Who's Responsible for the Digital Divide? Public Perceptions and Policy Implications

Dmitry Epstein, Erik C. Nisbet & Tarleton Gillespie

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Dmitry Epstein

Department of Communication, Cornell University, Ithaca, New York, USA

Erik C. Nisbet

School of Communication, the Ohio State University, Columbus, Ohio, USA

Tarleton Gillespie

Department of Communication, Cornell University, Ithaca, New York, USA

Addressing the reasons for—and the solutions to—the "digital divide" has been on the public agenda since the emergence of the Internet. However, the term has meant quite different things, depending on the audience and the context, and these competing interpretations may in fact orient toward different policy outcomes. The goals of this article are twofold. First, the authors unpack the term "digital divide" and examine how it has been deployed and interpreted across a range of academic and policy discourses. Second, through a framing experiment embedded within a nationally representative survey, the authors demonstrate how presenting respondents with two different conceptual frames of the digital divide may lead to different perceptions of who is most accountable for addressing the issue. From this, they discuss the dynamic relationship between the construction and communication of policy discourse and the public understanding of the digital divide, as well as implications for effective communication about the digital divide and information and communication technology policy to the general public.

Since the early 1990s, policymakers and rights advocates have worried that the benefits derived from information and communication technologies (ICTs) are in-

equitably distributed. Persistent gaps between developed and developing nations, as well as gaps domestically along socioeconomic, geographic, educational, racial, and gender lines, have broadly come to be known as the "digital divide"—a term that both names these disparities and stands as a marker for the concerns about them. Addressing the reasons for and the solutions to these inequities has been on the public agenda, as part of nearly every conversation about information policy, since the emergence of the Internet.

However, in reviewing public statements by policymakers and industry leaders, it is apparent that the term can mean different things, depending on the audience and the context. "Digital divide" not only covers different kinds of disparities with different kinds of consequence, it also obscures the variety of ideas about the nature of the problem itself and the manner in which it should be resolved. In some ways, this semantic flexibility may be of instrumental value, a pliable rallying cry around which groups with different specific needs and goals can unite in a single broader effort (see Boyle 1997). On the other hand, it may indicate some basic unquestioned assumptions about the nature of the "digital divide" and of ICTs more broadly. Rather than a united effort toward a single solution, these competing interpretations of the digital divide may in fact drive toward different policy outcomes.

In the first part of our study, we examine how the term "digital divide" has been deployed across a range of academic and policy discourses. Through this process we identify two master interpretations, or "frames," of the problem: One focuses on inequalities in material *access* to ICTs, and the other focuses on inequalities in the *skills*

necessary to use ICT effectively. We argue that each interpretation implies different kinds of solutions and different actors who may have the ability and obligation to intervene.

We also hope to demonstrate that *who* the public holds most accountable for addressing the issue depends in part on how the issue is framed. Depending on how the digital divide is described, different policy agendas may seem more or less plausible to the public, and current policies may seem more or less appropriate. But merely identifying competing frames in the policy discourse does not necessarily speak to whether these frames have any impact on public perceptions of the issue. So we added a modest empirical probe into the effects of these frames. We conducted a framing experiment embedded in a national survey, testing how presenting respondents with one of these two conceptual frames might lead to substantially different perceptions of how to best address the problem.

We believe this mixed approach, pairing an analysis of frame construction within policy and academic discourse with a survey experiment assessing the influence of explicated frames on audience perceptions, strengthens the validity of the overall study. We conclude our study by discussing the implications for effective communicating efforts to bridge the digital divide, and about ICT policy more broadly, to the general public.

FRAMING POLICY FOR THE PUBLIC

Framing is an analytical approach that cuts across the fields of communication, political science, sociology, and psychology and has explanatory power at both the macro, or institutional, and micro, or individual, levels of analysis (Benford and Snow 2000; Chong and Druckman 2007; Gamson and Modigliani 1989; Iyengar 1994; Nisbet and Huge 2006; Scheufele 1999; Scheufele and Tewksbury 2007). As a theoretical framework, it is aptly suited for our goals of unpacking competing interpretations of the digital divide and linking policy discourse with citizen perceptions.

Frames at the most basic level are "schemata of interpretation" that allow individuals "to locate, perceive, identify, and label" issues and topics within their own personal context (Goffman 1974, 21). Gamson and Modigliani (1989) describe frames as interpretative packages that give meaning to an issue by presenting "a central organizing idea . . . for making sense of relevant events, suggesting what is at issue" (3). Frames may offer particular problem definitions, diagnose causes, and/or suggest remedies for individuals employing those frames when constructing meaning, processing information, and making evaluations or decisions in everyday situations (Entman 1993, 2004; Gamson 1992).

Furthermore, frames operate both at a societal or institutional level and at an individual psychological level. Frames are constructed, modified, and diffused across a variety of competing social, political, and economic actors such as politicians, advocacy organizations, social movements, media organizations, corporations, and the like. (Benford and Snow 2000; Gamson and Modigliani 1989; Scheufele 1999; Scheufele and Tewksbury 2007; Gitlin 1980; Gamson 1992). Though framing processes are not necessarily intentional, competing actors constantly engage in meaning construction and diffusion of interpretative packages (strategic framing) that align with their goals or interests (Chong and Druckman 2007; Benford and Snow 2000; Scheufele and Tewksbury 2007).

