

## E-DEMOCRACY WRIT SMALL

R. Kelly Garrett & Michael J. Jensen

To cite this article: R. Kelly Garrett & Michael J. Jensen (2011) E-DEMOCRACY WRIT SMALL, Information, Communication & Society, 14:2, 177-197, DOI: [10.1080/1369118X.2010.490558](https://doi.org/10.1080/1369118X.2010.490558)

To link to this article: <http://dx.doi.org/10.1080/1369118X.2010.490558>



Published online: 04 Dec 2010.



Submit your article to this journal [↗](#)



Article views: 351



View related articles [↗](#)



Citing articles: 3 View citing articles [↗](#)

# R. Kelly Garrett & Michael J. Jensen

## E-DEMOCRACY WRIT SMALL

### The impact of the Internet on citizen access to local elected officials

*This article examines how elected officials' interactions with neighborhood groups, business interests, issue groups, and other stakeholders are shaped by their use of the Internet and by characteristics of local e-government infrastructure. The study utilizes data from a nationwide survey of local elected officials and from an analysis of corresponding local government websites. Results show that Internet use is associated with a significant increase in contact with stakeholders and with increasingly diverse types of communication partners, even after controlling for officials' general propensity to communicate. Both time spent on official duties and city size moderate the influence of Internet use. However, local government web sites do not appear to have a substantive influence on citizen's participation in policy making.*

**Keywords** e-democracy; Internet; civil society

*(Received 13 January 2010; final version received 29 April 2010)*

Scholars have been debating the democratic potential of networked computers for more than a quarter of a century (Danziger *et al.* 1982). During this time, local governments in the United States have invested considerable resources in electronic government (e-government) initiatives (Klotz 2004; Brown & Schelin 2005). Most US cities today have some type of e-government presence, and the range and number of services offered continues to expand (West 2005). Although specific goals vary, investments are frequently justified as a means of increasing government transparency and accessibility (Fountain 2003; Thomas & Streib 2003; Tolbert & Mossberger 2006). These optimistic expectations have been fueled in part by the belief that networked computer technologies have the potential to facilitate participation and promote 'strong democracy' more generally (Barber 1984; Dahl 1998; Owen 2006; Boulianne 2009). Despite high hopes for e-government as a participatory platform and rapid Internet diffusion and adoption, corresponding changes in the levels and forms

of citizen participation and in political knowledge are modest (Davis 1999; Margolis & Resnick 2000; Bimber 2003). The question we pose in this article is whether there is evidence of change in *local political processes* associated with the adoption of the Internet.

This research examines the role of the Internet in connecting authorities and civil society at the local level from the perspective of elected government officials. Our task is to more systematically establish whether increasing use of Internet technologies by American municipalities is promoting interaction between elected officials and stakeholders who have a vested interest in the local policymaking process. The extant literature tends to focus on a technology's attributes to explain its political consequences. In contrast to these technology-centered approaches, we suggest that it is also useful to look from the perspective of a changing political system. Elected officials must navigate a communication environment that is significantly more complex than that of just a decade ago (Crozier 2007). Although new technologies do not translate into concrete political outcomes, they supply new resources by which political actors change the operation of the political system in fundamental ways. The ubiquitous integration of new modes of communication – from email and text messaging to blogging – into everyday life and work, contributes to a world in which Americans conduct increasingly greater portions of their lives online. Likewise, these technologies facilitate complex communication flows that have the potential to redefine political communication.

### **Governance, the Internet, and the role of civil society**

Castells (1989) famously declared cities to be a 'space of flows' as digital communications technologies were used to create dense real-time networks linking businesses, governments, organizations and individuals around the globe. According to Castells (2000, 2009), these information flows profoundly shape the politics of cities, even as cities shape these flows. This section proposes a framework for analyzing network-enabled political interactions from the perspective of locally elected officials. Linear models of governance (e.g. Almond & Verba 1989[1963]; Svava 1990; deLeon 1999) have come under attack for being overly simplified and too general. The approach, sometimes called the "electoral chain of command" model of democracy' (Denters & Rose 2005) presumes that policy outputs are democratically tied to citizens to the extent that policies are determined by elected representatives. Given the low levels of electoral participation in local government, however, issue-specific communication flows are an important element in the policy process for two reasons. First, from the perspective of officials inside the political system, these communications are necessary for good governance as the political system depends on information flows for effective policy formulation and stakeholder cooperation

(Crozier 2008). Second, they democratically connect citizens with policy outputs in a way that extends beyond electoral institutions (Bang & Esmark 2009).

The Internet can play an important role in linking individuals and groups of stakeholders outside the regime with political authorities, promoting a more communication-centric vision of local governance. While information has always been important to politics, Castells (2006) notes that today 'politics is largely dependent on the public space of socialized communication' (p. 14), and by altering this space, evolving communication technologies are transforming the political process. Viewed from inside the political system, local elected officials' patterns of communication and information usage are at the heart of networked practices of governance. If coalitions of actors inside and outside the government are central to policy promulgation and implementation, then conduits of communication and the information conveyed are the channels and the currency of exchange. The Internet facilitates a networked form of governance by vastly increasing information access and coordination between officials, groups, and individual members of the political community (Castells 2006).

Scholars have debated at length whether the proliferation of digital communications networks will open up the political system. Castells (2009) celebrates the use of digital communication technologies as enabling 'mass self-broadcasting' expanding the role of individuals in the political system. Technology advocates suggest that this is probable thanks to reductions in information and communication costs for new participants (e.g. Rogers *et al.* 1994; Carroll *et al.* 2005). Internet users are often more politically informed, aided by the ease of access to political information online (Norris 2001), and this in turn motivates political participation (Tolbert & McNeal 2003). Additional research has shown that younger cohorts are also more likely to participate online than their offline counterparts (Muhlberger 2004; Jensen *et al.* 2007).

Critics contend, however, that new technologies are not likely to bring about changes that challenge the interests of political elites or established institutions (Dutton & Guthrie 1991; Davis 1999; Danziger & Anderson 2002; Jensen *et al.* 2007). Even to the extent that the Internet facilitates access to political information, it primarily benefits the politically interested because it makes inadvertent exposure to political information less likely (Prior 2007). Some take the argument further, claiming that online communications deepen political inequalities, favoring those who are already politically privileged (Warschauer 2003; Hindman 2009). As it becomes easier to communicate with high-status individuals, exchanges with less desirable communication partners may fall off (for more on this idea, see Rosenblat & Mobius 2004; Van Alstyne & Brynjolfs-son 2005), implying that the Internet could ultimately serve to concentrate power among political elites rather than to decentralize decision making. Furthermore, Coleman and Blumler (2009) note that even at the local level policy-makers tend to be ambivalent about the role of citizens in policymaking – a view that often perpetuates citizen skepticism and frustration.

