Toward a Critical Rhetoric of Risk Communication: Producing Citizens and the Role of Technical Communicators

Jeffrey T. Grabill
Georgia State University

W. Michele Simmons
Purdue University

In this article, we build on arguments in risk communication that the predominant linear risk communication models are problematic for their failure to consider audience and additional contextual issues. The "failure" of these risk communication models has led, some scholars argue, to a number of ethical and communicative problems. We seek to extend the critique, arguing that "risk" is socially constructed. The claim for the social construction of risk has significant implications for both risk communication and the roles of technical communicators in risk situations. We frame these implications as a "critical rhetoric" of risk communication that (1) dissolves the separation of risk assessment from risk communication to locate epistemology within communicative processes; (2) foregrounds power in risk communication as a way to frame ethical audience involvement; (3) argues for the technical communicator as one possessing the research and writing skills necessary for the complex processes of constructing and communicating risk.

Since the 1960s there has been an increasing concern for the environment in the United States. A number of risk communication scholars credit the 1962 publication of Rachel Carson's *Silent Spring* with launching the contemporary environmental movement (Belsten; Rubin and Sachs). In *Silent Spring*, Carson detailed the dangers of pesticides that accumulate in water, soil, and food, and as a result, generated a public awareness of environmental hazards. This awareness was heightened in 1969 when a series of environmental dangers plagued the nation, including the Santa Barbara oil spill, the

Fall 1998, Vol. 7, No. 4. (415-441)

seizure of eleven tons of salmon in Wisconsin and Minnesota due to excessive DDT concentrations, the Cuyahoga River fire in Cleveland, and the smog alert days in Los Angeles when health officials suggested that children not play outside (Belsten 30; Rubin and Sachs 54). The year 1970 brought the first Earth Day, and a "call for new initiatives to resolve environmental problems" (Belsten 30). The public was no longer content to leave the fate of human health and the environment to government and scientific experts. Communities demanded an explanation of what risks were present, and what was going to be done about those risks. When the U.S. congress began passing environmental regulations that provided for public involvement, such as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980, the public legally became an important component in the decisions of environmental management. Risk communication evolved out of the need for risk managers to gain public acceptance for policies grounded in risk assessment methodologies. However, conflicts began to arise between the quantitative approach to risk assessment—the characterization of the potential adverse health effects based on an evaluation of results of epidemiological, toxicological, and environmental research—and the public's perceptions of risk (Plough and Krimsky). As a result, experts in risk assessment and management worked to design models for effectively and efficiently explaining risk to the public—risk communication.

Although Craig Waddell argues that communicating the risk of both natural hazards and consumer products is "an increasingly important aspect of the work of both technical experts and professional communicators" (*Risk Communication* 1), risk communication has been investigated primarily by communication, cognitive psychology, and risk assessment scholars. Too many of these approaches to risk communication have been arhetorical—typically decontextualizing risks and failing to consider social factors that influence public perception of risk. Such a characterization of risk communication has been used to explain why communication problems arise—either audiences fail to understand risk and/or they reject what they are hearing (see, for example, Belsten). In this article, we build on arguments in risk communication that the predominant linear risk communication models are flawed for their failure to consider audience and additional contextual issues. We argue, following scholars like Craig Waddell and Barbara Mirel, that risk is socially constructed, and the failure to see risk as socially constructed leads to an artificial separation of risk assessment from risk communication. This separation can lead to unethical and oppressive risk communication practices because the public is separated from fundamental risk decision making processes. The claim for the social construction of risk has significant implications for both risk communication and the roles of technical communicators in risk situations. We frame these implications as a "critical rhetoric" of risk communication that (1) dissolves the separation of risk assessment from risk communication to

locate epistemology within communicative processes; (2) foregrounds power in risk communication as a way to frame ethical audience involvement; and (3) argues for the technical communicator as one possessing the research and writing skills necessary for the complex processes of constructing and communicating risk.

Institutions of Truth: The Production of Risk

Three disciplines contribute to much of the risk communication literature: risk assessment, cognitive psychology, and communication. While each has made significant contributions to the field of risk communication, each has to some degree contributed to the positivist positioning of most risk communication studies. We argue that it is important to examine these disciplines and related institutions in an effort to understand how hierarchies of power are established and exercised through each. Foucault asserts that institutions exercise power by regulating and constraining knowledge-making, production, and consumption through a system of rules and practices. Foucault also argues that by understanding the ways in which power is exercised, and looking for gaps in this system, we can work toward resisting, even altering these unequal power relations. An examination of the institutions currently contributing to risk communication will reveal that each still grants asymmetrical power in decision making processes to experts, and that this asymmetry serves to mask the complex ways knowledge about risk is socially produced. Our purpose here is to foreground the institutional and disciplinary production of knowledge about risk in order to look later for gaps or "space" within these systems for change. (The concept of "the institution" is important, and we explain our use of the term in more detail later in the article. Here we use the concept of "institution" in two senses, as a discipline [or regular, shared ways of producing and distributing knowledge] and as an organization [or bureaucracies with policy and decision making power]. Our concern at this point in the article is with the interrelationships between disciplines and organizations that mark the institutionalization of knowledge production and policy making about risk).

The first and still prominent contributor to knowledge about risk communication is risk assessment. Scholars of risk assessment work to identify and quantify risk to human health and the environment to determine the probability of accidents or the spread of disease. Risk assessment develops scientific methods for generating an assessment of risk. Regulatory agencies—in the decision making processes of risk management—evaluate and compare remediation options in order to select an appropriate regulatory response to a potential hazard (National Research Council). Risk assessment is commonly located within private and governmental institutions that create risks or regulate them. Because risk assessment is a function of scientific and

technological disciplines and experts, the access of others to these institutions is necessarily limited. When environmental regulations such as CERCLA began mandating that the public be involved in approving the risk policy, risk assessors began developing models of risk communication (Hance, Chess, and Sandman; Slovic). While the risk assessment literature promotes public inclusion in decision making about handling a hazardous waste site or risk situation, it asserts that the solution lies in educating the public and bringing public perception into conformity with scientific rationality. For example, an early and still dominant definition of risk communication adopted by the Environmental Protection Agency (EPA) asserts that risk communication is "the act of conveying or transmitting information between interested parties about levels of health or environmental risks; the significance or meanings of such risks; or decisions, actions or policies aimed at managing or controlling such risks" (Corvello, Sandman, and Slovic 112). Scientists and government officials who advocate this definition believe that making the public understand the risk will bring citizen approval. Risk is determined by experts and communication is the transfer of information from those who produce knowledge to those who consume it.