At a psychological level, frames may influence individual opinions, evaluations, and judgments by making either new or existing considerations more applicable, or valued, than others (Chong and Druckman 2007; Nelson, Oxley, and Clawson 1997; Pan and Kosicki 2005). By emphasizing a restricted set of available considerations when forming an opinion or by prioritizing new considerations over old ones, frames fundamentally impact how individuals process available considerations about an issue or topic (Chong and Druckman 2007). In other words, "frames in communication" are strategically constructed and communicated by social, political, and economic actors with the goal of influencing audiences to use specific interpretive "frames in thought" when making sense of an issue, topic, or problem (Benford and Snow 2000; Chong and Druckman 2007; Scheufele 1999; Scheufele and Tewksbury 2007).

Scholars across a number of academic disciplines have examined the competition between social, political, and economic actors over the preferred definition and interpretation of a topic, issue, or event; the diffusion of competing frames across policy and media discourse; and frames' influence on audience understanding of important issues (see, e.g., Benford and Snow 2000; Entman 1993; Entman 2004; Gamson and Modigliani 1989; Nisbet and Huge 2006; Scheufele 1999; Scheufele and Tewksbury 2007). Focusing on the role of the media as a key actor in framing processes, Scheufele (1999) develops a macro-micro model of framing that highlights the *frame-building* activities of competing social, political, and economic actors and their promotion of these frames to the mass media, and in turn the *frame-setting* role of the media in communicating frames and shaping audience attitudes about an event, topic, or issue. Benford and Snow (2000) take a similar macro-micro approach in their model of *frame contests* between social movements and their targets. They identify specific processes of strategic frame construction, and diffusion of those frames by competing social actors, all with the goal of shaping the public understanding of a social problem and spurring citizen mobilization.

Several authors have applied framing process models to particular policy issues, from international policy matters to public controversies concerning science and technology. For example, Gamson and Modigliani's (1989) seminal work focused on competing frames about nuclear power and how different interpretative packages about the issue shaped policy discourse, technology adoption, and citizen understanding. Entman (2004) has proposed a *cascading activation* model that examines the construction of issues frames about foreign policy by policy actors, their promotion and diffusion through the mass media, and their impact on audience perceptions of foreign policy issues like terrorism and weapons of mass destruction. More recently, Nisbet and Huge (2006) proposed a model of "mediated issue development" by examining how agricultural biotech was framed in policy discourse as compared to media discourse over time—with key implications for American attitudes about genetically modified food.

This focus on framing processes within policy and media discourse is complementary to what some have called the "argumentative turn" (Parsons 1995, 151–53) or the "politics of problem definition" (Rochefort and Cobb 1994) in the field of policy analysis. Policy scholarship has long recognized that the characterization of a public problem can often set the terms for how it will be perceived by policymakers, the press, and the public, and can point toward certain kinds of policy solutions. The argumentative turn emphasizes the pivotal role of language in this: The construction of social problems is both strategic and structural, a deliberate rhetorical tactic that takes place on an already given discursive terrain (see also Fischer and Forester 1993; Rein and Schön 1993).

COMPETING INTERPRETATIONS OF THE DIGITAL DIVIDE

The digital divide has been a salient issue for information and communication technology (ICT) policymakers at both the national and the global levels for quite some time. In the United States, the Clinton administration directed the National Telecommunication and Information Agency (NTIA) to examine ICT and Internet adoption in the United States; this investigation led to a series of reports titled "Falling through the Net." The first of these reports, released in 1995, documented systematic gaps in the use of computer networks by socioeconomic status, educational background, race, gender, and geographic location. To some extent that first report spurred (and offered rhetorical justification for) the Telecommunication Act of 1996—which, among other things, included public schools and libraries within the expanded "universal service" mandate, granting them significant "E-rate" discounts on the costs of building computing and telecom-

munication infrastructure. Starting in 1999 NTIA reports used the term "digital divide" explicitly, while documenting the gradual narrowing of these recalcitrant gaps. As Internet use has grown, the debate in the United States has shifted toward a "broadband divide," focusing on the implications of similar sociodemographic disparities around the availability and use of faster broadband Internet connections.

While concern in the United States has focused on disparities by socioeconomic status, education, and geography, similar questions have been raised on a global level concerning disparities in access to ICTs between developing and developed nations. Even as recently as 2007, while nearly three-fourths of the population of the United States used the Internet, use in Africa remained in the single digits.[1] A series of global efforts has been initiated to spur greater ICT use in the developing world. In 1996 the World Bank launched its InfoDev program, to help finance small-scale projects designed to implement ICTs as part of broader development efforts. In 2000 the United Nations proposed eight "Millennium Development Goals," one of which was making "available the benefits of new technologies—especially information and communications technologies."[2] In 2002 the International Telecommunication Union (ITU) sponsored the World Summit on the Information Society (WSIS); two meetings in 2003 and 2005 brought together political and industry leaders to discuss how to bridge the "global digital divide," and more broadly to consider the future of ICT and development on an international scale.

Framing the Digital Divide as a Problem of Access

Among global policymakers, the discourse surrounding ICTs and the digital divide is typically founded upon a fundamentally technocratic optimism: The technology is taken to be the ultimate developmental tool, and simply installing it will spur "development" more broadly. This is hardly a new presumption in U.S. and European policymaking (Smith 1994). Analyzing the 2003 Geneva meeting of the WSIS, Hamelink (2004) criticized the discourse on digital divide as being too detached from the context of international development and focused primarily on expansion of the technology from the "haves" to "have-nots." Similarly, Rooney (2005) showed that the main focus in WSIS policy documents concerning the "knowledge economy" was technological development, particularly in terms of improved infrastructure, as the ultimate solution for an array of social problems. Thompson (2004) characterized one speech by the president of the World Bank as revealing a "technologic optimism bordering on determinism" (114).

