Genre Repertoire: The Structuring of Communicative Practices in Organizations

Wanda J. Orlikowski; JoAnne Yates

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Wanda J. Orlikowski
JoAnne Yates
Massachusetts Institute of Technology

In this paper we propose the notions of genre and genre repertoire as analytic tools for investigating the structuring of communicative practices within a community. As organizing structures, genres shape and are shaped by individuals' communicative actions. Our empirical study examined the communication exchanged by a group of distributed knowledge workers in a multiyear, interorganizational project conducted primarily through electronic mail. We found that the genre repertoire of this community revealed a rich and varied array of communicative practices that members shaped and changed in response to community norms, project events, time pressure, and media capabilities. Our analysis establishes the concepts of genre and genre repertoire as a means of understanding communicative action as a central aspect of a community's organizing process.•

While communication is the fundamental activity through which social interaction is accomplished, the practice of communicating as a routine organizing activity has not been the focus of much organizational research. Organizational studies that consider communication have investigated specific aspects of communication such as media and technology (Sproull and Kiesler, 1986; Trevino, Lengel, and Daft, 1987; Fulk and Steinfield, 1990), have focused on relationships between communicative behavior and organization characteristics (Rice et al., 1984; Donnellon, Gray, and Bougon, 1986; Huber, 1990), and have explored the symbolic and political nature of communication in organizational processes (Eisenberg, 1984; Frost, 1987; Putnam and Poole, 1987; Manning, 1989; Fulk, 1993).

Communication, however, may also be viewed as central to the organizing process. As Schall (1983: 560) pointed out, without communication "there would be no organizing or organization." Likewise, Weick (1987: 97–98) noted: "Interpersonal communication is the essence of organization because it creates structures that then affect what else gets said and done and by whom. . . . The structures themselves create additional resources for communication such as hierarchical levels, common tasks, exchangeable commodities, and negotiable dependencies." In such a view, communication is conceived as inherently embedded and actively involved in agents' everyday social practices.

We adopt such a view in this paper, seeing communication as an essential element in the ongoing organizing process through which social structures are produced, reproduced, and changed (Giddens, 1984). Such a recursive relationship between action and structure is central to practice theory (Bourdieu, 1977, 1990) and to structuration theory (Giddens, 1979, 1984), both of which are grounded in the ongoing, practical activities of human agents in particular historical, cultural, and institutional contexts. Empirical investigations guided by a practice perspective center on the recursive relationship between routine activities and the social structures that are the medium and outcome of those activities (Barley, 1986; Suchman, 1987; Lave, 1988; Pentland, 1992). Our empirical investigation of

communicative practices likewise examines how and with what implications agents' routine communicative actions constitute some of the organizing structures of a community and how and why these ongoing practices may change over time.

We investigate communicative practices through the analytic lens of the "communicative genres" enacted within a community. We have previously defined genres of organizational communication as socially recognized types of communicative actions—such as memos, meetings, expense forms, training seminars—that are habitually enacted by members of a community to realize particular social purposes (Yates and Orlikowski, 1992). A genre established within a particular community serves as an institutionalized template for social action—an organizing structure—that shapes the ongoing communicative actions of community members through their use of it. Such genre usage, in turn, reinforces that genre as a distinctive and useful organizing structure for the community. The notion of community here broadly includes identifiable social units such as groups, organizations, and occupations (Van Maanen and Barley, 1984) or communities of practice (Brown and Duguid, 1991; Lave and Wenger, 1991).

Consider, for example, the communicative practices of two different organizations. In the first, decisions are made by organizational members discussing and voting on issues in open and participative meetings. In the second, decisions are made by the leader, who then broadcasts directives by memo to organizational members. An examination of the different genres routinely enacted in these two organizations would reveal two quite different organizing processes: a democratic and an autocratic one, respectively. Occasionally, members' communicative actions may deviate—deliberately or inadvertently—from the genre template, either by creating new genres or by modifying existing ones; in this way, members' actions can change aspects of their community's organizing process. For example, if members of the second organization were to adopt total quality management (TQM), their enactment of some of the genres associated with TQM (e.g., quality circle meetings) would begin to undermine the prior top-down mode of decision making. If sustained, the new communicative practices could result over time in a less autocratic form of organizing.

Members of a community rarely depend on a single genre for their communication. Rather, they tend to use multiple, different, and interacting genres over time. Thus to understand a community's communicative practices, we must examine the set of genres that are routinely enacted by members of the community. We designate such a set of genres a community's "genre repertoire," a concept that emerged from the study we describe below. Just as identifying a symphony orchestra's repertoire of symphonic works sheds light on the orchestra's established musical practices, identifying a community's repertoire of genres provides information about its established communicative practices and, hence, how it organizes some of its activities. Furthermore, explicating changes in a community's genre repertoire over time reveals changes in the community's

communicative practices and thus aspects of its organizing process.

Since work in a community is essentially social and, hence, dependent on mutually intelligible interaction (Suchman and Trigg, 1991), communicative practices also provide information about a community's work. Activities such as tax auditing, surgery, customer support, and personnel review all involve communicative action and communicative genres. While not revealing all of the task-related details of the activities, an examination of the communicative genres enacted in the performance of these activities can nevertheless shed light on how the underlying tasks are structured and executed. Devitt's (1991) study of tax auditing revealed a number of genres, such as memoranda to the file and opinion letters, routinely enacted by the auditors. Identifying such genres, which characterize the interaction among auditors and between auditors and clients, also reveals information about how the work of tax auditing is organized (e.g., the division of labor and responsibility among partners, managers, and associates, and the types of information attended to and not attended to).