Outside of institutionalized online deliberative forums, however, groups of individuals are making use of digital communication technologies to organize public campaigns. Despite his skepticism regarding participatory inclusion at the individual level, Bruce Bimber finds evidence of a 'revolution in the middle' as there has been an explosion in the use of digital media by stakeholders and interest groups with increasingly aggressive communications strategies (Bimber 2003, pp. 229–230). Digital communication technologies facilitate the emergence of new organizational forms for interest groups and stakeholder mobilization (Chadwick 2007). While there may not be a democratic revolution amongst the mass of the political community, the use of digital media could create new opportunities for politically interested individuals to engage the policy process.

### Expanding policy making engagement via the Internet

Although trends have been modest, the Internet does promote political communication. Research suggests that Internet use is associated with a small upswing in political participation among citizens in the United States and around the globe (Jennings & Zeitner 2003; Weber *et al.* 2003; Norris 2005; Shah *et al.* 2005; Boulianne 2009) and that this change is statistically significant even after controlling for many other likely explanatory factors (Kenski & Stroud 2006). More limited empirical evidence also suggests that local officials are witnessing the effects of increasing stakeholder participation. For instance, in 2002 nearly four in five (79 percent) elected officials reported that their constituents had contacted them online, and one quarter (25 percent) received email on a daily basis (Larsen & Rainie 2002). This number has likely grown in the intervening years since there are now more Americans online than ever before (Pew Internet & American Life Project 2009). Furthermore, both state and national-level data suggest that online communication is a significant mode of citizen-initiated communication with local governments (Thomas & Streib 2003; Jensen *et al.* 2007). Thus, we predict that *(H1) the more elected officials rely on the Internet in their course of duties, the more extensive their contact with stakeholders and stakeholder groups will be.*

In some cases, however, the Internet simply provides alternative conduits over which prior relationships between elected officials and stakeholders can be maintained and, potentially, strengthened (Kraemer & King 2003). For example, local officials might use new communication technologies to expand their interactions with political elites, which could displace input from other constituents thus producing further cyber-balkanization. But given the increasingly large and diverse population of citizens who are politically active online (Muhlberger 2004; Kenski & Stroud 2006; Jensen *et al.* 2007), increasing citizen contact could translate into more diverse stakeholder contact. It is

unclear which pattern will dominate, so we offer a pair of alternative hypotheses. Either (H2a) *the more elected officials rely on the Internet in their course of duties, the more diverse their contact with stakeholders and stakeholder groups will be*, or (H2b) *the more elected officials rely on the Internet in their course of duties, the less diverse their contact with stakeholders and stakeholder groups will be*.

The assertion that use of the Internet will be associated with greater stakeholder input in the political process can be fine tuned by examining the influence of several moderating variables. We consider two variables here: time spent on official duties and the size of the municipality. First, if we are correct that Internet technologies facilitate stakeholder contact in general, then these technologies should have the largest impact among officials who spend the most time working in their elective capacity. Thus, we predict that (H3a) *elected officials use of the Internet will promote more contact with stakeholders and stakeholder groups the more hours they spend on their official duties*. Second, we suggest that the influence of Internet use will be greater in smaller cities than in large ones. Elected officials working in large cities often have substantial staff and informational resources at their disposal, and are embedded within complex bureaucracies. Officials operating in highly managed environments have fewer opportunities for substantive changes in their communication patterns than those in smaller, less regulated environments (Yates 1993). For elected officials in smaller municipalities, however, use of the Internet can be an effective mechanism for independently gathering information (Hanssen 2007). This leads us to predict that (H3b) *elected officials use of the Internet will promote more contact with stakeholders and stakeholder groups the smaller the city*.

The potential for greater stakeholder participation in local decision making is promising, but thus far we have focused on a relatively thin form of engagement: stakeholders contacting officials for the purpose of ultimately influencing decision making. More frequent contact with elected officials may help individuals feel more connected to their local government (Tolbert & Mossberger 2006), but this contact does not necessarily mean that they have a more substantive role in the political process. There are a variety of reasons that we might expect elected officials to limit other types of stakeholder contributions to the decision-making process at the same time that their personal contact with stakeholders is increasing.

Local elected officials face significant time constraints, often juggling the demands of their unpaid political work with those of their professional obligations (Svara 2003). As Dahl and Tufte (1973) note in their classic work, *Size and Democracy*, engagement with citizens is governed by these constraints. If the timeframe for making a public policy decision is fixed, then more inputs translate into increasing time pressures on officials. Even though elected local government officials often use the Internet to do independent research in order to reduce information asymmetries with staffers and the administration more broadly (Hanssen 2007), they are likely to use the same types of resources

on which they relied in the print world. These mechanisms are at play even when elected officials have support staff collecting information on their behalf. Staffers are aware of the pressures officials face, and may therefore be inclined to rely on more trusted and well established resources. Thus, even if Internet communications remove constraints on the number of communication inputs from stakeholders, officials may seek to protect their time by limiting use of citizen-created resources by themselves and their staff.

Furthermore, individuals typically weigh the potential benefits afforded by new communication technologies against threats to existing routines. Even when established routines produce known limitations, people and organizations are often hesitant to give them up (Weick 1979). Thus, although there are many opportunities for information acquisition that is more substantive than email exchanges, notably including the use of stakeholder-created information resources, there are numerous obstacles to these more sophisticated exchanges, too. This leads us to predict that *(H4) elected officials' Internet use, both directly and by their staff, will have less influence on their use of stakeholder-produced resources than it does on their communication with stakeholders.*

If stakeholder contact and stakeholder-created resources emphasize the citizen's role in the communication equation, then efforts by municipalities to promote citizen participation represent officials' contributions. As noted at the outset of this paper, e-government initiatives have been gaining momentum over the past 25 years, driven in part by a desire to facilitate citizen participation in local decision making (West 2005; Tolbert & Mossberger 2006). Particularly relevant are technologies, termed e-democracy or e-citizenship, that are specifically geared toward helping citizens have a voice in the political process (Malina 2003; Evans-Cowley & Montoy 2005). If such initiatives successfully draw stakeholders into policy discourse, then e-government activity should make contact between elected officials and stakeholders both more diverse and more extensive.

