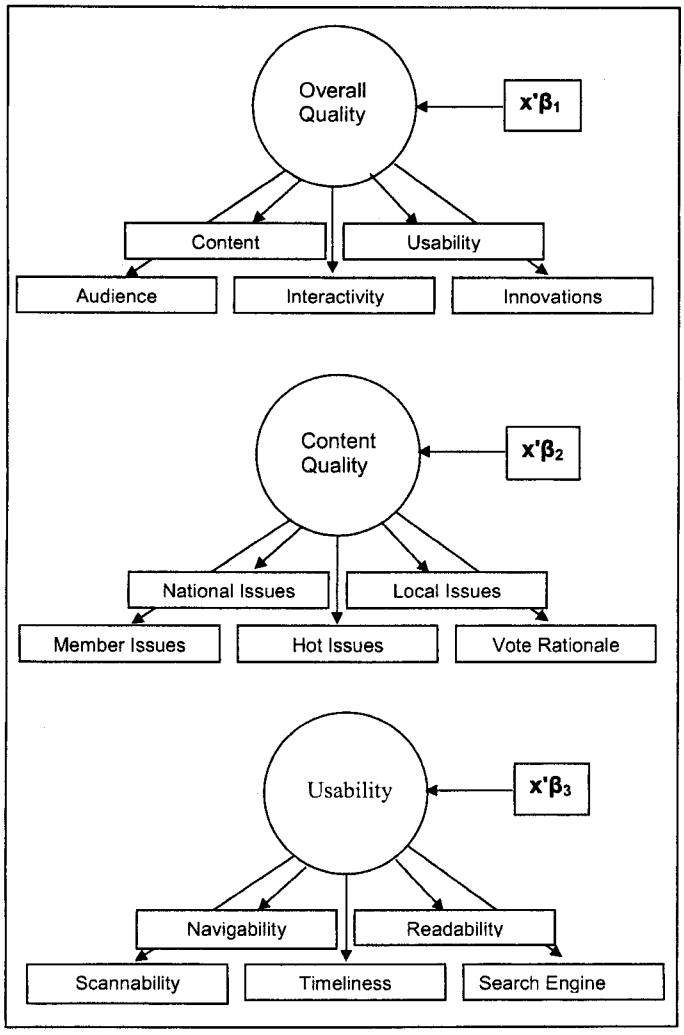
The House of Representatives is a unique laboratory for understanding the effective use of information technologies in the public sector. Congressional offices are 440 small, functionally identical, public organizations with a set of policy and procedural outputs (Salisbury & Shepsle, 1981). This enables a large N statistical study of innovation adoption and Internet practices of representatives. In this section, we develop measurement models to uncover the intrinsic quality of legislators' Web sites. We combine the measurement models with a structural model to test standard political science expectations that the behaviors of Members of Congress can be explained by recent electoral experience, district characteristics, and institutional resources (e.g., Fenno, 1978). The statistical study yields a portrait of the incentives for the adoption of best practice Web page innovations in the online legislature.

It is a common problem in social science that researchers wish to examine theoretical constructs that are difficult if not impossible to measure directly. It is difficult to directly measure the intrinsic quality of a Web site, but it is relatively easy to code attributes that one would expect a high quality legislative Web site to have. A measurement model is useful when one has several measured or observed indicators of a latent or unmeasured trait. In this chapter we develop measurement models of Web site quality that rely on latent variable modeling techniques, where we regress a set of related indicator variables on an unobserved latent quality fac-

tor. The measurement model estimates weights (or factor coefficients) that link the observed indicators to the unobserved trait. In turn, in the structural model we regress the latent variable on exogenous correlates to test hypotheses regarding the determinants of legislators' Web site quality. Figure 1 illustrates the measurement and structural models.

We first introduce the variables that we use for the measurement models and the structural models, and then we describe the statistical methods for estimation.