The early policy rhetoric within the United States conceptualized the digital divide in similarly dichotomous

terms. In 2000, the U.S. Department of Commerce noted that:

> [Some individuals] have the most powerful computers, the best telephone service and fastest internet service, as well as a wealth of content and training relevant to their lives. ... Another group of people don't have access to the newest and the best computers, the most reliable telephone service or the fastest or most convenient Internet services. The difference between these two groups is ... the Digital Divide.[3] (Selwyn 2004, 344)

This understanding of the digital divide, based entirely on access, was reinforced by the NTIA reports, which indicated that, despite high overall penetration rates of ICT, the distribution of Internet use was systematically uneven. Demonstration of this inequity was measured exclusively in terms of the penetration of personal computers and Internet connections into particular populations, that is, correlations between Internet access and demographic indicators. According to Stevenson (2009), these same rhetorical frameworks trickled down into an array of reports on public computing in libraries, philanthropic efforts to improve access, and elated information policy debates. Similar patterns were highlighted in commercial reports and in early academic research at the time, thus reinforcing this conceptualization of the digital divide exclusively in terms of a disparity in access (Norris 2001; Reddick, Boucher, and Groseilliers 2000).

Framing the Digital Divide as a Disparity of Skills

Material access to computers and network infrastructure has long been the dominant discursive framework for international and national policymakers addressing the digital divide. Yet as the results on the ground proved unsatisfactory, the focus on access has come under increasing scrutiny, particularly in the interaction between policymakers and other actors, including representatives of the technology industries, civil society, and most notably the academic research community.

As an academic subject, the digital divide has garnered a considerable amount of attention. As van Dijk (2006) notes, much of the early work consisted of gathering empirical evidence of these inequalities, efforts that entirely embraced the notion that the gap was one of material access to the technology. Most of the scholarly debate that emerged around this research focused on identifying the digital divide's component dimensions (see for example Barzilai-Nahon 2006; Mossberger et al. 2003; Warschauer 2002) and the appropriate methods of measurement (see, e.g., Chinn and Fairlie 2004; DiMaggio, Hargittai, Celeste, and Shafer 2004; van Dijk and Hacker 2003; Vehovar, Sicherl, Husing, and Dalnicar 2006).

However, much of the recent work on the digital divide has been an increasingly pointed critique of the "access" view of the digital divide and the simple "haves versus have-nots" dichotomy it implies. Part of this critique is that "digital divide" is too simple an analytical concept: Some suggest that the digital divide should be understood as a series of divides (Barzilai-Nahon 2006; Meredyth and Thomas 2002) or inequalities (DiMaggio et al. 2004), while others prefer viewing it as a continuum (Warschauer 2002, 2003) or spectrum (Lenhart and Horrigan 2003). Some also challenged the attention to access as determinist, utopian, and naïve, warning that the evident demographic disparities have to do with more than just the presence or absence of the technology, and do not simply disappear as ICTs and Internet connectivity become more ubiquitous (van Dijk 2006; Gunkel 2003). Others have attempted to link the digital divide to the larger forces that perpetuate resource disparities: Some see the digital divide as an element of broader waves of political and economic development (Norris 2001; Pohjola 2001; Warschauer 2003), while others see the divide as a product of cultural imperialism (Chomsky 2004), Westernization (Schiller 1992), or an emerging power bloc within the information industry (Chomsky 2004; Schiller 1992).

Most compelling, many critics of the access frame have noted that it overlooks the question of skills and the societal resources that provide them (Selwyn 2004; Warschauer 2003; van Dijk and Hacker 2003; van Dijk 2006; Hargittai 2002). The emphasis on access may suit policy debates well because it offers a clean and measurable index of the problem (Barzilai-Nahon 2006), and because it implies that merely installing the necessary technical infrastructure will somehow solve it. However, just because a household or a community has Internet access does not mean they are adequately prepared to use it, or to use it in a meaningful enough way to reap its benefits. Hargittai (2002), for example, conducted a series of experiments measuring both formal and substantial information skills—operationalizing skill as the ability to search for and find different types of information online, which she argued is a fundamental enabler of productive use of the Internet. Her research revealed significant differences in effective use of ICTs in practice, particularly by age, prior experience with technology, and education level, among subjects who all had available access to the Internet. Subsequent work has catalogued a broader array of skill types that, in our contemporary information context, might be relevant to ensuring that users are able to materially benefit from the Internet (van Dijk 2006) or engage in capital-enhancing activities (DiMaggio et al. 2004).

This "skills" frame has, to some degree, diffused into the policy community, to the point where we consider it an available alternative frame in the broader public discourse on the issue. For example, in 2002 the UN Conference on Trade and Development introduced measures of information literacy as part of their index of ICT development (Philippa 2003). Other international agencies have also begun to enrich their indices of information technology

adoption with data on technological literacy and uses of ICT (Barzilai-Nahon 2006). The World Summit on Information Society outcome documents listed not only access but also "necessary skills and knowledge" as essential requirements for an "inclusive information society" (ITU 2005).

