SPECIAL TOPIC ISSUE: INFORMATION RESOURCES AND DEMOCRACY

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Information Resources and Democracy: Understanding the Paradox

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Introduction

Americans have long cherished the notion that democratic political participation requires an informed citizenry, and that to be informed we must have ready access to the information we need. Yet today we find ourselves confronted with a paradoxical problem: How can it be that American citizens by and large feel alienated from the very political system they profess to believe in, at the same time that they have an ostensibly unprecedented array of media and information sources at their disposal? As the proliferation of information sources increases, why does political participation appear to be on the decline? Observers have noted that when Americans talk about political "participation" they are tacitly assuming the existence of political *discourse*—yet, does discourse really exist in the current information environment? Does access to information sources and communication media equal dialogue? What is the relation between information resources and democracy?

The six articles collected in this special issue of *JASIS* consider these questions to be problematic and of central importance to information and communication studies. Two are theoretical articles; they offer new frameworks for analyzing the information/democracy problem. Brenda Dervin considers the ontological foundations of a range of conceptualizations of information, and speculates on the implications of each concept for democracy and individual empowerment. Drawing on new developments in systems theory, Sandra Braman proposes that information access, use, and communication among citizens are necessary conditions for the evolution of the "autopoietic state," a possible successor to the nation-states and corporatist states of the modern era. Interestingly, both of these articles find chaos theory to be a fruitful starting point for reconsidering the information/democracy relationship.

The other four articles are empirical studies that cover many levels of analysis, information systems, and social settings. Michael Martinez reports the results of a national survey of computer access and use by schoolchildren, and demonstrates the disparities among racial and economic groups. John Newhagen examines the different senses of political empowerment in white and African-American communities and their varying uses of different media, and finds talk radio to be a particularly strong influence on political empowerment for African-Americans. Everett Rogers, Lori Collins-Jarvis, and Joseph Schmitz describe their case study of the Public Electronic Network (PEN) in Santa Monica, California, a community-wide information system whose innovative design and modes of access have encouraged otherwise socially isolated or politically disenfranchised groups to have more of a voice in municipal government. And Su-Lien Sun and George Barnett take the widest perspective with a network analysis of the global telephone system. They find a clear relationship between the relative places of nations in the international telephone infrastructure and their "places" relative to each other as democratic states.

In their own ways, each of these articles embodies the assumption that the information "environment" is undergoing important changes, with corresponding implications for democratic political processes and participation. In the remainder of this introductory essay, I want to frame the main principle that appears to underlie these changes: the shift from an information environment that is *informing* (i.e., reliant on traditional "mass" media and information systems, and therefore on information "consumption") to one that is *involving* (reliant on discursive information systems and media, and therefore on information seeking and communication). Considered as a collection, the authors in this special issue of *JASIS* seem to hypothesize that the more involving the information environment is perceived to be by citizens, the greater the likelihood for the emergence of democratic political participation.

Theories of Democracy and the Shifting Information Environment

In a review of current theories of democracy, Ingunn Hagen (1992) identifies three principal forms of democracy; this three-way scheme is a useful point of departure for the present discussion. The first form, which prevails in the U.S. today, is *competitive democracy.* It is essentially meritocratic. In this form, social and political interests compete with one another for resources (including information resources) and to gain influence. Competition leads to the emergence of successful interests as elites which often exert their influence technocratically; their success and dominant position often depend on access to information. The problems associated with such competitively based technocracy are critiqued in a wide-ranging and venerable literature (e.g., Ellul, 1964; Giedion, 1948; Postman, 1992; Winner, 1977).

The second form, which most Americans mean when they say "democracy," is *participatory democracy.* In this form, differing interests work out a kind of balance based on two premises: that all (legitimate, recognized) groups' claims should be represented fairly, and that political participation should be as broadly based as possible. In this scenario, Hagen notes, participation is the fundamental value. Theories of distributive justice have been an important influence on current thinking about participation and political "fairness" in an increasingly complex and pluralist society (cf. Hochschild, 1981).