However, most local e-government initiatives tend to downplay technologies that emphasize citizen empowerment and place greater emphasis on service delivery (Musso *et al.* 2000; Moon 2002; Needham 2004; Reddick 2004; West 2004, 2005; Kaylor 2005). Municipal promotion of online participation in other parts of the world have had relatively little impact on citizen participation and no impact on elected officials' communications to citizens (Saglie & Vabo 2009). Given that we have relatively little data concerning the real-world implications of these e-democracy initiatives in the United States, our empirical work is guided by two research questions: *(RQ1) Will local government web sites that facilitate citizen participation in the political process lead elected officials to have more extensive stakeholder contact?* And *(RQ2) Will local government web sites that facilitate citizen participation in the political process lead elected officials to have contact with more diverse types of stakeholders?*

## Methods

Primary data for the analyzes were collected via a mail survey of local elected officials from around the country. This survey was conducted with the assistance of the National League of Cities (NLC), which aided in the identification and recruitment of respondents. We selected a random sample of 316 cities stratified by size (under 25,000, between 25,000 and 100,000, and over 100,000) from the 872 cities with populations over 10,000 represented in the NLC membership rolls. Within each sampled city, three elected officials were randomly selected. In cases where the elected official no longer held office another elected official was sampled.

The survey was mailed to 950 elected officials (after replacements) in 316 cities. Of these, 348 individuals responded to the survey, resulting in a 36.6 percent response rate. Seventeen respondents were excluded from our analyzes because they skipped the question series concerning issue-based constituent communication – the topic of this study – yielding an effective sample size of 326. Of the 316 cities sampled, 228 had at least one respondent, resulting in a 72.5 percent city-level response rate. Comparing respondent and non-respondent cities in terms of city size and government structure (council manager, commissioner, mayor council, or representative town meeting), we find no statistically significant differences.

The sample is predominantly male (68 percent), white (79 percent), and well educated (71 percent hold an undergraduate or graduate degree). Respondents range in age from 29 to 87 ( $M = 55.7$ ,  $SD = 11.4$ ). A large majority (91.0 percent) of respondents are council or board members (i.e. council members, aldermen, trustees, or commissioners) rather than mayors (7.3 percent). Their experience ranges from less than a year (six respondents) to a maximum tenure of 36 years in municipal service ( $M = 6.8$ ,  $SD = 5.9$ ). Elected officials exhibit a high level of commitment to their position, having worked an average of 19.9 hours ( $SD = 15.1$ ; modal response 20 hours) on their duties in the prior week. Thirteen respondents worked more than 50 hours in that one week. This is particularly notable in light of the facts that nearly three-quarters (73.8 percent) of respondents hold another job and that the modal salary range associated with the elected position is between \$1,000 and \$10,000. Ideologically, the sample leans to the right slightly. About a quarter (23.9 percent) of respondents describe themselves as liberals, compared to the slightly more than one third who identify themselves as moderates (36.7 percent) or as conservatives (37 percent). Although most municipal elections are non-partisan, about four in five respondents identified themselves as either Democrat (41.2 percent) or Republican (39.1 percent).

Concurrent with the administration of the survey of elected officials, the research team also analyzed the content of the web sites of the municipalities

that the officials represented. The web sites were coded according to the number of services provided in each of a dozen functional areas. One individual conducted the bulk (88 percent) of the coding, while a second individual coded the remaining sites and an additional 7 percent of the sites a second time to ensure the consistency of the coding process. The inter-rater reliability on a summative index combining scores across functional areas was high (Krippendorff's  $\alpha = 0.90$ ).<sup>1</sup>

Additional city-level data were obtained from other sources, including the Census Bureau and the ICMA Municipal Year Book 2005. Combining these data with the survey results yields the following profile of the municipalities in the sample. The majority (62.7 percent) of cities are council-manager systems, but fully 85 percent have a separately elected mayor. Most respondents (73.8 percent) have a four-year term, and relatively few (28.0 percent) face terms limits. Looking at city population, we see a distribution with a very long tail to the right. The cities range in size from 10,704 to more than 3.8 million, with a median population of 38,569.5 ( $M = 110,137$ ,  $SD = 14,175$ ). The concentration of smaller cities in the sample reflects the national distribution of city sizes.

We asked officials to couch responses about their contact with stakeholders in the context of a 'council decision that generated input to you from the *largest number of* citizens, community groups, and business interests' in the preceding six months. Our dependent variables concern three aspects of the policymaking process: the diversity of stakeholders from which officials receive communications, the extent of contact with these stakeholders, and the diversity of sources that officials consider when making policy decisions. Stakeholders are taken to be individuals or groups of individuals that actively participate in the policy process independent of where they are located (Leach *et al.* 2002, p. 646; Ansell & Gash 2008, p. 546).

We operationalize stakeholder groups as neighborhood associations, service clubs, issue groups, business or merchant interests, political parties, and religious groups. Comparable lists of groups are commonly used to represent the range of potential inputs from outside formal government structures (Svara 2003). We constructed a measure of contact diversity by counting how many of these stakeholder groups each elected official communicated with (Range = 0–6,  $M = 3.2$ ,  $SD = 1.6$ ).<sup>2</sup> Next, we constructed a measure of the extent of contact on a five-point scale with higher values corresponding to greater contact by averaging the frequency with which elected officials had contact with members of each group (Range = 1–5,  $M = 2.4$ ,  $SD = 0.8$ ).

In order to analyze the role that outside information sources plays in policy making we also asked officials to indicate how often they consulted resources created by two categories of stakeholders: (1) citizens and citizen groups and (2) business interests. Such contact could occur directly, or through an intermediary, as when it is included in a staff report. Frequency of use was again measured on a five-point scale with higher values corresponding to more frequent use. The

extent to which officials rely on stakeholder-produced resources was computed as the average of these two values (Range = 1–5,  $M = 2.8$ ,  $SD = 1.0$ ).

## Results

A brief description of the local online political scene sets the stage for the analyzes that follow. Unsurprisingly, the Internet has become a primary conduit linking local elected officials to stakeholders. Fully 95 percent of those surveyed use technologies such as email and the Web in the course of their official activities. Email in particular is used to communicate about controversial issues in 90 percent of these cases, rivaling the use of the telephone (92 percent), group meetings (92 percent), and approaching face-to-face interactions levels (97 percent). Email is also the most *frequently* used interaction medium, with one in three (32 percent) officials using it daily, compared with only one in five (20 percent) who meet face-to-face with stakeholders on a daily basis, and one in six (17 percent) who talk to stakeholders on the phone every day. It is also interesting to note that although a plurality (46 percent) rely on a mix of personal and governmental accounts for this access, almost two in five (37 percent) rely exclusively on personal accounts.