When researchers in risk assessment began to realize that the public rarely perceives risk the way risk assessors do, they began working with researchers in cognitive psychology to explain the discrepancies between "expert" assessment and public perceptions of risk. As Barbara Mirel explains,

> Because psychological theorists of risk see that an individual's outrage about risk is generated by cognitive reactions to social and ethical interests, they argue that the goal of risk communication must not be to educate citizens in expert "facts" to change their opinions but rather to evoke dialogue through a focus on the sources of a particular audience's outrages and fears. (45)

Together, scholars in risk assessment and cognitive psychology adapted psychometric scales to predict how public audiences would react to specific risks. Paul Slovic explains that psychometric scales

> ask people to judge the current riskiness (or safety) of diverse sets of hazardous activities, substances, and technologies, and to indicate their desires for risk reduction and regulation of these hazards. These global judgments have then been related to judgments about the hazard's status on various qualitative characteristics of risk. (408)

Risk communicators currently use psychometric risk factors to determine how best to adapt their initial message to the public and how to negotiate the decision making process (Slovic). However, these factors focus primarily on the risk itself, not the public or on a range of other contextual issues. For example, a person might be asked to rate the hazard of living near a chemical company that produces toxic chemicals on a scale for nine different attributes. Attributes include

how well known the hazard is to the person, how harmful the effects of the hazard would be, how frightening those effects are, how easily those effects can be controlled, how easily the hazard itself can be avoided, and so on. Risk is then characterized with reference to these attributes. Health assessors consider these risk types static and universal perceptions. As a result, they often approach risk similarly in all communities, often leading to inappropriate policies and hostile reactions from involved citizens (see, for example, Ross 176).

Slovic argues that one generalization that can be drawn from psychometric studies is that "Perceived risk is quantifiable and predictable. Psychometric techniques seem well suited for identifying similarities and differences among groups with regard to risk perception and attitudes" (408). We argue, however, that these generalizations pose a problem for risk communication because these labels, which try to provide objective estimates for the public's "irrationalities," often take on ontological status and do not account for differences across communities. People's risk perceptions are determined by real and localized situations, not hypothetical, decontextualized questions on psychometric scales. Barbara Mirel argues likewise:

> [S]ome researchers claim that such psychological theories are too limited for the needs of risk communication. They argue that by using the individual as the unit of analysis, psychological theories fail to capture critical social and cultural influences, influences that will not be adequately addressed by communications simply oriented to outrage factors. These critics see social and cultural structures and relationships as the units of analysis, contending that perceptions of risk are constructed and perhaps even determined by membership in certain social and cultural groups. (45)

When some of these factors are disregarded in the decision making process, the conflicts that result are conflicts over the very "truth" about risk. As Mirel argues, the "'real debates' going on in risk controversies . . . are over the institutions that different groups set up as 'decision processors' . . . questions about the distribution of power, the credibility of authority, and the legitimacy of decision making practices and procedures" (47). Methodologies drawn from cognitive psychology, like psychometric scales, do include public perception in the decision making process, but they deny citizens any real power in determining what factors should shape the risk policy. Here again, the institutional location of knowledge production is important. There are clear lines between knowledge producers and consumers, with citizens playing only limited roles in the construction of risk.

In addition to risk assessment and cognitive psychology, communication studies has contributed significantly to our knowledge of risk communication. Typical approaches in communication are encouraging in that they see risk communication as a two-way process—asserting that all involved parties have valuable information to contribute in decision making processes. However, with some exceptions (Juanillo and Scherer; Rowan "What Risk," "Goals," and "The

Technical"), many studies attempt to establish rules and canons for effective communication that fail to acknowledge that social factors play a significant role in the public perception of risk and therefore should be considered in decision making processes (Adams; Heath and Nathan; Castelli). Work in communication, then, makes a significant start toward relocating aspects of risk assessment. However, little research has been done on these social factors, and therefore, little work has focused on how public perceptions and different interests, values, emotions, and rationalities can be incorporated into current institutional locations and practices of knowledge production about risk. Currently, risk assessment is separated from risk communication, and both stand in a more powerful (and removed) relation to the public. Understanding the exclusion of citizens from meaningful participation in the construction of risk itself is an important step toward understanding why many in risk communication feel it fails too often (e.g., Belsten). These institutionalized sites of knowledge-making, we will argue, constitute a location for changing risk assessment and communication.

Current Approaches of Risk Assessment and Communication

The institutional positioning of risk assessment, management, and communication is important for understanding how issues like risk, theories of communication, and audiences are perceived. The positions of risk assessors and communicators within industry and government often give a "practical" edge to published discussions of past risk situations or new models and tactics for future success. And it is in the practice of risk communication that most observers see systematic problems. Laura Belsten, for example, writes that the practice of environmental risk communication has "failed miserably," largely because agencies and firms dealing with risk decision making have excluded the public (31). She writes that most government agencies and private firms adopt some version of a "decide-announce-defend" policy in which decision making (risk assessment) happens behind closed doors with risk communicators then charged with defending the decisions to a sometimes hostile public. In this process, soliciting public comment happens only after the real decisions have been made. Belsten writes that the public's only recourse is to challenge decisions made for (and to) them in court or through public pressure on politicians, resulting in costly, time-consuming, and ineffective public policy processes (31-32).

The ineffective practice that Belsten describes is closely connected to the models of communication that inform practice. There are a number of models for risk assessment and communication to be found, and we think these models—to the extent that they are connected to practice—are descriptive of work in risk assessment and communica-

tion. Our review of the literature turns up four distinct models linked to risk communication, but here we have collapsed them into two categories. The first category we call "technocratic" approaches, a term we take from Waddell ("Saving") to describe positivistic, linear (one-way) approaches to risk communication. The second category we call "negotiated," a term we think describes a set of approaches developed as a critique of technocratic positions. Negotiated theories tend to work on an explicitly "democratic" model, yet as we will show, are still largely linear (and therefore limited) in their view of communication.

Technocratic Approaches

The technocratic approach is generally understood as a one-way flow of technical information from the "experts" to the public (Fiorino; Rowan "Goals"). In the technocratic approach, risk communicators strive to educate/influence the public to think about risk the way experts do (Plough and Krimsky 304). Technical aspects of risk, not the values, concerns, fears, and opinions of each local community are considered during decision making processes. This is a vision of communication with a long history. Before CERCLA, health assessors determined the quantitative risk of a hazard and dictated to the government or responsible industry how to alleviate that risk. The public, their concerns, questions, and opinions were excluded from the decision making process. Even after CERCLA, health assessors have had a difficult time understanding how to involve the public in the decision making process. The difficulty rests in the problems of accounting for a range of social, economic, cultural, political, and psychological factors in the largely quantitative decision making models used in risk assessment. For example, Steven Katz and Carolyn Miller, in their examination of a waste siting controversy in North Carolina, assert that in decision making contexts "risk communication developed as an attempt to overcome these differences by 'correcting' the public's 'risk perceptions' so that they would better match the 'risk analyses' made by the experts" (116). Therefore, when there are conflicts between the determined risk of a situation and the public's perception(s) of that risk, the problems that result are constructed as problems of communication (e.g., lack of information). For example, Stratman et al. cite Milton Russell, an EPA administrator for policy, planning, and evaluation as characterizing the risk communication process in terms of a metaconduit model:

> Let's imagine risk reduction as a consumer-driven production and distribution process. Scientists, who assess the severity of the risks, are the manufacturers. Government regulators, who make risk management decisions, are the wholesalers. And professional communicators—network and newspaper journalists—are the retailers. We government regulatory wholesalers use risk characterizations from the scientists to explain the reasons for our decision.