However, participation itself has a necessary prerequisite: interaction among individuals and interest groups. Hagen argues that the recognition of this fact has led to the articulation of a third form: *discourse* or *dialogue democracy.* This form has evolved in the work of social theorists like Jurgen Habermas, among others (Habermas, 1979, 1989). It rests on the premise that citizens must have the right and ability to engage with others in open discourse about issues that affect them. It is not enough that citizens simply have "access" to relevant information that might serve as a competitive advantage over other citizens, or that they have the opportunity to "participate" in political acts (which in practice often translate into the sole act of voting). Neither access to information nor participation in this sense are sufficient for successful democracy, without discursive action by citizens. From the perspective of information resources and communication, what is interesting about the three forms of democracy is that they are fostered by different information/communication environments. The differences are summarized in Table 1.

Competitive democracy in the U.S. has flourished in an information environment dominated by the mass media of radio, television, and print. Consider the following eight "democratic expectations" that Americans have about their sources of information in such an environment, according to Gurevitch and Blumler (1990, p. 270). Information sources should provide:

- Surveillance of the sociopolitical environment for developments that might affect the welfare of citizens.
- Meaningful agenda-setting, identifying key issues and the forces involved
- Platforms for "intelligible and illuminating" advocacy by politicians and proponents for different interest groups.
- Dialogue across a diverse range of views and between power holders and publics
- Mechanisms for holding powerful officials accountable for their activities
- Incentives for citizens to learn, choose, and become involved, "rather than merely to follow and kibitz over the political process."
- A "principled resistance" to outside forces that would subvert the independence, integrity, and public responsibility of information sources (e.g., mass media, public libraries).
- Respect for the citizen ("audience member") as capable of concern and understanding of the political environment.

These expectations are predicated on traditional mass media organizational structures and information sources that serve to direct the flow of information in the environment via gatekeeping, agenda-setting, or "editorial control." However, critics might argue that such sources have encouraged neither "dialogue" nor "involvement." Instead, citizens have been encouraged to be receivers, to "consume" information as they would any other product. An information environment characterized by these types of sources and audience behaviors can be described as an *informing* environment: literally, individuals are *shaped* by the information presented by a few main sources.

On the other hand, Hagen argues, participatory and discourse democracy are more likely to develop in an information/communication environment which is more discursive. Such an *involving* environment relies more on interactive information systems, and on individual information-seeking, -use, and communication via those systems. We might recast the eight "democratic expectations" about information systems and sources in an involving information environment accordingly. Information systems should provide:

- The means for personal involvement in and learning about the sociopolitical environment, and for playing a direct role in developments that might affect the welfare of citizens.
- The channels for meaningful issue creation, for raising questions and soliciting the interest and support of other citizens; for individuals to become information resources for others who are interested in the same is-

TABLE 1. Characteristics of informing vs. involving information environments.

Characteristics	Information environments	
	Informing	Involving
Infrastructure		
Dominant systems	"Mass," one-way, informative	"Demassified," *n*-way, conversational
Fundamental technology	Transmission	Switching
Distribution pattern	Broad; large "audience"	Narrow; "targeted"; interest groups
Economics		
Ownership pattern	Concentrated: few "voices"	Distributed: many "voices"
Revenue sources	Third-party advertisers	System users
Cost structure	High for info providers, low for consumers	Relatively low for providers, more costs borne by users
Content		
Public messages	Reflect consensus views: argument/ discourse controlled	Reflect diverse views: argument/ discourse encouraged
Gatekeeping approach	Insitutional: agenda-setting, "spin control" by info providers	Interpersonal: codes of etiquette, conflict mediated through interaction
Nature of "speech"	Property right associated with system ownership	Inherent capability of individual speakers
Participation/diversity via	Access to existing systems, consumption of information	Creation of new system/channels, providing information
Political		
Power implications	Stabilizing	Destabilizing
Democratic forms supported	Competitive, technocratic, meritocratic	Discourse/dialogue, participatory

sues; and for gaining first-hand knowledge of the key issues directly from the people involved.

- Platforms for personal advocacy of whatever issues citizens consider important, with interconnection to others who are directly and indirectly concerned with those issues.
- Dialogue with other individuals across a diverse range of views, geographic locations, institutional affiliations, and power.
- Forums for holding powerful officials accountable for their activities.
- The means for citizens to learn, choose, and become involved, "rather than merely to follow and kibitz over the political process."
- A "principled resistance" to any forces (government, corporate, special interests) that would subvert any individual's ability to contribute or seek public information.
- Channels for expressing concern about and understanding of the political environment.