Local government web sites are also quite prevalent in the United States, with fully 97 percent of the cities surveyed maintaining some kind of e-government presence online. Facilitating participation in city meetings is the most commonly supported form of e-citizenship: all but three government web sites included one service in this category, and nine in ten (88 percent) offered more than two such services. Providing contact information and information about city decisions are also common functional areas, and both are available on 95 percent of the sites examined. Voter information is somewhat less prevalent, but is still available in about four out of five (80 percent) cities. Deliberative functions are the least common of the e-citizenship services, as only one in six (17.3 percent) sites supported this type of functionality. This overview provides context for examining the influence of the Internet on local politics.

### *Internet promotes stakeholder—representative interaction*

Widespread use of the Internet suggests that it could have substantive consequences. Our first hypothesis predicts that Internet use by local elected officials will promote contact with stakeholders during the policy-making process, and the data support this prediction. To test the hypothesis, we examined the relationship between stakeholder contact and Internet use, defined as a summative measure of official's use of six different Internet-based services including email, blogs, and news summary services, ( $\alpha = 0.84$ , Range = 6–30,  $M = 18.9$ ,  $SD = 6.3$ ).

In the first analysis, we see that elected officials' use of the Internet is moderately correlated with stakeholder contact ( $r = 0.29$ ,  $p < 0.001$ ). Correlational results such as these, however, are limited because they do not account for differences in individual-level orientations towards the role of an elected representative. For example, it is possible that officials who are more oriented toward constituent input might also be more likely to use the Internet as a communication medium for interacting with citizens and groups. It is also conceivable that officials who regularly work on issues that generate the most stakeholder input are more likely to use email and the web as a means of managing these communications. Finally, individual characteristics such as age, education, gender, or computer skill, and city-level variables such as population or wealth, could shape both Internet use and levels of engagement with stakeholders. In order to control for these antecedent variables, we constructed a hierarchical ordinary least squares (OLS) regression model, presented in four stages.<sup>3</sup> The first stage includes only control variables, while subsequent stages introduce various Internet-use variables and test whether these additions yield an improvement in the model's explanatory power. The results are summarized in Table 1.

The first stage of this model, which only includes control variables, explains more than a quarter (29.5 percent) of the variance. Consistent with the findings of other local government studies, these data show that different policy matters attract different levels of citizen interest. Budget and tax decisions, and development and zoning policies elicit more stakeholder contact than issues concerning city services or administrative decisions. The amount of time a respondent spends on his or her work as an elected official is another important control, and is linked to more extensive stakeholder contact. The most important control, however, is the frequency of offline communication, which can take the form of face-to-face interaction, telephone calls, and letters. The standardized coefficient on this variable is more than double that of any other factor, confirming that non-Internet-mediated communications are a crucial link between elected official and stakeholders. Interestingly, none of the individual characteristics (age, gender, education, or political affiliation) were significant, and so they were dropped from the model.

Internet use, however, is the key theoretical consideration. Introducing Internet use in the second stage produces a significant improvement in explanatory power (change in  $R^2 = 0.03$ ,  $p < 0.01$ ). Even after controlling for alternative explanatory factors, frequency of Internet use has a positive and highly significant influence on stakeholder contact. The magnitude of the standardized coefficient is a bit less than half that of offline communication, which is notable considering that this measure represents a single communication channel, in contrast to the measure of offline communication, which represents several. Thus, officials' Internet use clearly promotes contact with stakeholders, supporting *H1*.

**TABLE 1** Predicting frequency of elected officials' contact with stakeholders.

	<i>Stage 1:</i> <i>control</i> B (SE) $\beta$	<i>Stage 2:</i> <i>Internet use</i> B (SE) $\beta$	<i>Stage 3:</i> <i>interactions</i> B (SE) $\beta$	<i>Stage 4:</i> <i>e-citizenship</i> B (SE) $\beta$
Intercept	0.81 (0.19)***	0.51 (0.21)*	0.64 (0.21)**	0.72 (0.23)**
Issue: budget and taxes <sup>a</sup>	0.33 (0.14) 0.15*	0.35 (0.14) 0.16*	0.33 (0.13) 0.15*	0.34 (0.13) 0.15*
Issue: development and zoning <sup>a</sup>	0.22 (0.11) 0.14*	0.22 (0.11) 0.14*	0.24 (0.11) 0.15*	0.24 (11) 0.15*
Issue: city ordinance <sup>a</sup>	0.18 (0.13) 0.09	0.19 (0.13) 0.10	0.20 (0.13) 0.10	0.21 (0.13) 0.11
Stress of official duties	0.02 (0.01) 0.11*	0.02 (0.01) 0.09 <sup>†</sup>	0.02 (0.01) 0.08	0.02 (0.01) 0.08
Time on official duties	0.01 (0.00) 0.10	0.00 (0.00) 0.06	0.00 (0.00) 0.05	0.00 (0.00) 0.11
City population (2005)	0.00 (0.00) 0.08	0.00 (0.00) 0.08	0.00 (0.00) 0.22**	0.00 (0.00) 0.22**
Frequency of non-Internet-based communication	0.09 (0.01) 0.42***	0.09 (0.01) 0.41***	0.08 (0.01) 0.39***	0.08 (0.01) 0.39***
<i>Internet-related variables</i>				
Frequency of Internet use for official duties	–	0.02 (0.01) 0.17**	0.02 (0.01) 0.14*	0.02 (0.01) 0.14**
Internet use X duty time	–	–	0.00 (0.00) 0.13*	0.00 (0.00) 0.13*
Internet use X population	–	–	0.00 (0.00) –0.22**	0.00 (0.00) –0.22**
Number of e-citizenship services on local web site	–	–	–	–0.02 (0.02) –0.05
<i>N</i>	291	291	291	291
<i>R</i> <sup>2</sup>	0.295	0.319	0.342	0.344
Change in <i>R</i> <sup>2</sup>		0.025	0.023	0.002
<i>F</i> <sub>change</sub> (df1, df2)		10.213 (1,282)**	4.833 (2,280)**	0.722 (1,279)

<sup>†</sup> $p < 0.1$ .

\* $p < 0.05$ .

\*\* $p < 0.01$ .

\*\*\* $p < 0.001$ .

<sup>a</sup>Reference category: other issues, including city services and administrative decisions. Controls for age, gender, education, and computer skills were tested, but were dropped from the regression because they had no significant influence.