Similar sentiment can be found in U.S. domestic policy discourse as well. Not surprisingly, higher education policy has aggressively adopted the skills framework. In 2000 the Association of College and Research Libraries adopted "Information Literacy Competency Standards for Higher Education," which spell out the skills necessary to locate, evaluate, and use information in an efficient manner. These standards were also endorsed by the American Association for Higher Education and the Council of Independent Colleges (ACRL 2000). But this skills frame goes well beyond the university. The Federal Communications Commission's expansive 2010 National Broadband Plan, for example, lists three elements of bridging the digital divide: availability of infrastructure, affordability of infrastructure, and digital literacy skills. Toward that third goal, the Federal Communications Commission (FCC) has proposed a publicly funded "National Digital Literacy Corps" (FCC 2010).

The policymaking community continues to focus on the more quantifiable and actionable aspects of the material diffusion of ICTs. Muir and Oppenheim (2002), highlighting universal access as a pivotal principle guiding American policymakers, cite Congressional statements such as this:

> The opportunity for people to participate in economic, political and cultural life depends on their ability to access and use communication and information services. Individuals need skills and tools to locate the communication pathways, information and audience in timely fashion and in an appropriate format. (269)

Courtright and Robbin (2001) explore the symbolic language employed by U.S. policy communities by examining attributed quotes in the five major U.S. newspapers during the year 2000. Focusing on how they define the problem, they show that "most of the stakeholders defined the digital divide as a lack of 'access' to computers and the Internet. ... Many stakeholders added dimensions of skills and education as important to the problem definition" (3–4). The breakdown of their findings is particularly interesting: While 100 percent of government stakeholder statements define the digital divide as a matter of access and 78 percent of them interpret it also as a matter of skills, only a small percentage (11 percent) of government stakeholder statements related to "deeper social and economic issues." Similarly, among the statements attributed to industry stakeholders, almost all (86 percent) viewed the digital divide as a matter of access, a bit more than half (57 percent) as skills, and none as "deeper social and economic issues."

LOCATING RESPONSIBILITY FOR BRIDGING THE DIGITAL DIVIDE

Framing the digital divide in terms of access or in terms of skills can do more than simply characterize the problem; it can also provide subtle cues as to the manner by which it should be solved, and who is most responsible for doing so. Frames do not simply name a problem; they offer it a rich conceptual terrain, including presumptions about the manner of the problem at hand, how it came to be, and what kind of steps might be necessary to rectify it. Defining the digital divide as a problem of access to ICTs may imply that those who can provide or help subsidize the technology, particularly *government and/or corporations*, are responsible for funding infrastructure and increasing access. Alternatively, defining the digital divide in terms of each person's capacity to use information technology effectively may suggest that responsibility lies in the hands of *individuals and educational institutions*, those who could help pursue the necessary "digital literacy."

Others have proposed (but not tested) this hypothesis, as they note the intricate rhetorical formations that have marked this issue. Kvasny and Truex (2001) conducted a critical discourse analysis of speeches given during the White House "New Markets Tour," in which President Clinton and administration officials, accompanied by high-ranking policymakers and industry representatives, spoke to historically underdeveloped communities in East Palo Alto, Harlem, Appalachia, and the Navaho Nation. They note a shift in Clinton's rhetoric, as the NTIA began to describe the digital divide not as a persistent inequity but as an inexorably closing gap, from a rhetoric of "digital divide" to one of "digital opportunity." This subtle change discursively shifts the implied responsibility: Once the digital divide was redefined as an "opportunity," it seemed to fall more to the individual to act on it. Kvasny and Truex suggest that the public may internalize this rhetorical logic, so that resolving the digital divide becomes perceived as their own personal responsibility. As such, they offer not just insight into how the digital divide has been constructed in public discourse; they open the question of how it potentially may influence perceptions of the problem.

In a study comparing a selection of key U.S. and EU policy documents, Stewart, Gil-Egui, Tian, and Pileggi (2006) suggest that, to the extent that the documents regularly emphasized the economic potential of ICT diffusion, over time terms such as "access" and "commerce" increasingly merged into a single semantic cluster. They assert that this shifts responsibility for bridging the digital divide from the government to the private sector. Kvasny and Truex (2001) also noted that the discourse regarding the "new economy" regularly emphasizes the close cooperation between the public and the private

sectors in bridging the digital divide. For example, in his speech to the Federal Communications Bar Association, Assistant Secretary Rohde (2000) asserted that:

> A top goal of the Administration is to close the digital divide and ensure that all Americans can share in the benefits of the telecommunications revolution. To achieve this goal, we must remain faithful to the pro-competitive principles of the Act and successfully establish a universal service system that is consistent with the Act's vision to ensure access to advanced telecommunications and information services.

Theirs is an important reminder that responsibility may not be a singular assignment among static players; discursive framing may itself change the degree to which different actors are opposed or paired in their efforts.

We were able to locate only one previous research effort that attempted to link the framing of the digital divide in policy discourse to the public perceptions of the issue. Clark, Demont-Heinrich, and Webber (2004) explored public perceptions of digital divide in the United States as part of a larger study based on interviews with seventy people from twenty families. Their findings reveal a set of recurring narratives that correspond to the policy discourse described earlier. The first narrative apprehends the technology in a deterministic way, emphasizing the "inevitability of computers in the future of everyday life and its economics" (531). Another focused on education perspectives, particularly for children and related to their future employment opportunities. The third perceived the adoption of ICT as a function of consumer choice.