> Then journalistic retailers pick up our product on the loading dock . . . [and] they present the news of the day. Based on those presentations, consumers of the news decide to buy the news or not, use it or misuse it, and change their behavior or demand that public officials change theirs . . . . If citizens misjudge risk, their orders will still come through, and the government machine still delivers, but the results don't necessarily leave citizens better off. (qtd. in Stratman et al. 10)

The model of communication here is strikingly similar to Shannon and Weaver's model. Knowledge is constructed prior to communication, and miscommunication is attributed to "noise" (or irrationality) along a one-way, linear channel. The "technocratic" approach of communication, then, sees risk as determined by experts prior to communication. "Effective" risk communication is the result either of transferring information to a public that understands and accepts it, or in some formulations, persuading the public to accept a given risk (see Sandman). In either case, knowledge is "scientifically" produced prior to communication, communication itself is largely linear, and audiences are seen as needing education and/or persuasion—management—and not as participants in the rhetorical construction of risk (see Porter, *Audience*, Chapter 3, for a discussion of audience management).

Negotiated Approaches

What we call "negotiated" approaches are actually a set of models that were developed as a critique and alternative to technocratic risk communication. They begin by questioning the technocratic assumption that risk assessment can be determined based solely on a defined set of principles and scientific norms independent of cultural values. Alonzo Plough and Sheldon Krimsky characterize the technocratic approach as one where "perceived responses to risk are important only in understanding the extent to which ordinary people's ideas deviate from the truth . . . from the perspective of technical rationality, risk can be studied independently of context" (305). Thus, scholars like Plough and Krimsky seek to solve communication problems through a more negotiated, two-way approach to risk.

Belsten's solution for poor risk communication is to offer a theory of "community collaboration," and we think her work is representative of useful negotiated approaches. Belsten's work rests on theories of public collaboration in public policy decision making (36). She argues, quoting others, that "collaboration occurs when a group of autonomous stakeholders of a problem domain [are] engaged in an interactive process, using shared rules, norms, and structures, to act or decide on issues related to that domain" (37). Anyone who is affected by a given risk is considered a stakeholder, and community collaboration only works when a high degree of participation is included in public decision making about risk. In addition, stakeholders are

included early in the process and have the option to say "no"—the acceptance of a given risk is voluntary (37-39). Negotiated approaches are important for their recognition of audience/the public as important participants in decision making processes. Furthermore, such approaches are useful in their recognition that participation must be wide-spread and take place early in decision making processes. Some scholars (e.g., Rowan "The Technical"; Ross) ground their work in a powerful theory of communicative ethics, usually Habermas. At its best, work relying on Habermas argues that decisions made currently within technical realms (e.g., administrative bureaucracies) should be deliberated publicly (see Blyler). The turn to Habermas makes sense; it is an attempt to argue questions of civic concern within a framework of discourse ethics that seeks to prevent coercion. But we see limitations with Habermas, and by extension, with the solutions of many negotiated approaches. Habermas argues that only when a decision emerges from an argumentative discourse situation that is in accordance with the pragmatic rules of discourse is the result ("norm") justified (71). His rule-bound procedure ("practical discourse") "insures that all concerned in principle take part, freely and equally, in a cooperative search for the truth" (198). But Habermas's system of argumentation is idealized; participants in a "real" risk situation are not free and equal, and despite the Habermasian rules for what "should" structure ethical communication, risk situations rarely, if ever, approximate his ideal. In short, negotiated approaches are problematic for their failure to include a notion of power, and therefore, we are suspicious that they are capable of changing risk communication practice. As we argue for risk as socially constructed, we are looking toward an approach to participatory decision making that links a theory of power (and powerlessness) to the exercises of power involved in knowledge production (risk assessment/communication).

Risk as Socially Constructed

Our claim is that the risk of a given situation is socially constructed by a number of interests and factors. Indeed, when there are disputes and communication "problems" in a risk situation, we suggest that what is happening is not problematic or an impediment to be overcome. Rather, these problems are a public contestation over the meaning of risk—the "truth" about risk is actually a product of such disputes. Our concern with the social construction of risk, however, extends beyond epistemology. As disputes about risk are characterized by interactions between interests more and less powerful, the failure to account for power in decision making about the meaning of risk—a failure of both technocratic and negotiated approaches—can lead to the "oppression" of (typically citizen) audiences. Conceptualizing risk as socially constructed is important because (1) it locates knowledge-making within communication processes, and (2) it considers how

power is differentially exercised in such processes.

As we have suggested, one of the problems associated with linear approaches to risk communication is the artificial separation of risk assessment from risk communication. This separation prevents a view of risk as socially constructed because knowledge production is not a function of communication processes. Rather than fostering an exchange and collaborative generation of knowledge that contributes to public policy, the technocratic approach, for example, sees the audience as consumers of information to be considered after decisions have been made. This audience-as-consumer stance is reflected in current CERCLA regulations on public participation and in Belsten's descriptions of typical practices, where public approval must be gained, but only after policy decisions have been made. The CERCLA section on public participation states that "before adoption of any plan for remedial action to be undertaken" the appropriate party must take both of the following actions: "(1) Publish a notice and brief analysis of the proposed plan and make such plan available to the public. (2) Provide a reasonable opportunity for submission of written and oral comments and an opportunity for a public meeting at or near the facility at issue regarding the proposed plan and regarding any proposed findings" (42 U.S.C. section 9617 CERCLA section 117). Further, a transcript of the meeting must be kept and made available to the public. While CERCLA section 117 (a) states that the analysis of the proposed plan must include "sufficient information as may be necessary to provide a reasonable explanation of the proposed plan and alternative proposals considered," public opinion does not have to be solicited or incorporated into the initial decision making process (42 U.S.C. section 9617 CERCLA section 117). This separation of assessment and communication denies the public the ability to actively participate in the production of public policy, too often resulting in public objections to policy and resistance to implementation (see Katz and Miller; Rowan, "What Risk"; and especially Stratman et al.).