### *Diversification, not balkanization*

Knowing that Internet use promotes contact with stakeholders is only a piece of the puzzle, though. The democratic potential of this pattern turns on whether officials are using the technologies to build up contact with some types of stakeholder at the expense of others, or if they are using them to diversify their

stakeholder contact. This is the subject of the next pair of alternative hypotheses, and the results suggest that the latter characterization is more accurate. Table 2 presents a comparison between respondents with above-median Internet use to those whose use is at or below median levels. These results indicate that, on average, elected officials who rely more heavily on the Internet in the course of their official duties interact with significantly more types of stakeholders ( $t = 3.3, p < 0.01$ ). A regression model (paralleling stage 2 of the first model, but not shown) confirms that this relationship persists in the presence of multivariate controls. We therefore conclude that *H2a*, and not *H2b*, is correct.

### *Time and population shape the influence of the Internet*

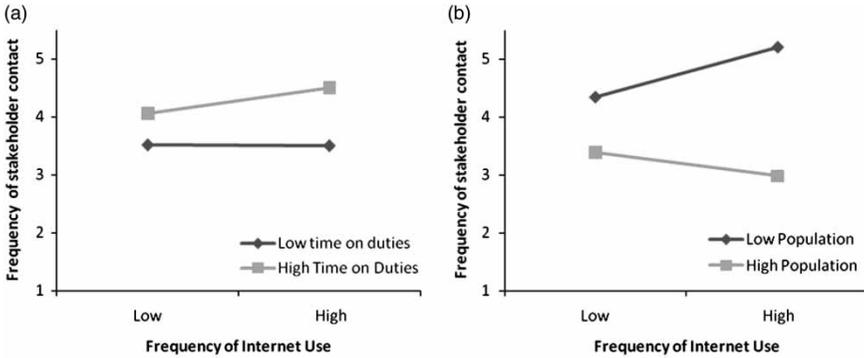
The next set of predictions extend our understanding of the Internet's influence by focusing on the moderating role of two factors: time spent on official duties and city size. The data support the prediction that time spent serving constituents augments the influence of Internet use on citizen contact (see stage 3 of Table 1). Internet use was associated with larger increases in stakeholder contact the more time elected officials spent on their elective duties, as evidenced by the positive, significant coefficient on the interaction between Internet usage level and duty time. This relationship is illustrated in Figure 1(a). The slope of the lines corresponds to the influence of Internet use on stakeholder contact for two groups of officials, and the difference in slopes reflects the interaction. The line representing officials who spend above-average time on their duties is steeper than the line representing officials who spend less-than-average time, meaning that Internet use has a bigger influence on the first group.

The data also support the prediction that officials in smaller cities will realize more of the stakeholder-contact benefits of the Internet than those in large cities (see stage 3 of Table 1). That is, the smaller the city, the bigger the increase in stakeholder contact associated with Internet use. In the regression model, this is shown by the negative, significant coefficient on the interaction between Internet usage level and population. Figure 1(b) illustrates this relationship. It is interesting to note that in this example, the influence of Internet use on constituent contact for smaller-than-average cities is opposite that of larger-than-average

**TABLE 2** Diversity of stakeholder contact by Internet use.

<i>Internet use</i>	<i>Types of stakeholders</i>
Low	2.92 (159)
High	3.54 (155)

Notes: Entries are mean counts of stakeholder types. Sample sizes are in parentheses. *N* (list-wise) = 314. Low and high Internet use groups are based on a median split.



**FIGURE 1** Interaction between Internet use and time on duty, population.

Notes: Internet use, time spent on official duties, and population range from one standard deviation below mean to one standard deviation above. Other variables set at mean values. Higher numbers on the vertical axis correspond to more extensive contact with citizen groups.

cities. In a city with a population one standard deviation below the mean, Internet use is associated with an increase in contact, while in larger cities it is actually associated with *reduced* stakeholder contact. Thus, both *H3a* and *H3b* are supported.

#### *Use of stakeholder-produced resources unchanged*

These data indicate that Internet use promotes more extensive and more diverse communication with stakeholders in the local decision-making process, but does this heightened involvement extend to other modes of participation? The fourth hypothesis is that Internet use by officials or their staff has less influence on elected officials' use of stakeholder-produced resources than it has on direct stakeholder contact. The results of a second hierarchical regression indicate that this is correct (Table 3). The dependent variable in this model is the index expressing official's use of stakeholder-produced resource. In addition to the official's use of the Internet, we also examine whether staff members use of the Internet was influential, as staff members often conduct research on officials' behalf. The latter test is based on a summative measure of staff's use of three different Internet-based services ( $\alpha = 0.84$ , Range = 3–15,  $M = 7.5$ ,  $SD = 4.1$ ).

As with the test of stakeholder contact, the independent variables are entered in two stages. The first stage includes the same set of controls as the first regression model, and explains about a fifth (21.2 percent) of the variance in the dependent variable. There is one striking difference between this model and the model of stakeholder contact: whereas officials are more likely to hear from stakeholders about budget issues, they are *less* likely to consult

**TABLE 3** Predicting frequency of elected officials' use of stakeholder-produced resources.

	<i>Stage 1: controls</i>		<i>Stage 2: Internet factors</i>	
	B (SE) $\beta$		B (SE) $\beta$	
Intercept	1.16 (0.26)***		1.08 (0.29)	
Issue: budget and taxes <sup>a</sup>	-0.37 (0.19) -0.13*		-0.38 (0.19) -0.13*	
Issue: development and zoning <sup>a</sup>	0.23 (0.15) 0.11		0.21 (0.15) 0.11	
Issue: city ordinance <sup>a</sup>	0.18 (0.18) 0.07		0.16 (0.18) 0.06	
Stress of official duties	0.01 (0.01) 0.04		0.01 (0.02) 0.03	
Time on official duties	0.00 (0.00) -0.03		0.27 (0.17) 0.11	
City population (2005)	0.00 (0.00) 0.10		0.00 (0.00) 0.10	
Frequency of non-Internet-based communication	0.11 (0.02) 0.41***		0.11 (0.02) 0.40***	
<i>Internet-related variables</i>				
Frequency official uses Internet for official duties	-		0.00 (0.01) 0.01	
Frequency staff uses Internet for official duties	-		0.02 (0.02) 0.06	
<i>N</i>	291		291	
<i>R</i> <sup>2</sup>	0.21		0.22	
Change in <i>R</i> <sup>2</sup>			0.004	
<i>F</i> <sub>change</sub> (df1, df2)			0.637 (2,281)	

<sup>†</sup> $p < 0.1$ .