This framework suggests that greater democratic participation may require a shift away from the informing to the involving information environment. Certain technological, economic, and cultural changes suggest that a shift in this direction might be underway.

Nature of Information Systems

First, we can consider the changing nature of the dominant information and communication technologies. For decades the print and electronic "mass" media have pervaded the U.S. information environment, and continue to be the main source of information for most citizens. These systems can be characterized as one-way information sources, which provide little practical opportunity for individuals to respond to the content that is presented. They are first and foremost *reproduction* and *transmission* technologies; their main strength is their ability to reproduce messages and distribute them to an enormous proportion of the general public.

This technological context has been conducive to thinking of information-seekers and users as "audiences," segments of the public that might "consume" a message. Individuals in such an environment find themselves on the receiving end of the communicative process, the targets of a dozen or so major media whose main goal is to "cut through the clutter" of the others' messages (Schiller, 1989). The repertoire of individual responses is largely limited to the consumption of messages and related products; the most powerful option open to the individual citizen is *not* consuming. In this environment, critics charge, even political activity itself has become a kind of consumption of candidates and issues that requires only opinion, not action: voting has become in essence a purchase decision. It is no wonder that the most an individual in this context can aspire to is "being informed."

However, the nature of information systems is changing rapidly. In a matter of a few years technologies have

been introduced and widely adopted which enable interaction among individuals and groups; for example, fax, electronic mail and other computer-mediated communication systems, and enhanced phone and voice mail systems. In this emerging environment, we might say that the ideal for individual behavior is "being involved"—that is, continually making and remaking the information that we share and communicate, including information about political issues, choices, and power (although, as Martinez notes in the present issue, this pattern of adoption is far from complete and is subject to a number of social and economic barriers).

Technologically, the axial principle of these new systems, and what makes them so powerful as discursive or "conversational" technologies, as Stewart Brand of the MIT Media Lab calls them (Brand, 1987), is their *switching* capacity, itself a product of computerization. That is, their strength is their ability to carry and route many different messages simultaneously and complexly from and to many locations, rather than just carrying and delivering a few messages to a broad audience.

Under the influence of new technologies, even the mass media are becoming "demassified": conventional broadcasting and print have been transformed by the switching power of cable and telephone networks. New technologies allow an unprecedented level of individual interaction and response, even to network television and radio programs, via telephone, electronic mail, fax, and other means. Indeed, new forms of programming have evolved to capitalize on this "talkback" phenomenon, including talk radio and television and home shopping networks. As Newhagen's article in this issue illustrates, this new form of "old" media may have unexpected effects on audience information uses and political action.

Likewise, in the involving environment, the "audience" concept that has been so central to the mass media also changes: the distribution of information is narrower, more specialized, and importantly, responds to specific information-seeking behavior by individuals. Indeed, even political campaigning itself has changed in response to the new technologies, which are used to gain direct contact with voters without the interpretive or agenda-setting influence of the news organizations (much to the understandable consternation of journalists). Campaigns used televised "town hall" meetings, entertainment-style talk shows with live audiences, electronic mail and computer bulletin boards, and direct satellite feeds to local television and radio stations to reach constituents. Overall, we might say that "audiences" are gradually shrinking into smaller and smaller "interest groups."

Ownership and Economics

Another arena where the shift from an informing to an involving information environment can be seen is in the economics of information and communication systems. Mass media systems are technologically complex and are expensive to develop and operate; accordingly, economies of scale have tended to encourage concentration of ownership (and a corresponding limitation of infrastructural redundancy). This produces a scenario with relatively few information sources: we might say there are few "voices" in a mass media–dominated environment. At the same time, owners and operators have borne most of the costs of these systems. For audiences, broadcasting is free, beyond the cost of the receiver; print (especially newspaper) has traditionally been cheap enough for virtually anyone to afford. Both media have kept costs low for consumers by depending on advertising revenues for most of their income.