Figure 1. Specification of the measurement models



Measurement Model Variables

In 2002, the Congressional Management Foundation (CMF) evaluated each Web site of the U.S. House of Representatives based on 37 operational criteria (see Johnson 2004). The criteria tapped into what makes for a high quality legislative Web site in the normative sense—whether the Web site performs basic representative functions of communicating information that citizens want to see on Web sites, and information the member wants constituents to know. CMF identified the criteria using a number of sources: asking focus groups of citizens to spend time on a sample of sites, interviews and surveys with office staff and citizens, as well as Web industry research on usability. (For more detail on the coding see Appendix 1.) Some criteria, for example rationales for key votes and issue information, were measured on a 0–5 point ordinal scale, while others like voting records and the presence of a search engine were measured on a binary scale, receiving a "1" if the site had the feature, and a "0" if it did not. These coded variables are described in the Appendix.

CMF grouped substantively related criteria into five categories relevant to the online representative function: *audience*, *content*, *interactivity*, *usability*, and *innovations*. The *audience* indicators tap into whether the Web site provides information in a manner appropriate to different groups of citizens, both constituents and DC elites. The *content* indicators include voting records and rationales for important votes, substantive issue information, and information about the district. *Interactivity* includes such things as e-townhalls, bulletin boards, Webforms, email newsletter signups, and the like. *Usability* includes items like navigability, readability, and scannability (see www.usability.gov), and *innovation* is based on an assessment of whether the site has unusual features that provides value to the site.

We use these data to construct three separate measurement models. We first wish to create a measure of the overall quality of Web sites, but a measurement model with 37 indicators is too unwieldy. To measure overall quality, we first reduce the dimensionality of the indicators to five additive indexes, one for each of the five quality dimensions, *audience, content, usability, interactivity,* and *innovations*. To construct the indexes, we make use of weights CMF developed for the importance of each attribute for each dimension (see the Appendix for the variables for each and the priority weights). The *overall quality* measurement model takes these five indexes as indicator variables.

We then create measurement models for the *content quality* and for the *usability* of members' Web sites making use of the unweighted indicator variables corresponding to each dimension. The indicators of *content quality* were the extent to which the member discusses national issues, hot issues, issues that are their personal priority, local issues, and rationales for their votes. The indicators of *usability* are ease of navigation, timeliness of content, readability of content, scannability, and the presence of a search engine.

Structural Model Variables

The explanatory variables in the model are derived from the behavioral literature on the incentives and constraints for members of the U.S. Congress, including measures of the electoral situation, the local district situation, and the intra-institutional situation. Table 1 provides the summary data for the independent variables.

It is well known that members of Congress generally seek re-election (Mayhew, 1974). In the model we include two variables that tap into the member's electoral situation. *Tenure in office:* Members gain greater electoral security with longer tenure in office due to the well-known incumbent advantages (Jacobson, 1987). Members with longer tenures in office have fewer incentives to seek out innovative ways to interact with constituents than those with shorter tenures. In addition, Members with longer tenures are more likely to have well-established ways of communicating with constituents (Arnold, 2004). *Margin of previous electoral victory*: Those with narrower victories have more powerful incentives to reach out to constituents in every manner possible (Arnold, 2004).

The institutional context within Congress also can create advantages and disadvantages for members to undertake new initiatives. The political parties in Congress help to organize and promote the adoption and use of IT among their members. We expect that for historical reasons the two parties in the House will have different capacities to promote the adoption of Web-based technologies among their members, and we include the political party variable to capture any difference. *Political party*: This is a dichotomous variable coded 1 if the Member is a Republican, and 0 otherwise.

Representation inherently requires attention to district needs and interests. In the model we use state level measures for these variables, which will serve as rough measures of district characteristics. *Percent of households in the state with Internet connections* measures the capacity and the interest of citizens to use online services and to contact their member through Web sites, where for the average state, 50% of the households have an Internet connection as of 2002 (NTIA, 2002). *Manufacture of electronic equipment in the state (dollars per capita).* Organized interest group politics often drives members' choices (Jacobson, 1987), and the amount of production of electronic equipment serves as a proxy for industry demand for technology-driven, online representation.