\* $p < 0.05$ .

\*\* $p < 0.01$ .

\*\*\* $p < 0.001$ .

<sup>a</sup>Reference category: other issues, including city services and administrative decisions.

Controls for age, gender, education, and computer skills were tested, but were dropped from the regression equations because they had no significant influence.

information resources created by this group. This is understandable – how many citizens have the skills to produce a cogent budget analysis? – but it also highlights an important point. Officials often evaluate inputs with respect to the criteria of efficient governance rather than considerations of democratic participation and accountability. Paralleling the prior model, however, offline interactions with stakeholders are associated with significantly greater reliance on the resources created by these parties.

Introducing the Internet factors, including use of the Internet both by the elected official and by his or her staff, fails to produce a significant increase in

the regression model's explanatory power (change in  $R^2 = 0.00$ , n.s.). Looking further into the model, the coefficients on both factors are very small and non-significant. Although the Internet fosters contact with stakeholders, it does not promote increased use of outside sources by elected officials. We therefore conclude that the Internet has a bigger influence on stakeholder contact than on use of stakeholder-created resources, consistent with *H4*.

*Are e-citizenship services influential?*

We conclude by examining the influence of local government web sites on officials' stakeholder interactions. Specifically, we ask whether the number of citizenship-supporting services provided on a locality's e-government presence is related to the extent of citizen contact or the diversity of this contact. Combining the data describing local web sites' functionality with the survey responses, we tested whether a summative index of municipal-website citizenship services (Range = 0–11,  $M = 6.5$ ,  $SD = 2.4$ ) influenced stakeholder contact. We find no evidence of a relationship in these data. The test utilized is an extension the first regression model. The number of e-citizenship services offered on a municipality's web site is added in the last stage in the model of stakeholder contact (see stage 4 of Table 1), but it does not improve the model's explanatory power. One might argue that lack of significance is a result of an insufficiently large sample; however, the coefficient is also quite small, suggesting that even if it had achieved statistical significance, the substantive influence of online citizenship services would be small. The test of contact diversity follows a similar procedure, adding e-citizenship services to the second regression model (not shown). Again, the variable does not significantly influence the model. Thus, we find no evidence that e-citizenship services on local government web sites are producing measurable changes in interactions between stakeholders and elected officials during the political decision-making process.

In sum, these data indicate that as elected officials integrate Internet-based communication into the routine execution of their duties they become more accessible to individuals who have a stake in the decisions being made, and that the types of stakeholder with which they interact become more diverse. The increase in stakeholder contact is moderated by the time officials spend on their elective duties, with larger increases in contact occurring among Internet users who work the longest hours. The increase is also moderated by city size: officials in small cities realize greater increases in contact associated with Internet use than officials in larger cities. These increases in communication are not, however, accompanied by a greater reliance on the part of elected officials on materials produced by stakeholders. Finally, we find no evidence that local government web sites that facilitate citizen participation in the democratic process – for example providing information about city meetings, upcoming

decisions, or official voting records – are yielding increases in contact between elected officials and stakeholders.

## Discussion

This study sheds light on a longstanding question regarding the influence of new information and communication technologies on patterns of interaction between elected officials and stakeholders who are impacted by their decisions. As elected officials integrate networked computer technology into the routine execution of their duties, they are communicating with a more diverse group of constituents, and they are doing so with increasing frequency. As of today, however, they are not using the technology to more effectively draw on the expertise found in citizen-created resources. Citizens appear to be similarly unmoved by the emergence of online tools intended to facilitate their participation in the political process. These results are broadly consistent with Bimber's findings that the information abundance fueled by Internet-based communications has not translated into substantially greater influence for individuals in the political system.

These results suggest that the Internet is falling short of *both* the pluralizing and exclusionary possibilities that some have attributed to it. Technologies such as email and the web have brought neither widespread adoption of direct democracy, nor rapid balkanization of the local political environment. But then, the social consequences of technologies are rarely so easily encapsulated. As Coleman (2009) notes, 'It would be glibly deterministic to posit a democratizing relationship between the internet as a communication technology' and a political institution (p. 97). Sociotechnical change is a process of integration, whereby new capacities, evolving practices, long held attitudes, and existing routines adapt to accommodate one another (Danziger *et al.* 1982; Dutton 1999; Kling 2007[1999]). Thus, it is not surprising that the consequences of elected officials' Internet use are consistent with deep-rooted functional imperatives internal to the political system.

We should not, however, dismiss the transformative potential of e-government initiatives too readily. Citizens and officials alike view new technologies as opening up the political system, making processes more transparent and elected representative more accountable (Tolbert & Mossberger 2006). These subtle shifts in attitude, which are strongly linked to new technologies, could have significant implications for the future of local politics. Changing expectations about the role that stakeholder expertise can play in the democratic process may yet produce changes in practice (Roberts 2004; Crozier 2008).

We consider these findings to be encouraging. Citizens and other groups are finding ways to use Internet technologies to make themselves heard in the policy process, and there is no evidence that political elites are benefiting at the expense of those with less power. But for proponents of a strong democracy, in which

citizens can play a more profound role in the execution of governmental power, it is still too early to tell whether these technologies are a blessing or a curse.

## Notes

- 1 We used Hayes and Krippendorff's (2007) SPSS macro to compute this reliability estimate.
- 2 Detailed information about the construction of all measures is available from the first author upon request.
- 3 We treat elected officials as independent throughout our analysis, using OLS regression instead of multi-level models. We recognize the problems that this could produce, but find no evidence of differences in stakeholder interactions between cities when evaluating random effects using either Wald or likelihood ratio tests (see Hayes 2006). The lack of systemic variation on the outcome variable at the city level justifies treating the cases as independent.