The economics of the "new" media or information systems are somewhat different, however. The cost of a fax machine, telephone line, or a personal computer with modem and communications software is relatively low. It is fairly inexpensive to set up and run an information service, bulletin board, or news agency using these technologies. Therefore, there is a potential for a great many more "voices" to exist simultaneously. (As Dervin shows, in this issue, the coexistence of many voices is the sign of an underlying ontological relativism which, she argues, is essential for a pluralist democracy.) Moreover, in most cases, information providers charge users on a subscription or per-use basis that essentially shifts the costs to the system users. While some systems (e.g., Prodigy) also have advertising revenue, most information services depend on user fees for their income.

Content of Information Resources

The next evidence we might consider is the differences in information or communication content between the two environments. In an informing environment the few information sources are subject to the demands of sponsor/advertisers for the largest possible audience. Therefore, the media tend to be reluctant to alienate potential audience members by presenting extreme points of view that might evoke conflict.

In the informing environment, conflict or disagreement on an issue is quickly resolved in one of two ways. First, substantive differences may be transformed into entertaining (and therefore audience-building) bickering among media personalities whose "arguments" do little to inform, persuade, or otherwise advance public understanding of the issue in question. Alternatively, conflict can be managed by the rapid adoption across information sources of a consistent "line" or "spin" that tends to shut out alternative interpretations of an event or its importance. That is, information in the *informing* environment is subject to institutional gatekeeping processes involving agenda-setting or "spin control." The pressure for audience share therefore dovetails with the

agenda-setting function identified by Gurevitch and Blumler (1990). As a result the tendency of content in an informing environment is toward conflict resolution and the establishment of centrist or "consensus" views (Exoo, 1987).[1]

Content in an informing environment is also characterized by the way that "speech" is construed legally. While it is a notion that is central to U.S. First Amendment protections of communication or information content, traditionally "speech" has been treated as a property right associated with communication media or information system ownership (e.g., printing presses, radio stations, auditoria or other meeting spaces) (see Graber 1991; Katsch, 1989). Those who do not own the media have virtually no way (and, by implication, no right) to express their views, political or otherwise, to more than a few other people. Mark Graber (1991) has pointed out that this interpretation has led to a counterintuitive situation in which large corporate organizations have more ability to "speak"—and therefore more political power—than do individual citizens. Basing his arguments on the idea of the "ideal speech situation" proposed by Jurgen Habermas, Graber proposes that "speech" be reconceptualized as an inherent right of individuals stemming from their physical, social, and psychological ability to speak, instead of from their ability to own property.

The emphasis on property rights and ownership in the informing environment also has implications for content diversity. The mass media have often been criticized for the narrowness or redundancy of their content, or for the homogeneity of viewpoints they express. In periods when this lack of diversity has been perceived as an important social problem (e.g., the 1970s) and the subject of political activism, the Federal Communications Commission, Congress, and the courts have responded by providing the opportunity for more "access" to (but not necessarily ownership of) mass media systems for underrepresented groups by directing owners to allow outsiders limited use of their systems to satisfy their "public interest" responsibilities as broadcast licensees (Krasnow, Longley, & Terry, 1982). Nonetheless, this type of intervention has not resulted in much of an increase in diversity. Indeed, over the last 15 years most access requirements for broadcasters have quietly been dropped or cut back.

By contrast, in the *involving* information environment there is no necessary economic drive to maximize audience size, since system users are by definition specialized and carry much of costs of the systems they subscribe to and use. Accordingly, there is no need to drive content toward premature resolution or consensus; multiple issues and multiple perspectives about them are allowed to proliferate. Indeed, it is precisely this proliferation that provides the bulk of the content of (and interest in) new information systems. "Consumers" are simultaneously "producers" of information in this environment. As the article in this issue by Rogers et al. illustrates, when conflict does become a problem, it is resolved not institutionally, but interpersonally: participants in fax distribution lists, computer bulletin boards, and voice mail systems frequently adopt codes or rules of etiquette to govern their interactions in order to avoid personal affront or offense. But there is no attempt to impose a single interpretation or point of view on issues, as exists in the mass media. Individuals are held responsible for their own communications; offenders may be "lectured" directly by other system users or, in extreme cases, excluded from a particular network or group.