The positivist view that science discovers an objective Truth through a rational, linear process has been called into question by many (e.g., Kuhn; Latour) who argue that knowledge is not an accumulation of facts that progress toward the Truth but is rather a collection of perceptions that are agreed upon by a discourse community. Rules for how science is conducted or how theory choices are made are negotiated by the practitioners of a community who hold to a shared set of methods and beliefs. The progression toward increased public involvement in the decision making about risk is contingent upon the concept of scientific knowledge shifting toward a negotiated understanding, a shift contingent upon creating a space within "the community" of risk assessors for "others." As a result, what some see as the problems of public outcry against risk assessments or policies can also be seen as the construction of "risk" itself. In this manner, risk communication becomes a complex web of issues and participants that

work together to construct a risk policy. Similarly, Craig Waddell argues that

> risk communication is not a process whereby values, beliefs, and emotions are communicated only from the public and technical information is communicated only from technical experts. Instead, it is an interactive exchange of information during which all participants also communicate, appeal to, and engage values, beliefs, and emotions. Through this process, public policy decision are socially constructed. ("Saving" 142)

Rather than a linear flow of technical information from the risk assessors to the public, risk communication becomes a web, a network, an interactive process of exchanging information, opinions, and values among all involved parties. In contrast to all linear models, this approach flattens the hierarchy between the "expert" and "non-expert" and believes risk assessment must incorporate technical information about a risk within a broader framework, including social, political, and economic factors. Recently, similar socially constructed views of risk communication have been promoted by scholars such as Rowan ("Goals"); Juanillo and Scherer; and Plough and Krimsky. Additionally, Katz and Miller see this approach to risk communication as fostering participatory democracy, emphasizing "process more than results, with participating citizens gaining not only results but satisfaction and investment from their engagement in decision making" (133-34).

If, as we have argued, risk is socially constructed, then the separation between expert/public and assessment/communication cannot hold. We have constructed the separation of assessment and communication as a linear process of research and dissemination (see Figure 1).

According to this representation, the processes of risk assessment

Figure 1. Traditional Risk Assessment and Communication

and communication are linear and sequential, and the risk assessors are typically "experts": scientists, statisticians, actuaries, economists, public health officials. Our characterization is not meant to dismiss or demean the expertise, insight, and inquiries of intellectuals involved in risk assessment. Their work and expertise is crucial to the process. We are not arguing that risk assessment be thrown out, but rather that additional knowledge be added to the mix. Because, as we will argue, citizens are capable of contributing valuable knowledge to the decision making process, we do want to call into question the exclusive domain accorded risk assessors and the power of the expertise granted them. (As Winner argues, as groups contest public decision making about technologies, each often produces a set of experts who can differ widely on a given "scientific" question. Such a situation results in "[1] futile rituals of expert advice and [2] interminable disagreements about which choices are morally justified" [75]. The result is continual use of conflicting "expert" advice, tangled ethical and moral discussions about the design and use of technologies, and a range of intractable problems. Winner concludes that "political disputes about technology are seldom if ever settled by calling upon the advice of experts" [76]. In this way, Winner *dispenses* with expert opinion, at least in terms of the status typically given to experts.) Such a situation allows an arbitrary line to be drawn between assessment and communication activities, and such a line serves as a false border with epistemology linked to science on one side, leaving an impoverished rhetoric of "arrangement" and "style" on the other. The effect of this separation between assessment and communication is to frame communication in ways we have discussed earlier: risk communicators are given the task of disseminating information (the truth about risk) to various public audiences. The resulting rhetoric of risk communication—stripped of its epistemological possibilities—has at its goal the creation of consent, either via belief in the truth of the information or a range of persuasive strategies (see Katz and Miller). The problems risk communicators face often stem from the fact that the public resists their separation from the processes of risk assessment and their passive role in these processes, and their resistance takes the only form available—rejection of risk communication and communicators (see Rowan, "What Risk," for examples of such rejection). (Stephen Doheny-Farina sees a similar problem in the area of technology transfer. He focuses on the notion of "uncertainty" in the largely linear communication models involved in technology transfer [uncertainty=difference between information needed and information available]. He writes that the theory of communication that underlies most practice separates knowledge [and knowledge production] from communication and sees knowledge as produced by experts in a realm separate from audiences and non-experts. In this way, knowledge becomes a commodity [8-9]. When communication is successful, there is little uncertainty and the "truth" is well-received. When there are problems, "the concept of uncertainty indicates that the communication

problem is not one of meaning but one of the availability of the correct information" [9]. Doheny-Farina's description of the status of knowledge and models of communication in technology transfer describes how communication "problems" are constructed in technocratic approaches to risk assessment and communication.) Seeing risk as socially constructed situates knowledge making and audiences within communication processes.

The notion of risk as socially constructed also asks us to foreground power. While often alluded to in risk communication scholarship, "power" strikes us as the most undertheorized issue in the risk communication literature. In our view, technocratic approaches of risk communication can easily (and perhaps necessarily) oppress audiences. And even "negotiated" approaches are problematic because they tend to assume equal power relations within processes of negotiation. We take our notion of power and oppression from Iris Marion Young because it is directly connected to our central concern with participation in decision making. Domination and oppression are key terms in Young's work because they allow her to name certain practices "unjust" outside a distributive framework. For Young, domination occurs when people are systematically excluded from "participating in determining their actions or the conditions of their actions" (31). In many ways, most people are dominated in some aspect of their lives, usually at work or school—institutional systems that often do not allow people fundamental access to decision making. Young argues that the powerful draw on the resources of an institution through the everyday practices of the institution, thereby maintaining and extending their power. This is precisely what happens when experts, committees, or closed agencies control the decision making processes involved with risk assessment/communication (see Katz and Miller; Waddell "Saving" and "Defining"). To act powerfully within an institution, then, requires *access* to everyday processes and practices. James Porter writes that access can mean three things, infrastructural access (access to resources), literacy (education), and community acceptance (*RHETORICAL ETHICS*). In the sense in which access is important for decision making about risk, infrastructural access means access to the processes of decision making within an institution, literacy means the discursive means to participate effectively, and acceptance refers to a "listening stance," or a commitment to collaborative decision making. Access means not only "a place at the table," it means the rhetorical ability to participate effectively and the structured requirement that others listen.

For Young, oppression is a qualitatively different experience than domination. An oppressed group need not have an oppressing group; oppression is structural and relational as well as material and often the result of "humane" practices and intentions. In Young's schema, oppression has "five faces," yet we believe one is particularly relevant to risk communication—powerlessness. According to Young, powerlessness is an oppression that is the result of a lack of participation and

a reliance on hierarchy. Many people have some power in relation to others. Young argues, however, that

> The powerless are those . . . over whom power is exercised without their exercising it; the powerless are situated so that they must take orders and rarely have the right to give them . . . [a] social position that allows persons little opportunity to develop and exercise skills. The powerless have little or no work autonomy, exercise little creativity or judgment in their work, have no technical expertise or authority, express themselves awkwardly, especially in public or bureaucratic settings, and do not command respect. (56-57)

The powerless, in other words, lack all three forms of access and therefore have little chance to change their position.

We believe that in order to be ethical and nonoppressive, decision making processes in risk assessment/communication must consider not only the scientific assessment of the risk posed, but also the values, emotions, and concerns of *all* involved parties, with preference given to the input of the less powerful (e.g., citizens, particularly those typically underrepresented). This interactive exchange of information among parties is a complex process that a linear model of risk assessment and then communication cannot accommodate. Rather, we envision risk communication as an intricate web of issues and participants that socially constructs policy. What we envision, namely, is a critical rhetoric of risk communication that sees risk as constructed socially and the *processes* of construction as the focus of concern.