We also include measures of the demographics of the district. Here we are interested in seeing if the digital divide is reproduced in Congress. We include *Median income of the district* to measure the relative income of the district (Arnold, 2004). We also include *Per capita gross state product* (in millions of dollars for year 2000) to capture contextual effects on the assumption that districts located in wealthier states benefit from positive externalities and redistributive polices. We also include a measure of the *Percentage of the district that is African American.*

Table 1. Summary statistics for the independent variables

	N.	Mean	SD	20th percentile	80th percentile
Tenure (# of terms)	436	5.52	3.83	2	9
Margin in Previous Election	437	68.88	13.55	58	77
Percent of State Households Connected to the Internet	433	50.43	5.17	46.9	55.3
Elec. Equip. Manuf. ($ per capita)	433	802	785	321	1364
Political Party (Republican = 1)	440	.497	.500	---	---
Gross State Product ($ per capita)	433	35602	11466	31182	39267
Percent of District African American	435	11.8	15.7	2.1	17.8
Median Income of District	435	36020	9306	28591	43375

Statistical Method

The statistical models combine a measurement model for Web site quality with a structural model that regresses measured quality on exogenous covariates. For each measurement model, we specify a link function and distribution for regressing the indicator variables on the latent variable, with the constraint that the latent variable can take on one of two values or "classes": low quality and high quality. Simultaneously, we regress the dichotomous latent variable on a vector of exogenous covariates in a structural model using a logit distribution. In the analysis, the parameters of the measurement model and the structural model are estimated simultaneously in a single likelihood function (see Skrondal & Rabe-Hesketh, 2004).

More formally, for the *Overall quality* model, label the observed variables as follows: audience O_1, content O_2, usability O_3, interactivity O_4, and innovations O_5. We specify the following identity link functions for each indicator:

$$O_i = d_i + \lambda_i \eta_1 + \varepsilon_i \quad \text{for i = 1 to 5} \qquad (1)$$

Assume that each O is distributed normally. We set $\lambda_1 = 1$ for identification. In addition, only one level 1 error variance is identified, so assume

$$\varepsilon_i \sim N(0,\theta) \quad \text{for i = 1 to 5}$$
$$E(\varepsilon_i \varepsilon_{i'}) = 0 \quad \text{for } i \neq i' \qquad (2)$$

Assume the latent variable can take on one of two values, e_1 for low quality Web sites and e_2 for high quality Web sites, with corresponding prior probabilities π_1 and π_2. Set

$$\sum_{c=1}^{2} \pi_c e_c = 0$$

for identification. Further assume that the prior probability that a legislator's Web site falls into the higher class follows a logistic distribution

$$\pi_c = \frac{1}{1+e^{x\beta}}$$

To ease interpretation of the estimated coefficients β, we standardize all continuous variables with zero mean and unit variance, so that a one unit change for a continuous variable is a standard deviation, and a one unit change for a dichotomous variables compares the zero to the one category. In this case, the marginal percent change in probability for a one unit difference for any variable is given by 1-exp(β), where the difference is from the mean for continuous variables.

The structural coefficients {β}, latent class locations {e}, and latent class probabilities {π} are estimated using maximum likelihood estimation. We estimate all models using the GLLAMM software (available at gllamm.org). The standard errors for all marginal percent changes and linear combinations are approximated using the delta method as implemented in the Stata statistical software.

The estimation of the *usability* and the *content quality* models proceeds in a similar fashion, with two exceptions. First, we dichotomize the 6-category indicator variables to reduce measurement error, with the cut point in each case between 3 and 4. We then specify a binomial distribution with probit link for each dichotomous indicator. While dichotomizing the indicator variables reduces variability, there is a net increase in efficiency since dichotomizing allows us to substitute a probit for an ordered probit link function, reducing the number of estimated parameters by 25 in each model. Second, each equation in the measurement model has probit variability rather than an additive error term.

Results

Tables 2 and 3 give the results of the statistical estimations.