In the involving environment, because so many individuals are responsible for providing content, there may be more of a tendency to consider speech as the acts of individual speakers, along the lines of Graber's (1991) framework. Indeed, Graber argues that this approach is the only way that First Amendment rights can continue to be meaningful in an information environment filled with new interactive media, since First Amendment protections of speech, as Ethan Katsch (1989) has demonstrated, are not being extended by regulators and the courts to other media besides print and non-broadcast images.

The approach to participation also differs in this environment. Education, and not just "access" to production facilities, becomes the best means to encourage participation, both in the sense of training people how to use new technologies, and in the sense of teaching them to become better information-seekers and -users. The assumption is that being a consumer is not enough; participants must actively inquire about their interests, gather information that is relevant to those interests, and be willing and able to provide information to other inquirers.

Political Implications

Finally, we can look at the differences between the informing environment and the involving environment *vis à vis* the political activity of individuals. Given the differences already noted, we might conclude that the net political effect of an informing information environment is political stabilization and the persistent influence of certain elites. Most information is distributed in the form of a few, generally consistent messages, which are distributed *en masse* by a limited number of information systems, to relatively large portions of the public over a short period of time. Messages or issues tend to "roll over" quickly, replaced by whatever next message seems most likely to gain the attention of the greatest audience

[1] For an important polemical discussion of this phenomenon, see Herman and Chomsky (1988).

share. Individuals wishing to use different information sources or gather more complete knowledge about a subject must expend considerable time, money, and effort in the process; those who can afford to do so are most likely to gain the information advantages that bestow political influence in a competitive democratic political context.

In contrast the net political effect of an involving information environment ultimately may be destabilization. As Braman points out in this issue, the new information environment might provoke turbulence and even chaos that would give the existing form of democracy the chance to "either fall apart completely, or . . . reorganize in a new configuration made visible . . . via creativity, experimentation, and deviance" (p. ??). New information resources may enable more individuals to seek out information that concerns them directly, that is more meaningful because it can be contextualized through interaction via the same channels with others who share their concerns. New interest groups organize their efforts in order to share more information, which may contradict the messages available from mainstream media and other usual information sources. As a result of experience with the new information systems, individuals' political choices may come to reflect such emerging concerns and a suspicion of the actions of and information provided by the dominant information systems and political elites.

Of course, system availability is crucial in this scenario, as Sun and Barnett's findings so clearly demonstrate. Unless they are widely available, discursive information resources (at least the network "backbone" that connects them) are likely to be monopolized by the same elites that dominate the informing environment, as they attempt to preserve their social and political advantages. Without widespread availability and adoption of the new resources, the very possibility of the involving information environment will be subverted and the informing environment will continue to prevail for the majority of Americans. At the same time, the possibility of a shift from competitive to participative/discourse democracy, for renewal via chaos and reorganization of the political system, will have been lost.

Of course, the current open questions about information system availability (exemplified by the contested development of the "information superhighway") testify that there are powerful countervailing forces and established interests that are resisting fundamental structural or economic changes in the information environment. This resistance may prevent any meaningful shift in the present competitive political scenario, characterized as it is by competition for power and influence by a few major players on one hand, and widespread sense of alienation and disenfranchisement for most individual citizens on the other. It is instructive to note several trends:

- Media ownership patterns continue to become more concentrated, not less so. The current wave of proposed mergers between telephone and cable companies (which appears to have as a major objective the rapid privatization of the "information superhighway"), which are proceeding without notable intervention by government, indicates that diversity of ownership is not a public policy priority at the moment.
- At the same time, oligopolistic or monopolistic trends are not being balanced by the utility-type regulation that has been applied in the past to moderate the economic and political power of natural monopolies (e.g., telephone monopolies).
- System developers are tending to configure them as "product delivery" (one-way, consumption-oriented) systems, in the style of the dominant information systems of the past, rather than as interactive or conversational services, in the style of the telephone system or computer-mediated communication. They use the language of product consumption, not of dialogue, to describe new media. For example, the proponents of the Bell Atlantic/TCI merger emphasized the capacity of their new system to deliver "video on demand" and home shopping channels; the analogy they invoked for their plans was not the "information superhighway" but the "electronic shopping mall."
- By framing new information systems in product-delivery and consumption terms, owners are laying the groundwork for a revenue and rate structure that moves away from the flat-fee or subscription model of the past, such as for local telephone or basic tier cable service, and toward an increased pay-per-use (per-product) basis. Such a revenue scheme would largely discourage discursive use of the new media, much as high per-minute long-distance charges tend to discourage casual conversation.
- The persistently high price point (roughly $2,000) and training costs for entry-level computer communications technology continues to serve as a barrier keeping many middle- and lower-income people from learning about new media and information services. Put another way, over the last 15 years the price of a "starter" computer, printer, modem, and basic software has remained about the same. Personal computers have become faster and more powerful during that time, but slower machines with less memory have been taken off the market as new versions were introduced. Therefore, there has been very little elasticity of supply, and as a result buyers have had very little price flexibility at the lower end of the personal computer market.