Research and the Technical Communicator: Toward a Critical Rhetoric for Risk Communication

A critical rhetoric for risk communication would be based on the following principles. First, it sees risk as socially constructed and rhetorical—an epistemic rhetoric that focuses on the construction and communication of risk. The meaning and value of risk in a given situation is a function of multiple and sometimes competing discourses. In this way, controversy about risk is reframed not as a problem or a negotiation between two parties (the risk maker and the audience) but as a complex web of stakeholders and positions that contribute to the meaning of risk in a given situation. Second, a critical rhetoric focuses on the processes of decision making, seeing these processes as the key institutional locations for knowledge making (e.g., within government agencies or legislation). In particular, a critical rhetoric focuses on the relations of power within decision making processes, asking questions about who participates and in whose interests decisions are made. And third, a critical rhetoric seeks to contextualize and localize risk situations and processes, a function both of its rhetorical approach and its concern with local participa-

tion. By contextualizing risk, a critical rhetoric counters the tendency to develop "scientific" and universal models of assessment and communication that treat risk algorithmically and audiences as universal, rational, and therefore silent. Viewing "the public" as universal and reasonable, traditional risk communication theory privileges logos and assumes all audiences think alike—that all rational individuals will be swayed by the same evidence. (We have a problem with the concept of "the public," and it is a problem we fail to solve here. In fact, quite the opposite is true. We have recourse to a [false] concept of "the public" as a rhetorical counter to "experts," but we believe the concept of "the public" to be largely fictional. The subject position of "the public" as coherent, unified, and identifiable strikes us as an unhelpful decontextualization of the people affected by a given risk and therefore important participants in the construction of that risk. Our hope is that the critical rhetoric we outline here necessarily asks risk assessors and communicators to help identify various "publics" and to take seriously the differences of a given town, neighborhood, or community.) In addition, by contextualizing risk, assessors and communicators must consider a range of issues related to the relationships of individuals to the social institutions involved in a given risk situation. Such a consideration would necessarily examine concepts of race, class, gender, and other issues important to a given community in the assessment and communication of risk, issues too little considered in the risk communication literature but which are nonetheless deeply relevant. An investigation of these factors hopefully would work to inform a more ethical approach to risk communication, uncover the suppressed voices in risk communication approaches, and be a starting point for improving the present condition of how certain groups are excluded from the decision making process in risk communication.

In effect, by changing the processes we are looking toward more "democratic" and *effective* assessment and communication. However, we must be cautious in our use of the term democratic. In one sense, the technocratic approach is democratic because the public is involved in the last stage of the communication process—this is the participation of liberal democracy and interest-group politics (see Patterson and Lee). We are arguing for an approach that fosters *participatory* democracy; one that involves the public in fundamental ways at the earliest stages of the decision making process. Rather than telling the public about a risk or a decision, we are arguing for an approach that allows the public to actively participate in producing the policy itself. An approach that fostered participatory democracy would grant the public—and their contributions to the policy—equal and sometimes preferential status with the technical experts and their contributions. If we accept that citizens should be able to participate in decisions that affect themselves and their communities, and that they, themselves, are the best judge of their own interests, then we see that the technocratic approach is incompatible with participatory democracy. And because negotiated approaches often fail to account for asymmetries of power and conceptualize a limited number of stakeholders, we also see

them as useful but limited. A critical approach, in short, seeks to solve problems of omission (e.g., people, positions, ways of knowing and talking), domination (e.g., failure to acknowledge differences in power), and indeed oppression. We think a critical approach will lead to *better* risk communication.

Research and the Technical Communicator

In their critique of the "environmental rhetoric of 'balance,'" Robert Patterson and Ronald Lee argue that the appeal to "balance" in the regulatory and political discourse connected to the Kingsley Dam relicensure "procedurally diminish[es] the public" (26). Patterson and Lee write that the processes of decision making in relicensure procedures are concerned with identifying interests and then gathering information from these interests. The problem is that "the public" does not participate in these decision making processes but rather is represented and seen as "consubstantial" with the organized interest groups capable of generating the expertise and access necessary to participate in decision making (28-29). In this respect, Patterson and Lee argue that "the subjective experience and moral reflection of ordinary citizens are discounted" (29).

We agree with their reading of this decision making process but feel that their characterization exposes an even deeper problem of representation and participation. The process they describe is democratic—citizens, through organized representation, can and do participate in public policy decision making. However, the very notion of "the public" is a representation. For us, the problem, then, is not representation, but what kind of representation and how that representation takes place. Is it possible, in other words, to construct risk communication practices that allow citizens (various publics) to represent themselves in decision making processes and thus add more of a participatory element to our current (and limited) representative participation in decision making about risk? We think it is possible and look to the skills of the technical communicator to help articulate such a view.

As a way to conceptualize how a critical rhetoric of risk communication can be implemented, we want to reconceptualize risk communication as a type of technical communication. But beyond this, we are interested in a more research-driven, analytical role for the technical communicator, one that we hope can help break down the line between risk assessment and communication.

There seems little question that technical communication has been changing due to changes in communications technologies and the political economy. Dan Jones writes that new technologies are challenging the professional identity of technical communication, but he also asserts that changes driven by these new technologies do not take technical communicators away from a central purpose and expertise as advocates for users. To this discourse of professional

change, Johndan Johnson-Eilola adds more fundamental changes in the political economy that have altered the value and nature of production from industrial production to information exchange. Johnson-Eilola argues for the necessity of relocating the value of technical communication by reframing it as "symbolic-analytic" work that "mediates between the functional necessities of usability and efficiency while not losing sight of the larger rhetorical and social contexts in which users work and live" (246). Johnson-Eilola's contextualization of technical communication is an important move because it forces technical communicators to wrestle with tough intellectual, ethical, and political issues.

We are interested in his adaptation of Reich's symbolic-analytic worker because such a framework describes, we believe, the complexities involved in risk communication—a type of symbolic-analytic work—and therefore articulates a connection between the research burdens of risk communication and the technical communicator. In Johnson-Eilola's adaptation of the symbolic-analytic worker as technical communicator, he lays out a set of characteristics that we believe are important for seeing the technical communicator as a key player in risk assessment/communication situations. Johnson-Eilola writes that the technical communicator as symbolic-analyst works with information and produces a wide range of documents in a variety of media–typical for most professional communicators. The symbolic-analyst, however, is also capable of "experimentation," "collaboration," "abstraction," and "systems thinking." In other words, the technical communicator as symbolic analyst can conduct research, work with others from multiple specialties, "discern patterns, relationships, and hierarchies in large masses of information" (Johnson-Eilola 260), and think systematically in ways that construct relationships between disciplines and within messy situations. Furthermore, the technical communicator as symbolic analyst retains an advocacy role. While many professionals function as hired advocates, we want to retain the historical advocacy for "users" that is common to the ethos of technical communicators and expand that notion of advocacy to include those who normally do not hire professionals (e.g., citizens or "the powerless"). The connection of some of the symbolic-analyst's characteristics to risk communication is obvious. But we are particularly interested in crossing the gap between assessment and communication, and we think the research capabilities of the symbolic-analyst allows the technical communicator to cross that gap, an issue that warrants further discussion.