Table 2. Intercepts and factor coefficients for the measurement models

	Intercept	Factor Coefficient
Overall Model		
Audience	-0.082* (0.068)	1 (0)
Content	-0.083* (0.065)	0.941* (0.076)
Usability	-0.073* (0.061)	0.838* (0.074)
Interactivity	-0.047* (0.053)	0.649* (0.075)
Innovations	-0.057* (0.057)	0.738* (0.075)
Usability Model		
Ease of Navigation	-0.724* (0.105)	1 (0)
Timeliness of Content	-0.479* (0.078)	0.614* (0.097)
Readability	-0.924* (0.175)	1.526* (0.232)
Scannability	-1.259* (0.254)	1.596* (0.297)
Search Engine	-0.639* (0.068)	0.252* (0.085)
Content Model		
Member Issues	-0.825* (0.113)	1 (0)
Hot Issues	-1.548* (0.137)	0.780* (0.119)
National Issues	-1.337* (0.151)	1.118* (0.163)
Local Issues	-1.223* (0.121)	0.824* (0.108)
Vote Rationale	-1.870* (0.163)	0.644* (0.118)

*$p<0.05$

Table 2 reports the intercepts and the factor coefficients for all three measurement models. The factor coefficients are all positive and statistically significant, and most are of similar magnitude. This indicates that each indicator variable has similar weight in determining quality along the different dimensions. The reliability of the overall quality measurement model is 0.43. The intercepts are all statistically significant and negative, which shows that Web sites of average quality (η=0) tend to score relatively low on the indicator variables. In other words, the average quality of Web sites tends to be low by the CMF coding standards.

Table 3. Marginal percent change in probability of high quality Web site

	Overall	Usability	Content
Percent Households Connected to Internet	0.170 (0.136)	0.114 (0.131)	**0.341*** (0.107)
Previous Margin of Victory	-0.142 (0.159)	**-0.274*** (0.169)	0.042 (0.140)
Tenure	**-0.635*** (0.241)	**-0.319*** (0.161)	**-0.512*** (0.257)
Median Income	0.142 (0.126)	-0.063 (0.147)	0.033 (0.147)
Republican (1=yes, 0=otherwise)	0.232 (0.203)	-0.019 (0.249)	0.292 (0.194)
Percent African American	-0.447 (0.306)	-0.137 (0.165)	-0.234 (0.238)
Electronic Equipment Manuf. (dollars per capita)	**0.273*** (0.121)	**0.210*** (0.102)	0.046 (0.111)
Gross State Product (dollars per capita)	-0.157 (0.216)	0.044 (0.171)	-0.106 (0.213)

*$p<0.05$

Cells give the percent change in probability from changing the row variable by one unit (one standard deviation from the mean for continuous variables), holding all other variables constant. Standard errors of percent changes in parentheses, approximated using the delta method

Table 3 reports the estimated effects from the structural models. The cells give the marginal percent change in the probability that a typical member has a high quality Web site that counterfactually would occur if one were to change the row variable one unit from the mean (one standard deviation for continuous variables), holding all other variables constant at their mean.

The variables measuring members' electoral situation, not surprisingly, generally have a strong and robust effect on the overall quality of members' Web sites. The most robust finding is the effect of tenure, or years of service, on the quality of Web sites across all three measurement dimensions. Increasing tenure by one standard deviation from the mean, approximately four terms or eight years, decreases the probability of a member falling into the high quality class for overall quality by nearly 64%, for content quality by over 50%, and for usability by over 30%. The result is robust and is largely expected since seniority helps to confer a member an incumbency advantage, and at the same time members with a longer tenure in office will have established standard operating procedures for communicating with constituents.

In addition, we find that margin of victory affects usability. Decreasing the margin of victory by one standard deviation from the mean (or by about 14%) increases the probability that a member has a highly usable Web site by about 27%. This result also is not surprising since the re-election incentive is strong, and one would expect

members desire to improve communication with their constituents if they are in competitive districts. Perhaps more surprising is that having a narrow margin of victory does not appear to affect the quality of the issue-based content on a member's site; the coefficient in the content quality model is positive but is swamped by its standard error. Combining these two results suggests that members with narrow margins are risk averse: they attempt to improve communication through better usability without risking communication that offends potential voters by posting specific content. A distinctive but important feature of Web sites is, currently, the content cannot be tailored to individual audiences, and members with narrow margins may wish to exercise the virtues of ambiguity when it comes to issue content.