## References

- Almond, G. A. & Verba, S. (1989[1963]) *The Civic Culture; Political Attitudes and Democracy in Five Nations*, Sage Publications, Newbury Park, CA.
- Ansell, C. & Gash, A. (2008) 'Collaborative governance in theory and practice', *Journal of Public Administration Research and Theory*, vol. 18, no. 4, pp. 543–571.
- Bang, H. P. & Esmark, A. (2009) 'Good governance in network society: reconfiguring the political from politics to policy', *Administrative Theory & Praxis*, vol. 31, no. 1, pp. 7–37.
- Barber, B. R. (1984) *Strong Democracy: Participatory Politics for a New Age*, University of California Press, Berkeley.
- Bimber, B. (2003) *Information and American Democracy: Technology in the Evolution of Political Power*, Cambridge University Press, New York.
- Boulianne, S. (2009) 'Does Internet use affect engagement? A meta-analysis of research', *Political Communication*, vol. 26, no. 2, pp. 193–211.
- Brown, M. M. & Schelin, S. (2005) 'American local governments: confronting the e-government challenge', in *Local Electronic Government: A Comparative Study*, ed. H. Drüke, Routledge, New York, pp. 229–268.
- Carroll, J. M., Rosson, M. B., Kavanaugh, A., Dunlap, D., Schafer, W., Snook, J. & Isenhour, P. (2005) 'Social and civic participation in a community network', in *Domesticating Information Technologies*, eds R. Kraut, M. Brynin & S. Kiesler, Oxford University Press, New York, pp. 168–181.
- Castells, M. (1989) *The Informational City: Information Technology, Economic Restructuring, and the Urban-Regional Process*, Blackwell Publishers, Oxford.

- Castells, M. (2000) 'Grassrooting the space of flows', in *Cities in the Telecommunications Age: The Fracturing of Geographies*, eds J. O. Wheeler, Y. Aoyama & B. Warf, Routledge, New York, pp. 18–27.
- Castells, M. (2006) 'Network society: from knowledge to policy', in *The Network Society: From Knowledge to Policy*, eds M. Castells & G. Cardoso, Center for Transatlantic Relations, Washington, DC, pp. 3–22.
- Castells, M. (2009) *Communication Power*, Oxford University Press, Oxford.
- Chadwick, A. (2007) 'Digital network repertoires and organization hybridity', *Political Communication*, vol. 24, no. 3, pp. 283–301.
- Coleman, S. (2009) 'Making parliamentary democracy visible: speaking to, with, and for the public in an age of interactive technology', in *Routledge Handbook of Internet Politics*, eds A. Chadwick & P. N. Howard, Routledge, New York, pp. 86–98.
- Coleman, S. & Blumler, J. G. (2009) *The Internet and Democratic Citizenship: Theory, Practice and Policy*, Cambridge University Press, New York.
- Crozier, M. (2007) 'Recursive governance: contemporary political communication and public policy', *Political Communication*, vol. 24, no. 1, pp. 1–18.
- Crozier, M. (2008) 'Listening, learning, steering: new governance, communication and interactive policy formation', *Policy & Politics*, vol. 36, no. 1, pp. 3–19.
- Dahl, R. A. (1998) *On democracy*, Yale University Press, New Haven.
- Dahl, R. A. & Tufte, E. R. (1973) *Size and Democracy*, Stanford University Press, Stanford, CA.
- Danziger, J. N. & Anderson, K. V. (2002) 'The impacts of information technology on public administration: an analysis of empirical research from the "golden age" of transformation', *International Journal of Public Administration*, vol. 25, no. 5, pp. 591–627.
- Danziger, J. N., Dutton, W., Kling, R. & Kraemer, K. (1982) *Computers and Politics: High Technology in American Local Governments*, Columbia University Press, New York.
- Davis, R. (1999) *The Web of Politics: The Internet's Impact on the American Political System*, Oxford University Press, New York.
- deLeon, P. (1999) 'The stages approach to the policy process: what has it done? Where is it going?' in *Theories of the Policy Process*, ed. P. A. Sabatier, Westview Press, Boulder, CO, pp. 19–32.
- Denters, B. & Rose, L. E. (2005) 'Towards local governance?' in *Comparing Local Governance: Trends and Developments*, eds B. Denters & L. Rose, Palgrave, New York, pp. 246–262.
- Dutton, W. H. (1999) *Society on the Line: Information Politics in the Digital Age*, Oxford University Press, New York.
- Dutton, W. H. & Guthrie, K. (1991) 'An ecology of games: the political construction of Santa Monica's public electronic network', *Information and the public sector*, vol. 1, no. 4, pp. 279–301.
- Evans-Cowley, J. & Montoy, M. M. (2005) *E-government and Planning: Key Citizen Participation Issues and Applications*, The John Glenn Institute of Public Service and Public Policy, Columbus.

- Fountain, J. E. (2003) 'Electronic government and civics', in *Encyclopedia of Community: From the Village to the Virtual World*, eds K. Christensen & D. Levinson, Sage Publications, Thousand Oaks, CA, pp. 436–441.
- Hanssen, G. S. (2007) 'ICT in Norwegian local government – empowering the politicians?', *Local Government Studies*, vol. 33, no. 3, pp. 355–382.
- Hayes, A. F. (2006) 'A primer on multilevel modeling', *Human Communication Research*, vol. 32, no. 4, pp. 385–410.
- Hayes, A. F. & Krippendorff, K. (2007) 'Answering the call for a standard reliability measure for coding data', *Communication Methods and Measures*, vol. 1, no. 1, pp. 77–89.
- Hindman, M. (2009) *The Myth of Digital Democracy*, Princeton University Press, Princeton.
- Jennings, M. K. & Zeitner, V. (2003) 'Internet use and civic engagement: a longitudinal analysis', *Public Opinion Quarterly*, vol. 67, no. 3, pp. 311–334.
- Jensen, M., Danziger, J. & Venkatesh, A. (2007) 'Civil society and cyber society: the role of the Internet in community associations and democratic politics', *The Information Society*, vol. 23, no. 1, pp. 39–50.
- Kaylor, C. H. (2005) 'The state of local e-government and e-democracy: benchmarking the progress of US cities at providing online opportunities for citizen engagement', in *E-government and Planning: Key Citizen Participation Issues and Applications*, eds J. Evans-Cowley & M. M. Montoy, The John Glenn Institute of Public Service and Public Policy, Columbus, pp. 4–15.
- Kenski, K. & Stroud, N. J. (2006) 'Connections between Internet use and political efficacy, knowledge, and participation', *Journal of Broadcasting & Electronic Media*, vol. 50, no. 2, pp. 173–192.
- Kling, R. (2007[1999]) 'What is social informatics and why does it matter?', *Information Society*, vol. 23, no. 4, pp. 205–220.
- Klotz, R. J. (2004) *The Politics of Internet Communication*, Rowman & Littlefield, Lanham, MD.
- Kraemer, K. L. & King, J. L. (2003) *Information Technology and Administrative Reform: Will the Time after E-government be Different?*, Heinrich Reiner mann Schrift fest, Speyer, Germany.
- Larsen, E. & Rainie, L. (2002) *Digital Town Hall: How Local Officials Use the Internet and the Civic Benefits they Cite from Dealing with Constituents Online*, Pew Internet and American Life Project, Washington, DC.
- Leach, W. D., Pelkey, N. W. & Sabatier, P. A. (2002) 'Stakeholder partnerships as collaborative policymaking: evaluation criteria applied to watershed management in California and Washington', *Journal of Policy Analysis and Management*, vol. 21, no. 4, pp. 645–670.
- Malina, A. (2003) 'Electronic democracy', in *Encyclopedia of Community: From the Village to the Virtual World*, eds K. Christensen & D. Levinson, Sage Publications, Thousand Oaks, CA, pp. 432–436.
- Margolis, M. & Resnick, D. (2000) *Politics as Usual: The Cyberspace 'Revolution'*, Sage Publications, Thousand Oaks.