Usability Research: Participation and Epistemology

While risk assessment may traditionally be done by biological and chemical scientists, actuaries, statisticians, and psychologists, the technical communicator as symbolic analyst can add research practices other specialists cannot provide. In particular, it is the technical

communicator who can insert the audience/public/citizens directly into the risk assessment process through usability testing. We are not talking about usability strictly in terms of document production (although we are not excluding this). Rather, we are looking toward a wider range of research practices—a range of contextual interviewing and observation practices in particular—that necessitate researchers work *with* audiences in the construction of knowledge (e.g., risk). For example, Katherine Rowan ("Goals") asserts that in order to create awareness and concern about a risk, messages from all parties must be detectable, decodable, and considerate to all. Usability testing could examine such messages as well as their delivery mechanism in order to facilitate a more effective negotiation and decision making process among involved parties.

Usability is powerful because we believe that "users"—citizens, the public, stakeholders—have important knowledge often excluded from decision making, and it is this "user knowledge" that usability testing can get to. The analogy we are making here is that the user of technologies and documents found in most usability work is like the "user" of technologies and documents in risk situations. In this case, members of a given community are "users" of the public spaces and environmental resources as well as the risk communication distributed to them. But more importantly in our view, users in all contexts are *potential* participants in decision making about technologies—from computer interfaces and documentation to waste incinerators and construction projects. We feel they should be *actual* participants, and in this regard, we want to use Bob Johnson's work to develop a notion of user knowledge for that participation.

Johnson writes that most users are perceived as "dumb," at the "bottom of the proverbial epistemological ladder," and therefore designers of technologies seek to "idiot-proof" technologies to keep users out of harm's way. In contrast to this, Johnson believes that users are productive and therefore "have a responsibility for the design and implementation of technology" (57). He continues,

> The reason for the absence of discussions of users and use runs deep in the history of western culture, and at the root is the question of ownership of knowledge—in short, the question of epistemology. Who creates knowledge? Is it created only by those who we generally equate with knowledge, like philosophers or scientists? Or is knowledge production also within the province of those generally associated with "the practical," such as technicians or users of technology? (58)

The answer is that users are productive, and Johnson glosses three types of user knowledge. (The connection between Johnson's notion of users and use producing knowledge is clearly connected to Scandinavian design of technologies. Designers like Pelle Ehn have long argued for work-oriented participatory design, and as a part of that work, have often articulated a notion of epistemology linked to users and use.) Users as "practitioners" are capable of "cunning intelli-

gence" (*metis*), or the ability to use technologies in new, effective, and context-dependent ways not envisioned by front-end designers. Users as "producers" are more clearly connected by Johnson to the design of technologies, but most importantly for our purposes here, the notion of users as "citizens" focuses on how users can become "responsible members of the technological community" (77). Johnson writes that the "spaces in which the knowledge of users and the cultural environment intersect are difficult to describe . . . because there is no terminology for discussing users in large, social contexts" (77). We feel that risk situations provide the terminology that Johnson is missing, and furthermore, we feel that a recognition of user knowledge is essential for changing the epistemological order in risk situations.

For instance, Johnson cites an important example in which users helped design traffic flow in Seattle. The situation was one common to many large cities—too many cars on the road during peak commuting hours. Taking a common approach, transportation officials measured traffic flows utilizing various counting and statistical methodologies in order to determine how to reroute traffic and which roads to expand. However, nothing seemed to work until a team of technical communicators from the University of Washington explored the same problem from a different angle. Rather than studying the traffic, this team studied the driving preferences and habits of Seattle citizens through surveys, interviews, focus groups, and observations (81). This information provided a workable solution to the traffic problems. The technical communicators sought user knowledge about the problem, and in fact, users had the best solutions to this particular traffic problem and were able to solve problems that "experts" could not. About this example, Johnson writes "In terms of the user as citizen . . . the point is made most strongly: the users are represented as an important force in the design of the system . . . because they are asked to help determine the best solutions to the problem" (82). Citizens possess knowledge about how a technology is used in, or would affect, a particular community. This understanding is something "experts" may lack but need in order to design a usable technology. As a result, citizens can contribute valuable information to the design and decision making process. Our point is that users are intelligent and productive—like experts, users create knowledge—and sometimes user productivity takes decision making in new and important directions. But our point is also that users cannot be productive if they are silent. The power of Johnson's example comes from the fact that it was technical communicators who thought to ask users about the problems of traffic flow and implemented the research practices necessary to help construct user knowledge.

In fact, technical communicators are perhaps uniquely capable of participating in the construction of user knowledge. But what types of research practices are we talking about? We are not talking about testing methods commonly located in usability labs, for they are most appropriate for working with discrete technologies. Like the research-

ers in Seattle, we are talking about methods common to some usability work and most qualitative research: surveys, interviews, and perhaps most importantly, field-based observation of how people use the spaces and/or technologies associated with a given risk. The type of research and multidisciplinary work we are framing here expands the scope of work for technical communicators. We believe that the technical communicator may be one of the few professional workers trained for both the multidisciplinary perspectives and user advocacy necessary to help dissolve the boundary between assessment and communication and thereby facilitate a more participatory construction of risk. In fact, as Figure 2 helps us illustrate, we believe the technical communicator as symbolic analyst allows us to move between two key binaries in risk communication scholarship, expert/non-expert and assessment/communication. In this figure, we see the binaries as continua in an attempt to express a range of practices between "straight" assessment and communication and the positions between expert and non-expert. In keeping with our argument, we see the technical communicator as able to occupy multiple positions and play a variety of roles.