We include several variables in the model that measure the demand and the capacity for local constituents to gain access to their member's Web site. The percent of households in the state that are connected to the Internet is a measure of the individual-level constituent capacity to access the member's Web site, and also a proxy for the demand among constituents for Web-based information and services. We find this measure, controlling for the member's margin of victory, tends to drive issue-based content. Increasing the percent of citizens connected by one standard deviation (or about 5%) increases the probability that the member's Web site has high quality content by about 34%. To measure the demand for technology-based communication among local organized interests and firms, we include a measure of the total output in the electronic equipment manufacturing sector, normalized by the state population. We find that increasing the per capita production of electronic equipment (our proxy for high tech local industry) by one standard deviation above the mean increases the probability that the member has an overall high quality Web site by about 27% and increases usability by about 21%.

Adler, Gent, and Overmeyer, (1998) found that Republicans are more likely to have setup homepages in the early days of adoption on the Hill. Thus, we had expected to find that Republican have an advantage in quality given their longer experience with e-government. We find that the party variable has a large and positive point estimate in the overall and the content quality models, consistent with the Adler findings, but there is insufficient power in the statistical model to distinguish the effects from zero.

We assumed that we would find the digital divide reproduced in Congress, and indeed we find some evidence that the Web sites for poor and minority districts are of relatively worse quality. The point estimates for district median income and percent African American are large in several of the models but not significant at conventional levels in any of the models. Given that race and income go hand-in-hand, there is some collinearity among these variables, and the joint effect of the two variables combined reaches statistical significance in the overall quality model. Increasing the percent black and decreasing median income, each by one standard deviation from the mean, decreases the overall quality of members' Web sites by a whopping 69%, although the statistical evidence for this remains weak ($p = 0.09$).

In the other two measurement models, he combined effect of race and income is not nearly as dramatic and does not reach statistical significance.

Discussion

These cross sectional findings confirm the expectations given in the political science literature (see Arnold, 2004) on U.S. congressional behavior: the quality of members' Web sites, as in other decisions, is heavily dependent, in predictable ways, on the member's political and institutional situation.

On "the electoral connection" side, necessity appears to be the mother of invention when it comes to adopting Web-based innovations among members of Congress. It seems quite natural that a narrow victory would intensify a member's incentives to extend his or her "advertising, position-taking, and credit-claiming" activities to a high quality Web presence (Mayhew, 1974). Nearly all of the Web sites carry the member's picture and biography, the beginning of any good campaign to advertise a person. We find however that members with narrow margins tend to improve the usability of their Web sites, but do not necessarily increase the amount of issue-related content. Taken together, the estimates suggest a dilemma for members with narrow margins: these members likely wish to improve communication with constituents, but are reluctant to place content on their Web site that may offend potential voters. This calls attention to the distinctiveness of the Web site as a forum for representation, since members cannot tailor the content of the Web site to different audiences as they can when meeting with constituents in a face-to-face setting.

Shorter tenure contributed to higher quality Web sites in all three measurement models, even controlling for margin of victory. There are several possible interpretations of this result. First, it is possible that there is still a kind of electoral security connection beyond margin of victory. That is, there may be more variance in margins of victory early in one's career (or just less information) leading to a kind of risk-averse discounting of a freshman's wide margin of victory. Second, the tenure effect might be driven by institutional factors. Since members with lower seniority have fewer institutional roles and powers, they tend to focus more on constituent services. Such services are featured prominently on many Web sites. Third, new members will be setting up their Web sites from scratch and thus may benefit from more recent "best practices" before routinization and office inertia set in. Finally, tenure may be proxying for some mechanisms associated with age (e.g., younger people being more comfortable with technology). Because of co-linearity issues, this last possibility is difficult to tease out, but in future research we plan to identify the precise mechanism or mechanisms driving the significant tenure effect.

So far we have discussed "supply side" determinates of high quality sites. Turning to the "demand side," we find local determinants of the demand for computer-mediated interaction with one's elected representatives. First, we find that increasing high

tech industry presence enhances the usability of Web sites, with members possibly meeting technical expectations or standards of local industry. Second, we find that controlling for margin of victory and tenure, increasing the percent of citizens with Web connections enhances the quality of the issue-based content of members' sites. The dynamics around this latter variable should become more interesting over time. As Web connections go the way of the telephone—i.e., from a luxury to a nearly universal household feature—the decrease in variance for this variable will presumably cause it to lose predictive power. However, it is possible that the effect is capturing something more than merely the raw possibility for accessing Web sites, such as the characteristics of individuals and districts that adopted technology early (controlling for income and local tech industry). The search will then be on to find indicators for these other possible effects.