These categories tell a story similar to that of the discourse of policymakers. We can find technocratic and deterministic views of technology, as well as a growing utilitarian view of ICTs as enablers of economic activity. However, the main finding of Clark, Demont-Heinrich, and Webber (2004) was that individualism was the dominant narrative in people's perception of digital divide. Those of both lower and higher socioeconomic status tended to attribute the responsibility for bridging the digital divide to individuals rather than to government or other institutions, whether it was described in terms of skills or physical access. This tendency was partly explained by their view of ICTs as a "luxury related to entertainment and consumer choice, rather than necessary for participation in contemporary society" (535). The researchers explain this contradiction by noting the growing dominance of market forces in ICT diffusion processes and the internalization of marketing messages about ICT diffusion by the public. Clark and her colleagues' concerns about the commercial efforts to bridge the digital divide are similar to those sounded by Stewart and his colleagues (2006).

EXPLICATING FRAMING EFFECTS ON PERCEPTIONS OF DIGITAL DIVIDE

As noted earlier, research has demonstrated that "frames in communication," strategically developed and deployed within policy debates or in the media, may influence public understanding and perceptions of an issue, problem, or event by offering "frames in thought" (Chong and Druckman 2007; Nelson, Oxley, and Clawson 1997; Pan and Kosicki 2005). To demonstrate the connection between the framing of the digital divide and the understanding of it by the public, correlation between the dominant frames and the common perceptions can get us only so far. While the studies looking at digital divide policy discourse have only hypothesized its repercussions for public perception of the issue, we would like to explore this claim, by drawing on framing theory to actually test how the public may react to different policy frames of the digital divide as a policy matter.

One way that frames may influence public perceptions is by influencing the perceived *treatment responsibility* for an issue, a term Iyengar uses to distinguish "who or what has the power to alleviate (or forestall alleviation of) the problem" (Iyengar 1994, 8). Moreover, "People think about responsibility instinctively, and attribution of responsibility represents a powerful psychological cue" (10), a cue Iyengar argues has an effect on people's subsequent opinions about that particular issue. Assuming a memory-based model of opinion formation, frames may influence perceptions of responsibility by making either new or existing considerations more *accessible* or more *applicable*—in other words, a *framing* effect (Chong and Druckman 2007; Iyengar 1994; Nelson, Oxley, and Clawson 1997).

We aim to demonstrate through an experimental manipulation how the two dominant policy interpretations of the digital divide may influence individual attributions of responsibility for addressing the issue: in other words, the framing effect of exposure to the "access" and "skills" frames. If the evidence suggests that characterizing the digital divide as an issue of access or of skill, even just once, can shift people's perception of responsibility in that moment, it is probable that the pervasive and persistent framing of the issue across the public discourse would have similar, and perhaps cumulative, consequence over time (Scheufele 1999; Scheufele and Tewksbury 2007). More specifically, we propose the following hypotheses:

> H1: Framing the digital divide in terms of access to information technology will increase the likelihood of individuals attributing treatment responsibility to governmental and industry actors.

> H2: Framing the digital divide in terms of the skills necessary to use information technology effectively will increase

the likelihood of individuals attributing treatment responsibility to individuals and educational institutions.

As the dominant and the most persistent discursive framework, the access paradigm has been adopted primarily by the governmental actors and the private sector. Over time, in many people's eyes, physical access and economic affordability of the Internet have become a necessity and a basic right. At the same time, skill development is not obligatory in the public sense. Although it has been picked up by the higher education circles, it is still viewed as an optional, not key, tenet in college requirements, thus highlighting the individual responsibility.

EXPERIMENTAL METHODOLOGY

Data Collection

In order to test our hypotheses, we conducted a framing experiment embedded in a national omnibus poll conducted by the Survey Research Institute at Cornell University between March 30, 2007, and May 3, 2007. The sample population consisted of U.S. citizens, at least 18 years of age, from randomly selected households. Within each household, respondents were randomly selected. In total, 500 interviews were completed. The response rate was 23.9 percent and the cooperation rate 55.1 percent, which comports with AAPOR standards.[4]

Telephone respondents answered a series of questions regarding their Internet use, followed by the experimental manipulation and attribution questions; questions regarding demographics and political orientation were asked at the end of the survey. The telephone interviewing software randomly assigned respondents to one of two possible experimental framing conditions. The first framing condition (FC1) defined the digital divide in terms of *access to technology* and read:

> FC1: I am going to read you one definition of digital divide: "the gap between those who have access to information and communication technologies, and those who do not."

The second framing condition (FC2) defined the digital divide in terms of *capacity to use technology*, and read:

> FC2: I am going to read you one definition of digital divide: "the gap between those who have the skills to use information and communication technologies effectively, and those who do not."

Two hundred and forty-five subjects were exposed to FC1, and the remaining 255 subjects to FC2. Once exposed to their framing condition, all subjects were asked the same attribution question: "Given the definition read above, in your opinion where does the primary responsibility for bridging the digital divide lie?" The subjects in each condition were asked to choose one answer from the same standardized response options,[5] which were read in their entirety to each respondent, including an "other category" in which they could specify their own attribution.

Data Analysis

A stringent test of the experimental hypotheses was conducted by employing a multivariate analysis. Even though respondents were randomly assigned to the experimental conditions, a multivariate analysis accounts for any incidental variations in sample characteristics between the two groups, and compares the influence of the experimental message frame on subject attribution controlling for other sociodemographic or ideological factors. Since the dependent variable in the experiment was a categorical variable (list of actors responsible for addressing the digital divide), a multinomial logistic regression was used. Multinomial logistic models simultaneously estimate the models for comparison among all categories of the outcome variable (Long 1997).