On this map, the top left quadrant represents "traditional risk assessment," or risk assessment done solely by experts. The technical communicator's role here is fairly traditional—to help "translate" knowledge to audiences. The top right represents non-expert risk assessment, or a range of informal assessment practices that people use whenever confronted with risk—conversation, reading, formal and informal writing, and meetings. The technical communicator, given that he or she is capable of collaborative research (as a symbolic-analyst), can gain access to these processes and help give voice to these audiences. The bottom left represents technocratic (at the extreme) and other linear approaches to risk communication. The bottom right represents a wide range of "non-expert" risk communication, or discourse produced by interests without the institutional designation as authorities. Of course, as we used Langdon Winner to suggest earlier, real life risk situations often have expertise on both sides of a given issue, and so our map fails to capture the complexity of audiences in such situations. Nevertheless, the technical communicator can move between ranges and varieties of experts and non-experts. In short, this figure illustrates the positions we assert the technical communicator can occupy as well as the movement we believe is necessary between positions—in fact, we believe that a critical rhetoric moves, that research and rhetorical actions must move between and across positions as situations and problems dictate. (We are taking our mapping practices and our sense of critical research practices from the work of Sullivan and Porter. See their book for a discussion of postmodern mapping and a significantly more substantial discussion of critical research.) In so doing, we believe this figure captures the complexity of risk processes and is descriptive of the complex web that characterizes the social construction of risk. All of these practices, from expert to non-expert assessment to a wide range

Figure 2. The Multiple Positions of the Technical Communicator

of communication practices happen, sometimes simultaneously, in a given risk situation. As Johnson-Eilola writes, "[b]ecause of the political, economic, and social aspects of all technologies, technical communication should not limit itself to simple functionalism, but must also include broader and more complex concerns" (259). Risk assessment/communication encompasses such broad and complex social, intellectual, and rhetorical concerns. Risk communication explicitly takes technical communication into the realm of civic discourse.

Usability Research: Participation and Power

The focus on research and user knowledge that we have been articulating as part of a critical rhetoric for risk communication has ethical as well as epistemological dimensions. Thus the issue with which we want to conclude is the same issue at the core of a critical rhetoric—power. If power and the abilities of professionals like technical communicators are located within institutions creating risks and used to manage not only risks but also stakeholders, then technical/risk communication and communicators are involved in a relation of power that can dominate and oppress. This is why we are interested in a critical rhetoric for risk/technical communication that can help prevent such exercises of power. (In our concern, we echo the work of others concerned with the uses to which "good" technical communication can be put and the potentially limiting institutions within which technical communicators work. See Katz; Savage; Sullivan; and Slack, Miller, and Doak.) We have argued that technical communicators as user advocates can bring about more participatory and ethical decision making processes. However, the implications of such a positioning create their own problems. We typically imagine clients for risk assessment/communication to be business, industry, and the government—risk makers. In our approach to risk communication, however, we suggest that "clients" can be citizens, the public, the poor, or the powerless. However, it is more likely that the technical communicator will be hired by the relatively more powerful rather than the powerless. Because technical communicators have an obligation to their client, whoever hires the technical communicator often has an advantage. As a result, it is possible for the technical communicator to be caught in the very power relations that we argue technical communicators can work to dismantle. This problem of clients and advocacy is why we believe the merger of risk assessment and communication practice is important. Such a merger—hopefully—inserts audiences and audience advocacy earlier in the decision making process, even when technical communicators are working for more powerful clients. Still, problems of advocacy will not disappear.

Yet we believe that it is possible to change the processes of risk assessment/communication through research and writing practices in order to insert user knowledge and participation into decision making processes. To do so requires changing the institutions that make decisions about risk, and this is difficult. A common view of institutions as monolithic and static bureaucracies makes institutional change an impossibility—how can we change government? business? However, Porter et al. have a view of institutions that sees them as rhetorical systems of decision making formed by the discourses that make them possible (e.g., legislation, business plans, policies, procedures, research protocols). According to this view, institutions are "inherently dynamic and open to change through the very rhetorical practices by which they operate" (16). In short, institutions are written, and therefore, can be rewritten. In order to rewrite institutions, rhetorical (and sometimes material) space must be created

within an institution; the creation of such space can sometimes have radical consequences. Our claim that users produce knowledge and that technical communicators are uniquely capable of the research necessary to enable users to participate in decision making is an attempt to frame how institutional space can be created. The institutional separation between assessment and communication is not only false (epistemologically) and unproductive, but it prevents the creation of "spaces" for users within decision making processes. We suggest that it is through research practices that institutional space for users/citizens within knowledge producing and decision making institutions can be constructed. It is one thing to talk about how decision makers *should* listen and *should* allow citizens to participate (they should!). It is an entirely different project to structure as part of the everyday practices of a given institution research designed to facilitate user/citizen participation as legitimate knowledge producers and decision makers.

How would the creation of institutional space for users/citizens solve problems of power and powerlessness? It wouldn't. At least not entirely. But we do think a critical rhetoric for risk communication would address problems of powerlessness because it enables users/citizens to speak, to develop autonomy within institutions—in short, to exercise power. The technical communicator as symbolic analyst can contribute to critical risk communication through research and communicative practices that can help provide a preferable space for those least powerful within assessment and communicative decision making practices. Such processes might indeed lead to a collective articulation of the good of a risk situation and subsequent implementation of that good. Not only might these processes lead to more ethical risk assessment/communication (the articulation of a good for a *we*), but we think such processes would be *better* because they seek to avoid the problems of mistrust and conflict that mark traditional practices. Furthermore, given the inclusion of user/citizen knowledge, such processes might also be more "intelligent" by including multiple perspectives, different types of knowledge, and potentially a greater number of acceptable solutions. The risk communication literature is full of stories of corporate or governmental abuse, citizen resistance, and general "failure." We suggest that a critical rhetoric of risk communication and the role of the technical communicator within that rhetoric can help alleviate conflict and impasse through the facilitation of more effective assessment/communication processes. Our title refers to "producing citizens," and that phrase embodies a double meaning. Risk communication practices invariably produce citizens—the real or idealized audience who consumes communication. A much more "productive" view sees citizens as themselves producers—of knowledge, of values, of communities. A critical rhetoric locates its energy and hope in this sense of producing citizens by seeking to access user/citizen knowledge by creating the institutional space within which risk can be collectively constructed and more effectively communicated.

Acknowledgments

The authors would like to thank Patricia Sullivan for her encouragement and guidance.

Works Cited

42 United States Code, Section 9617 (1995).

Adams, William C. "The Role of Media Relations in Risk Communication." *Public Relations Quarterly* 37.4 (1992): 28-31.

Belsten, Laura. "Environmental Risk Communication and Community Collaboration." *Earthtalk*. Ed. Star Muir and Thomas Veenendall. Westport, CT: Praeger, 1996. 27-42.

Blyler, Nancy Roundy. "Habermas, Empowerment, and Professional Discourse." *Technical Communication Quarterly* 3 (1994): 125-45.

Carson, Rachel. *Silent Spring*. Boston: Houghton Mifflin, 1962.

Castelli, J. "Welcome to the World of Risk Communication." *Safety and Health* 142 (1990): 68-71.

Corvello, Vincent, Peter Sandman, and Paul Slovic. *Risk Communication, Risk Statistics, and Risk Comparison: A Manual for Plant Managers*. Washington, DC: Chemical Manufacturers Association, 1988.

Doheny-Farina, Stephen. *Rhetoric, Innovation, Technology: Case Studies of Technical Communications in Technology Transfer*. Cambridge, MA: MIT P, 1992.

Ehn, Pelle. *Work-Oriented Design of Computer Artifacts*. Stockholm: Arbetslivscentrum, 1988.