The evidence for the reproduction of the digital divide within Congress is somewhat mixed. We find weak evidence that districts that are disproportionately poor and minority have lower quality Web sites, but we do not find evidence for this difference in any of the measurement models. If the divide indeed does exist in Congress, it appears to operate at only in a diffuse manner or at very general levels.

Conclusion

In sum, we argue that the determinants of Web-based innovations among congressional offices presented in this chapter generally comport well with predictions generated out of previous research into "pre-Web" domains of congressional behavior (exemplified by Mayhew [1974] and Fenno [1978]). It also integrates nicely with research into the very early days of congressional e-government (Adler et al., 1998; Owen, Davis, & Strickler, 1999). Both "supply side" variables that tap members' motivational incentives, such as tenure and the margin of victory, and "demand side" variables that tap constituent and industry interests behave as predicted.

Thus, the cross sectional study shows that adoption of Web site features that enhance the quality of online representation is not haphazard, but is often a purposeful response to a member's political situation. So where do we go from here? The static nature of our cross-sectional analysis, while interesting and informative, does not answer other important questions regarding the diffusion and use of digital technologies inside of Congress. What is the specific process of diffusion of Web-based innovations? Do members with better quality Web sites also make better use of feedback from constituents in their offices? Do members themselves monitor and evaluate the effectiveness of their Web sites, and further, do they use such feedback to modify and improve the quality of their Web-based representation?

These considerations suggest that future studies of Web-based innovations require combined quantitative/qualitative and dynamic analyses to identify the mechanisms behind, and impact of, adopted technologies. In combination with the research presented here, such studies will help political scientists and e-government researchers better understand what is rapidly becoming the most common mode of interaction between citizens and their elected representatives. And this academic knowledge can, in turn, be deployed by practitioners to facilitate more and better representation. Thus, we can say, without hyperbole, that the Web and its progeny are almost certain to prove a key nexus for any normatively ambitious 21st-century democracy.

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Appendix: Data and Sources

CMF Codes

In this section, we list the criteria CMF used in evaluating the Web sites, with the level of priority each criteria received listed in parentheses. All variables are dichotomous except those with an asterisk are measured on an ordinal 0 to 5 scale.

Audience: Constituent interests* (1) Recruit interests* (2) Press interests* (2)

Content:

- *Issue information*: Member's key issues* (1) "Hot" issues* (1) National issues* (1) State/local issues* (1)
- *Casework and Constituent Services*: Casework guidance or answers to frequently asked questions* (1) Casework initiation instructions* (2) Information and links for key agencies for casework* (2) Grant information* (3)
- *Accountability Information:* Vote rationale* (2) Voting record (1) Sponsorships and co-sponsorships (1)
- *Educational Information*: Information about the legislative process
- *Press Information*: Press contact information (2) Press releases by date (1) Press releases by topic (1)
- *Legislative Information*: Member's committee service (1) House and/or Senate schedules (2) Link to Thomas or Thomas search box (2)

- *District/state Information*: Member's district schedule or schedule of district events (2)
- *Member Information*: Member's biography (1) Member's photo (3)
- *Privacy Information*: Privacy statement (1)

Interactivity: E-mail updates (1) Office hours (2) Web form or public e-mail address (1) Postal addresses (1) Phone numbers (1) Guidance on how to communicate with the office

Usability: Navigation* (2) Timeliness* (1) Readability* (2) Scannability* (2) Search engine (2)

Innovations: To what degree does the site provide innovative features or content that makes the site easier or more interesting to use?* (1)

Data Sources for the Exogenous Variables

The gross state product and electrical equipment manufacturing variables come from census data from the calendar year of 2000. The district level variables, percent African American, and median district income, are from Scott Adler's Web site, department of political science, University of Colorado (Adler, 1997).

CURRENT ISSUES AND TRENDS IN E-Government Research

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