In short, while the *technical* potential exists for a shift away from informative to discursive information resources, there are clear indicators that information/communications industry and policy interests are reluctant to let go of the economic advantages and structures of the mass media, even as they enter the new media field. The very information resources that might support a renewal of democratic participation are being organized, financed, and configured to resemble and "deliver" the

same kind of media "products" as conventional mass media. The rate-regulated utility-style framework of the telephone system, which is our principal model for conversational technologies, is being avoided in favor of a fee-per-use model. In turn, this rate structure will discourage the use of new media in discursive ways.

To conclude, the articles in this special issue show that there are reasons to be optimistic about the emergence of discursive information resources as a transformative force in democratic politics, even though all of the authors acknowledge that the potential exists for the gap between the information-rich and -poor to widen, rather than narrow, in the short term. However, we may soon see the day when most Americans consider personal computers and information networks and services to be necessities, as the telephone, newspapers, and public libraries are today. When and if such a day comes, the demand for equity of information resources will become not just an economic problem, but also a political problem. Americans will have to begin to make active decisions about what information they want, from whom, and for how much, and whether the political empowerment that comes with active information seeking is worth the personal effort.

References

Ellul, J. (1964). *The technological society.* New York: Knopf.

Entman, R. M. (1989). *Democracy without citizens.* Oxford: Oxford University Press.

Exoo, C. F. (1987). The bias of the news. In C. F. Exoo (Ed.), *Democracy upside down: Public opinion and cultural hegemony in the United States* (pp. 73–106). New York: Praeger.

Giedion, S. (1948). *Mechanization takes command: A contribution to anonymous history.* New York: Norton.

Golding, P., & Murdock, G. (1986). Unequal information: Access and exclusion in the new communications market place. In M. Ferguson (Ed.), *New communication technologies and the public interest* (pp. 71–83). London: Sage.

Graber, M. A. (1991). *Transforming free speech: The ambiguous legacy of civil libertarianism.* Berkeley, CA: University of California Press.

Gurevitch, M., & Blumler, J. G. (1990). Political communication systems and democratic values. In J. Lichtenberg (Ed.), *Democracy and the mass media* (pp. 269–289). Cambridge: Cambridge University Press.

Habermas, J. (1979). *Communication and the evolution of society* (T. McCarthy Trans.). New York: Beacon Press.

Habermas, J. (1989). *The structural transformation of the public sphere: An inquiry into a category of bourgeois society.* Cambridge, MA: MIT Press.

Hagen, I. (1992). Democratic communication: Media and social participation. In J. Wasko and V. Mosco (Eds.), *Democratic communications in the information age* (pp. 16–27). Norwood, NJ: Ablex.

Herman, E. S., & Chomsky, N. (1988). *Manufacturing consent: The political economy of the mass media.* New York: Pantheon.

Hochschild, J. L. (1981). *What's fair? American beliefs about distributive justice.* Cambridge, MA: Harvard University Press.

Katsch, M. E. (1989). *The electronic media and the transformation of law.* New York: Oxford University Press.

Krasnow, E. G., Longley, L. D., & Terry, H. A. (1982). *The politics of broadcast regulation* (3rd ed.). New York: St. Martin's Press.

Postman, N. (1992). *Technopoly.* New York: Vintage.

Schiller, H. (1989). *Culture inc.: The corporate takeover of public expression.* New York: Oxford University Press.

Winner, L. (1977). *Autonomous technology: Technics-out-of-control as a theme in political thought.* Cambridge, MA: MIT Press.

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