- Moon, M. J. (2002) 'The evolution of e-government among municipalities: rhetoric or reality?', *Public Administration Review*, vol. 62, no. 4, pp. 424–433.
- Muhlberger, P. (2004) 'Access, skill and motivation in online political discussion: testing cyberrealism', in *Democracy Online: The Prospects for Political Renewal Through the Internet*, ed. P. M. Shane, Routledge, New York, pp. 225–237.
- Musso, J., Weare, C. & Hale, M. (2000) 'Designing web technologies for local governance reform: good management or good democracy?', *Political Communication*, vol. 17, no. 1, pp. 1–19.
- Needham, C. (2004) 'Citizens or consumers? Electronic government in the USA and UK', in *Electronic Democracy: Mobilization, Organisation and Participation via New ICTs*, eds R. K. Gibson, A. Römmele & S. J. Ward, Routledge, New York, pp. 43–69.
- Norris, P. (2001) *Digital Divide: Civic Engagement, Information Poverty & the Internet Worldwide*, Cambridge University Press, New York.
- Norris, P. (2005) 'The impact of the Internet on political activism: evidence from Europe', *International Journal of Electronic Government Research*, vol. 1, no. 1, pp. 20–39.
- Owen, D. M. (2006) 'The Internet and youth civic engagement in the United States', in *The Internet and Politics: Citizens, Voters and Activists*, eds S. Oates, D. M. Owen & R. K. Gibson, Routledge, New York, pp. 20–38.
- Pew Internet & American Life Project (2009) *Online Activities, 2000–2009*, [Online] Available at: <http://www.pewinternet.org/Trend-Data/Online-Activities-20002009.aspx> (23 July 2009).
- Prior, M. (2007) *Post-broadcast Democracy: How Media Choice Increases Inequality and Political Involvement and Polarizes Elections*, Cambridge University Press, New York.
- Reddick, C. G. (2004) 'Empirical models of e-government growth in local governments', *e-Service Journal*, vol. 3, no. 2, pp. 59–84.
- Roberts, N. (2004) 'Public deliberation in an age of direct citizen participation', *The American Review of Public Administration*, vol. 34, no. 4, pp. 315–353.
- Rogers, E. M., Collins-Jarvis, L. & Schmitz, J. (1994) 'The PEN project in Santa Monica: interactive communication, equality, and political action', *Journal of the American Society for Information Science*, vol. 45, no. 6, pp. 401–410.
- Rosenblat, T. S. & Mobius, M. M. (2004) 'Getting closer or drifting apart?', *The Quarterly Journal of Economics*, vol. 119, no. 3, pp. 971–1009.
- Saglie, J. & Signy, I. V. (2009) 'Size and e-democracy: online participation in Norwegian Local Politics', *Scandinavian Political Studies*, vol. 32, no. 4, pp. 382–401.
- Shah, D. V., Cho, J. & Eveland, W. P., Jr., Kwak, N. (2005) 'Information and expression in a digital age: modeling Internet effects on civic participation', *Communication Research*, vol. 32, no. 5, pp. 531–565.
- Svara, J. H. (1990) *Official Leadership in the City: Patterns of Conflict and Cooperation*, Oxford University Press, New York.
- Svara, J. H. (2003) *Two Decades of Continuity and Change in American City Councils*, National League of Cities, Washington, DC.

- Thomas, J. C. & Streib, G. (2003) 'The new face of government: citizen-initiated contacts in the era of e-government', *Journal of Public Administration Research and Theory*, vol. 13, no. 1, pp. 83–102.
- Tolbert, C. & McNeal, R. S. (2003) 'Unraveling the effects of the Internet on political participation?', *Political Research Quarterly*, vol. 56, no. 2, pp. 175–185.
- Tolbert, C. J. & Mossberger, K. (2006) 'The effects of e-government on trust and confidence in government', *Public Administration Review*, vol. 66, no. 3, pp. 354–369.
- Van Alstyne, M. & Brynjolfsson, E. (2005) 'Global village or Cyber-Balkans? Modeling and measuring the integration of electronic communities', *Management Science*, vol. 51, no. 6, pp. 851–868.
- Warschauer, M. (2003) *Technology and Social Inclusion: Rethinking the Digital Divide*, MIT Press, Boston.
- Weber, L. M., Loumakis, A. & Bergman, J. (2003) 'Who participates and why?: An analysis of citizens on the Internet and the mass public', *Social Science Computer Review*, vol. 21, no. 1, pp. 26–42.
- Weick, K. E. (1979) *The Social Psychology of Organizing*, McGraw-Hill, Inc, New York.
- West, D. M. (2004) 'E-government and the transformation of service delivery and citizen attitudes', *Public Administration Review*, vol. 64, no. 1, pp. 15–27.
- West, D. M. (2005) *Digital Government: Technology and Public Sector Performance*, Princeton University Press, Princeton.
- Yates, J. (1993) *Control Through Communication: The Rise of System in American Management*, The John Hopkins University Press, Baltimore, MD.

---

**R. Kelly Garrett** (PhD, University of Michigan, 2005) is an Assistant Professor in the School of Communication at the Ohio State University. His research interests include the study of online political communication, online news, and the ways in which citizens and activists use new technologies to shape their engagement with contentious political topics. *Address:* School of Communication, Ohio State University, 3080 Derby Hall, 154 North Oval Mall, Columbus, OH 43210, USA. [email: garrett.258@osu.edu]

**Michael J. Jensen** (PhD, University of California, 2007) is a Beatriu de Pinós postdoctoral fellow with the Institute of Government and Public Policy at the Autonomous University of Barcelona. His research interests include political participation, Internet politics, and political communications. *Address:* Institute of Government and Public Policy, Autonomous University of Barcelona, Bellaterra 08193, Spain. [email: mjensen@uci.edu]

---