Independent Variables

Four sets of independent variables were included in the multinomial logistic analysis. Demographic indicators included measures of *age*, *gender*, *race*, *household income*, and *education*. Age was measured with a continuous variable with a respondent range of 18 to 93 years of age ($M = 49.8, SD = 16.0$). Gender is dummy coded with men coded high (47.0 percent). Race is dummy coded, split between whites and non-whites, with whites coded high (75.2 percent). Household income was measured on a nine-point scale ranging from less than $10,000 to $150,000 and up ($M = 5.5, SD = 4.4$). Education was measured on an eight-point scale, ranging from none/grade 1 to 8 to graduate degree ($M = 5.0, SD = 1.6$).

Political orientation was assessed by a single item asking respondents their political party affiliation on a seven-point scale ranging from strong Democrat to strong Republican ($M = 3.6, SD = 2.1$).

Frequency of Internet use assessed the average number of hours per day spent on the Internet by asking respondents, "On a typical day, how much total time do you spend on the Internet/World Wide Web? Include any time spent sending and receiving e-mail, surfing Web pages, chatting with others, buying products or services, watching video, blogging, downloading or sharing files, etc." ($M = 1.7, SD = 2.4$).

Lastly, to test the influence of the experimental manipulation after taking into account the preceding controls, a dichotomous variable indicating the *experimental frame condition* to which a respondent was assigned (with 1 = skills condition [FC2] and 0 = access condition [FC1]) was included the multivariate analysis.

TABLE 1
Treatment responsibility for bridging the digital divide

Actors	Digital divide defined in terms of "access" (%), $n = 245$	Digital divide defined in terms of "skills" (%), $n = 255$	Total across conditions (%), $N = 500$
Individual people	26.9	36.5	31.8
Federal government	27.3	21.6	24.4
Local government	5.3	6.7	6.0
Local schools	5.7	10.2	8.0
Colleges or universities	2.4	3.1	2.8
Large corporations	4.1	1.6	2.8
Local businesses	4.1	1.6	2.8
National foundations and nonprofit organizations	3.3	0.4	1.8
Local community groups	1.6	2.0	1.8
Other	7.8	4.3	6.0
Don't know/refused	11.4	12.2	11.8
Total:	100	100	100

Dependent Variable

As previously described, the dependent variable for the experiment was the respondents' attributions of primary responsibility for bridging the digital divide. The distribution of selected actors for both framing conditions are presented in table 1. Individuals, the federal government, and educational institutions (especially "local schools") were the three most commonly cited set of responsible actors across both conditions. Relatively few respondents selected private corporations, nonprofits, or local community groups as most responsible.

Based on the theoretical focus of the hypotheses and the requirementthat predicted categories contain enough respondents for analysis, some response categories from the original dependent measure were collapsed, creating five primary categories for the multinomial logistic modeling. The new dependent categorical variable was composed of five sets of actors: individual people (31.1 percent of valid responses), government (combining respondents who cited federal and local—34.5 percent), educational institutions (combining respondents who cited local schools and colleges/universities—12.2 percent), and industry actors (combining respondents who cited local businesses and large corporations—6.3 percent), and a residual "other" category (combining respondents who cited nonprofits, local groups, "other" actors—10.9 percent).

TABLE 2
Influence of experimental manipulation on treatment responsibility for digital divide

Treatment responsibility category	Individual people	Educational institutions	Industry actors	Government
Individual people	n.a.			
Educational institutions	.29 (.35)	n.a.		
Economic actors	−1.43 (.51)**	−1.71 (.54)***	n.a.	
Government	−.57 (.27)*	−.85 (.35)**	−.86 (.49)	n.a.
Other actors	−1.10 (.39)**	−1.39 (.45)**	.32 (.57)	−.54 (.17)

Note. Significance indicated by *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$. Reported is the influence (unstandardized coefficients and standard error) of the frame condition indicator on the likelihood of respondent selecting treatment responsibility category versus reference category, controlling for age, gender, education, race, household income, frequency of Internet use, and political orientation.

RESULTS

Since multinomial logistic regression simultaneously estimates models for comparison among all categories of the outcome variable, a reference category is required for the analysis. In other words, model coefficients indicate whether an independent variable increases or decreases the likelihood of belonging to a specific category as compared to a reference category. As the reference category varies, the influence of an independent variable on the likelihood of category selection will vary accordingly. Thus, for our analysis, we report the influence of the framing manipulation, while controlling for all other independent variables (Internet use, demographics, political orientation) in the model for each set of possible categorical comparisons (e.g., individuals vs. government, individual vs. economic actors, government vs. educational actors). In total, four versions of the multinomial logistic model were estimated for ten combinations of category comparisons, in order to demonstrate how the framing manipulation influenced respondent attribution.

The results of the multinomial logistic model are presented in table 2. The total explained Nagelkerke (1991) variance (a pseudo R^2 employed as an indicator of model fit) for the multinomial logistic model, with controls and framing manipulation indicator included in the final model, was 19.6 percent. Furthermore, the inclusion of the framing manipulation significantly improved the model fit $(\Delta \chi^2(4) = 21.782, p < .000)$ after including control variables and accounted for 5.1 percent of the incremental Nagelkerke variance.

In total, 380 cases were included in the analysis after listwise deletion. As indicated by table 2, the frame manipulation indicator (with skills condition coded high) decreased the likelihood of respondents attributing responsibility for bridging the digital divide to the government $(b = -.57, p < .05; b = -.85, p < .01)$ and economic actors $(b = -1.43, p < .001; b = -1.71, p < .001)$ as compared to individuals and educational institutions, respectively. In addition, the framing manipulation did not influence the probability of selecting individuals as compared to educational institutions, nor industry actors as compared to the government. These experimental results are consistent with both H1 and H2, with the probability of selecting the categories of individuals/educational institutions or government/industry actors significantly varying depending on how the definition of the digital divide is framed.