Fiorino, Daniel. "Citizen Participation and Environmental Risk: A Survey of Institutional Mechanisms." *Science, Technology, and Human Values* 15 (1990): 226-43.

Foucault, Michel. "The Subject and Power." *Michel Foucault: Beyond Structuralism and Hermeneutics*. Ed. Hubert L. Dreyfus and Paul Rabinow. Chicago: U of Chicago P, 1982. 208-26.

Habermas, Jürgen. *Moral Consciousness and Communicative Action*. Trans. Christian Lenhardt and Shierry Weber Nicholsen. Cambridge, MA: The MIT P, 1990.

Hance, B. J., Caron Chess, and Peter Sandman. *Industry Risk Communication Manual: Improving Dialogue with Communities*. Boca Raton, FL: Lewis, 1990.

Heath, Robert, and Kathy Nathan. "Public Relations' Role in Risk Communication: Information, Rhetoric, and Power." *Public Relations Quarterly* 35.4 (1990): 15-22.

Johnson, Robert R. *User Centered Technology: A Rhetorical Theory of Computers and Other Mundane Artifacts*. Albany: SUNY P, in press.

Johnson-Eilola, Johndan. "Relocating the Value of Work: Technical Communication in a Post-Industrial Age." *Technical Communication Quarterly* 5 (1996): 245-71.

Jones, Dan. "A Question of Identity." *Technical Communication* 42 (1995): 567-69.

Juanillo, Napoleon K., and Clifford W. Scherer. "Attaining a State of Informed Judgments: Toward a Dialectical Discourse on Risk." *Communication Yearbook*. Ed. Brant Burleson. New Brunswick, NJ: International Communication Association, 1994. 279-99.

Katz, Steven. "The Ethic of Expediency: Classical Rhetoric, Technology, and the Holocaust." *College English* 54 (1992): 255-75.

Katz, Steven, and Carolyn Miller. "The Low-Level Radioactive Waste Siting Controversy in North Carolina: Toward a Rhetorical Model of Risk Communication." *Green Culture: Environmental Rhetoric in Contemporary America*. Ed. Carl Herndl and Stuart Brown. Madison: U of Wisconsin P, 1996. 111-40.

Kuhn, Thomas. *The Structure of Scientific Revolutions*. Chicago: U of Chicago P, 1970.

Latour, Bruno. *Aramis or the Love of Technology*. Trans. Catherine Porter. Cambridge, MA: Harvard UP, 1996.

Mirel, Barbara. "Debating Nuclear Energy: Theories of Risk and Purposes of Communication." *Technical Communication Quarterly* 3 (1994): 41-65.

National Research Council. *Risk Assessment in the Federal Government: Managing the Process*. Washington, DC: National Academy P, 1983.

Patterson, Robert, and Ronald Lee. "The Environmental Rhetoric of 'Balance': A Case Study of Regulatory Discourse and the Colonization of the Public." *Technical Communication Quarterly* 6 (1997): 25-40.

Plough, Alonzo, and Sheldon Krimsky. *Environmental Hazards: Communicating Risks as a Social Process*. Dover, MA: Auburn House, 1988.

Porter, James E. *Audience and Rhetoric: An Archaeological Composition of the Discourse Community*. Englewood Cliffs, NJ: Prentice Hall, 1992.

—. *Rhetorical Ethics and Internetworked Writing*. Greenwich, CT: Ablex and Computers and Composition, 1998.

Porter, James E., et al. "(Re)writing Institutions: Spatial Analysis and Institutional Critique." Unpublished.

Ross, Susan M. "Two Rivers, Two Vessels: Environmental Problem Solving in an Intercultural Context." *Earthtalk*. Ed. Star Muir and Thomas Veenendall. Westport, CT: Praeger, 1996. 171-90.

Rowan, Katherine. "Goals, Obstacles, and Strategies in Risk Communication: A Problem-Solving Approach to Improving Communication About Risks." *Journal of Applied Communication Research* 19 (1991): 300-29.

—. "What Risk Communicators Need to Know: An Agenda for Research." *Communication Yearbook*. Ed. Brant Burleson. New Brunswick, NJ: International Communication Association, 1994. 300-19.

—. "The Technical and Democratic Approaches to Risk Situations: Their Appeal, Limitations, and Rhetorical Alternative." *Argumentation* 8 (1994): 391-409.

Rubin, D. M., and D. P. Sachs, eds. *Mass Media and the Environment*. New York: Praeger, 1973.

Russell, Milton. "Communicating Risk to a Concerned Public." *EPA Journal* 12.9 (1986): 19-21.

Sandman, Peter. "Getting to Maybe: Some Communications Aspects of Siting Hazardous Waste Facilities." *Readings in Risk*. Ed. Thomas Glickman and Michael Gough. Washington, DC: Resources for the Future, 1990. 223-31.

Savage, Gerald J. "Redefining the Responsibilities of Teachers and the Social Position of the Technical Communicator." *Technical Communication Quarterly* 5 (1996): 309-27.

Slack, Jennifer Daryl, David Miller, and Jeffrey Doak. "The Technical Communicator as Author: Meaning, Power, Authority." *Journal of Business and Technical Communication* 7 (1993): 12-36.

Slovic, Paul. "Informing and Educating the Public about Risk." *Risk Analysis* 6 (1986): 403-15.

Stratman, James E., et al. "Risk Communication, Metacommunication, and Rhetorical Stases in the Aspen-EPA Superfund Controversy." *Journal of Business and Technical Communication* 9 (1995): 5-41.

Sullivan, Patricia, and James E. Porter. *Opening Spaces: Writing Technologies and Critical Research Practices*. Greenwich, CT: Ablex and Computers and Composition, 1997.

Sullivan, Dale L. "Political-Ethical Implications of Defining Technical Communication as a Practice." *Journal of Advanced Composition* 10 (1990): 375-86.

Waddell, Craig. "Saving the Great Lakes: Public Participation in Environmental Policy." *Green Culture: Environmental Rhetoric in Contemporary America*. Ed. Carl Herndl and Stuart Brown. Madison: U of Wisconsin P, 1996. 141-65.

—. "Defining Sustainable Development: A Case Study in Environmental Communication." *Technical Communication Quarterly* 4 (1997): 201-16.

—. Risk Communication Course Syllabus. Michigan Technological University. Winter 1994-1995.

Winner, Langdon. "Citizen Virtues in a Technological Order." *Technology and the Politics of Knowledge*. Ed. Andrew Feenberg and Alastair Hannay. Bloomington: Indiana UP, 1995. 65-84.

Young, Iris Marion. *Justice and the Politics of Difference*. Princeton, NJ: Princeton UP, 1990.

Jeffrey Grabill is an assistant professor of English at Georgia State University in Atlanta, specializing in rhetoric and technical writing. His work focuses on technical and professional writing, computers and writing, and literacy.

Michele Simmons is a graduate student in the Ph.D. program in Rhetoric and Composition at Purdue University. Her current research focuses on technical and professional writing and risk communication.