Beyond the effect of the framing manipulation, the only other variable significantly contributing to a better model fit was the respondent's political orientation $(\Delta \chi^2(4) = 16.814, p < .001)$, though to a somewhat lesser degree in comparison to the framing manipulation. The influence of political orientation on respondent attribution was note-

worthy in several respects. First, conservative political orientation decreased the probability of selecting educational actors $(b = -21, p < .05)$ and the government $(b = -20, p < .01)$ as responsible for addressing the digital divide, as compared to individuals. Conversely, conservative political orientation increased the likelihood of attributing responsibility to industry actors $(b = .32, p < .01; b = .32, p < .01)$ as compared to government and educational institutions, respectively. In other words, conservative respondents favored individuals or industry actors as the primary responsible actors for addressing digital divide, over government or educational institutions.

DISCUSSION AND CONCLUSION

Limitations of Experiment

Before we discuss some of our conclusions and implications from the overall study's findings, some of the limitations of the experimental methodology should be reviewed. The primary limitation of the study was a lack of robust measurement. Due to resource limitations, additional measurement of other possible independent variables, such as respondents' knowledge and awareness about the digital divide previous to the survey, their attitudes toward technology more generally, or more subtle details of their own use of information technology, was not possible. Likewise, more robust measurement of dependent variables such as issue importance, policy preferences, and attribution would have contributed to the study. Moving forward, future research not only can provide more robust measurement of both independent and dependent variables, but also can test more nuanced versions of these and other frames

Furthermore, we acknowledge that the experimental manipulation was rather modest and subtle, and accordingly so were the experimental effects on audience attribution. Respondents were exposed to a single preceding sentence and limited to verbal cues over the phone. In contrast, many framing experiments often attempt to simulate "real-world" exposure to competing frames by employing more robust stimuli like simulated newspaper articles or multimedia advertisements that may include a range of textual, visual, and audio framing devices. Subjects may also be exposed more than once to such stimuli.

Nevertheless, our analysis demonstrated that our rather modest framing manipulation significantly influenced how audiences make decisions about which political, social, or industry actors are most responsible for addressing the digital divide. The framing manipulation accounted for more than one-quarter of the total explained Nagelkerke variance in the multinomial regression model (5.1 percent out of 19.6 percent). Thus, we argue that our experimental results demonstrate ongoing and repeated exposure to

"interpretative packages" of the digital divide in a "richer" format such as media reports, political discourse, and advertisements (i.e., "frames in communication," would have a rather substantial and meaningful impact of audience "frames in thought" about the digital divide).

Framing Policy, Implying Responsibility

Our analysis suggests that framing the digital divide in terms of access or of skills may provoke different patterns of attribution, urging different attitudes toward particular government initiatives when it comes to gathering support for a policy. This is not a shocking conclusion—policymakers have long known that care must be taken in selling policy to citizens in terms that will resonate with them. But it does offer empirical evidence indicating not only that framing is important for how citizens judge the importance of an issue, but also that who they categorically see as responsible for addressing it. This adds a wrinkle to the process of selling a policy: A legislator may attempt to convince voters of the merit of a particular bill or regulation, but if in the process they also convince their audience that it's not government's problem, they may be undercutting support for their intervention.

Those who have criticized the digital divide rhetoric for focusing too exclusively on access have argued that policy interventions based on this assumption will necessarily fall short, building infrastructure while quietly retaining and reifying persistent inequities in information literacy. We add to this a second concern, that framing the digital divide in terms of access may also be swaying public opinion about who is most responsible for addressing the problem. To the extent that U.S. and European policymakers have overwhelmingly characterized the digital divide as a question of access, and regularly presented a partnership between the public and the private sectors as the force best suited to addressing this problem, they may be subtly undermining nontraditional community based initiatives by convincing individuals that these are not as relevant to the problem.

Ironically, there may be an unintended consequence of those who argue for a greater emphasis on skills. While making a worthy and well-intentioned point, those who champion the "skills" frame for the digital divide issue may be unwittingly helping to move the perceived responsibility for it from the domain of the government to that of individuals or educational institutions. To the extent that a "skills" frame for characterizing the digital divide suggests that responsibility lies with individual citizens or educational institutions, it may diminish the public's call for public policies or collective efforts to address the problem. By framing the issue in a way that assigns responsibility to individuals and educational institutions, they may be helping to put the burden on those with the least

resources to make a difference. Many of those with the financial and cultural capital to avail themselves of ICTs and seek out the skills necessary to use them effectively have done so; those who still lack access or skill tend to have less capital and less political clout; highlighting their needs may actually be undermining the public sentiment necessary to call on government to help. Institutions of higher education may have an important role to play, and arguably should be thinking about their public mission in terms of broad information equities in a modern world. But unlike governmental agencies, educational institutions are not in the same kind of position to pursue infrastructural improvements, subsidize large-scale material improvements, address the political contexts on a national and international scale that help these inequities persist, or begin to rectify the broader sociopolitical inequities that undergird the digital divide.

And though our manipulation does not test for this, the emerging discourse of digital "opportunity" that Kvasny and Truex and others have identified could have similar consequences for public opinion. To the extent that the digital divide is not only portrayed as closing, but is framed as therefore one that belongs in the domain of private enterprise, we might expect shifts in public opinion about the responsibility for resolving digital inequities toward both private enterprises and also, more importantly, toward the individual. Iyengar's (1994) study of the assignment of treatment responsibility for public issues like poverty, racial inequity, and antiterrorism noted a strong variation, depending on the discursive frame, between assigning responsibility to society or to the individual. To the extent that an issue was suggested to be endemic and structural, it seemed to lie at society's door to deal with; when the discursive frame suggested an episodic problem, more often people saw it as the individual's responsibility to handle or not. The language of "digital opportunity," rather than persistent inequity, could very likely move public opinion in the same direction, impacting not only the kind of policy initiatives proposed but also whether the public would support any government initiatives at all. Moreover, the combination of emphasis on private corporations and the individual may be moving this frame away from the individual as citizen, toward an understanding of the individual as consumer (Gandy 2002). As such, market actors may appear to share no responsibility; they merely provide the "digital opportunities" that consumers may choose to take advantage of.

Divides, Digital and Political

Our findings also serve as a reminder that the "public" is not a monolithic and homogenous audience when it comes to defining public problems. Perceived

responsibility for the digital divide differed not only in relation to how it was defined, but by political orientation. Our finding matches similar findings around other contested policy issues where the partisan disagreement is not merely about different policy approaches, but different attributions of responsibility and means of addressing the issue at hand (Gollust, Lantz, and Ubel 2009; Hardisty, Johnson, and Weber 2010). This suggests that different social groups may be more effectively addressed using different conceptualizations of the digital divide, depending on the desired outcome. For example, when communicating about ICT policy to a conservative audience, an emphasis on the role of government may be counterproductive, whereas emphasizing the role of individual citizens or corporations may resonate. The fact that political affiliation was the only significant factor in our analysis other than the framing manipulation suggests that it may play a distinctive role in perceptions of information and communication technology more broadly.

In the United States at least, the digital divide and broader questions of information access have become politicized in recent years. Soon after President George W. Bush's election to the office, the Bush administration quickly moved to close a number of programs initiated by the Clinton administration. In 2002 the administration cut the budgets of two programs—the Education Department's Community Technology Centers Program, which helped finance computer activity centers for students and adult education, and the Commerce Department's Technology Opportunities Program, which provided money and services to organizations that need a technology boost (Schwartz 2002)—implying that the digital divide in these cases had been already "bridged" by the market forces. The NTIA reports issued during the Bush administration focused on "digital inclusion," even replacing the title "Falling through the Net" with the more positive "A Nation Online." And, to the extent that the discussion shifted from Internet access to high-speed broadband access, the government imperative was lessened and the discourse continued to evolve.

In 2004 both U.S. presidential candidates took stands on the digital divide. While President Bush emphasized the economic benefits of greater broadband penetration, Senator Kerry advocated for more government-sponsored initiatives (Wilgoren and Sanger 2004). Kerry called for defining broadband access as a universal service, thus subjecting it to federal regulation and including it in government programs that subsidize service in rural and underserved areas (Eberhart 2004), whereas Bush focused on spurring market actors to invest in network infrastructure. In other words, viewing the market as the primary actor responsible for bridging the digital divide was more a Republican prerogative, while the Democratic argument leaned toward a more federally managed approach.

Similar tendencies reappeared in the 2008 presidential campaign: Senator Barack Obama spoke of the federal government's responsibility to encourage access through subsidy, while Senator John McCain championed private investment—although he did not discount public intervention on a local, community level if market actors failed. The issue of information skills also appeared in the literature of both campaigns, under the broader umbrella of enhancing science and math education. It is telling that the two campaigns did not differ on the basis of their choice of how to define the problem; they both used both frames. The fundamental difference between the two campaigns was not in framing communications policy in terms of either "access" or "skills," but in assigning responsibility, to government institutions on the one hand or individuals and the market on the other, for addressing gaps in both.

As persistent a problem as the digital divide is, the political divide in the United States is also a substantial factor in how ICTs are characterized, or framed, in policy and public discourse. In turn, the competitive framing and packaging of the digital divide by policymakers does have implications for how the public perceives the problem, and to whom they assign responsibility—which then may strengthen or weaken the political capital of these same policy actors who are offering competing interpretations about how to either define or address digital inequalities.

In the next policy cycle, the character of the inequities that plague access to and use of ICTs may have again shifted as technologies change, policy efforts materialize or collapse, and economic resources dwindle or grow. The discourse about the digital divide may also have shifted, as frames grow or diminish in significance, or as related debates around Internet neutrality or open-access publishing offer competing paradigms. What will remain constant is that the way the digital divide is defined and interpreted by policymakers and public alike will depend in part on the intensely partisan divides within which such policy debates occur.

NOTES

1. International Telecommunication Union, "Internet Indicators: subscribers, users and broadband subscribers"; http://www.itu.int/ITUD/icteye/Indicators/Indicators.aspx.

2. United Nations, "Millennium Development Goals," http://www.un.org/millenniumgoals.

3. Digitaldivide.gov's "About the Digital Divide" Web site is no longer available.

4. Using AAPOR standard calculation #4, see http://www.aapor.org/Standard_Definitions/1481.htm.

5. Response options were "federal government," "local (i.e., city, town, county) governments," "colleges or universities," "large corporations," "local businesses," "individual people," "local schools," "national foundations and nonprofit organizations," "local community groups," "something else, please specify."

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