Drazin and Sandelands (1992: 236) argued that the organizing process could "be explained by observ[ing] and categoriz[ing] the interactions of independent actors whose behavior is governed by a system of recursively applied rules." In keeping with this approach, we examined the communicative practices of geographically dispersed knowledge workers participating in a multiyear, interorganizational project conducted primarily through electronic mail. The participants were engaged in the collaborative task of defining a new computer language, and they carried out this work almost entirely by exchanging electronic messages to raise issues, offer proposals, solicit opinions, suggest amendments and alternatives, debate language features, reach group decisions, and document their results. We analyzed the group's electronic interaction over the course of the project to identify the genres they enacted over time to accomplish their collaborative work. Our investigation of this group's communicative practices identifies the genre repertoire—the set of organizing structures—enacted by the group members over time.

GENRES OF ORGANIZATIONAL COMMUNICATION

Genre Characteristics

A genre of organizational communication, such as the business letter, shareholders' meeting, or report, is a distinctive type of communicative action, characterized by a socially recognized communicative purpose and common aspects of form (Yates and Orlikowski, 1992). The communicative purpose of a genre is not rooted in a single individual's motive for communicating, but in a purpose that is constructed, recognized, and reinforced within a community (Miller, 1984). The commonly recognized purpose of an annual shareholders' meeting is to report on the company's past accomplishments and present its future outlook to stockholders, while that of a business letter is to communicate and simultaneously document business

matters to a party external to the writer's organization. Such communicative actions are typified responses to recurrent situations within organizations. A firm holds its annual shareholders' meeting (a particular instantiation of the genre) at the end of the financial year, when the rights of owners and the responsibilities of management require managers to report to the firm's owners.

A genre also typically has some characteristic aspect(s) of form. Form refers to the readily observable features of the communication, including structural features (e.g., text formatting devices, such as lists and headings, and devices for structuring interactions at meetings, such as agenda and chairpersons), communication medium (e.g., pen and paper, telephone, or face to face), and language or symbol system (e.g., level of formality and the specialized vocabulary of corporate or professional jargon). Shareholders' meetings typically include oral and visual presentation of progress and plans by company officials as well as voting by shareholders on various proposals, while business letters typically are typed or printed on corporate letterhead, have a characteristic format for inside address, date, salutation, and sign-off, and use relatively formal language.

Genres are recognizable within a community by either one or both of these characteristics of purpose and form. Some genres have such a distinctive form that it is sufficient to identify an instance of the genre. Memos and meetings have clearly identifiable forms (a distinctive heading for the memo genre and structural devices such as the agenda and chair for the meeting genre) but may be used for a wide variety of specific purposes. Other genres are much more distinguishable by their purpose. The proposal has a specific communicative purpose (to put forward a plan for evaluation and acceptance or rejection), and this purpose is a better identifier of the genre than its form, which can vary in linguistic and structural features; some proposals may take a very specific form (as in the NSF proposal), while others may be realized in the form of other genres such as memos or presentations at meetings. Finally, some genres are identifiable by both a specific communicative purpose and a distinctive form. IRS 1040 returns, for example, have a definite purpose (the declaration of tax liability by U.S. residents) and form (the distinctive 1040 format with its numbered fields and embedded instructions).

While we have been discussing individual genres, communicative action often involves the use of multiple genres that work together to produce a more complex communicative practice. Czarniawska-Joerges (1993: 198) noted that genres, in use, are rarely homogeneous and clearly separate, with particular communicative actions often being characterized by several generic strategies. We recognize two types of interactions among genres. One is based on genre overlap, in which a particular communicative action may involve the enactment of more than one separate genre. For example, shareholders' meetings often include oral presentations, video screenings, and voting, while genres such as proposals and trip reports are often incorporated within memos. The second type of interaction among genres is based on genre interdependence and is

represented by Bazerman's (1995) notion of a "genre system," which he defines as "a complex web of interrelated genres where each participant makes a recognizable act or move in some recognizable genre, which then may be followed by a certain range of appropriate generic responses by others." The sequence of opening and closing statements by opposing counsel in a court trial, for example, would constitute a genre system. While genres may interact in practice, it is nevertheless possible to distinguish analytically among the various genres constituting a communicative practice. Whether the focus should be on the individual genres or on their interaction depends on the exact relationship of the genres and the purpose of the research.

Genre Change

People produce, reproduce, and change genres through a process of structuring (Yates and Orlikowski, 1992). Members of a community enact a genre by drawing on their knowledge, tacit or explicit, of a set of genre rules. When community members instantiate genres that, through tradition or mandate, have become established as useful for conducting the community's activities, they reinforce those genres. A particular instance of a genre need not reflect all the rules constituting that genre as long as it is still recognizable. Business letters sent via fax are still identified as such, even though the transmission medium (an aspect of form) is not traditional for that genre. Enough distinctive genre rules must be followed, however, for the communicative action to be recognizable within the relevant social community as an instance of a certain genre. While members typically reinforce established genres through their communicative actions, they can and, on occasion, do challenge and modify these genres, both deliberately and inadvertently. When changes to established genres are repeatedly enacted and become widely adopted within the community, genre variants or even new genres may emerge, either alongside existing genres or to replace those that have lost currency. For example, the memo genre initially emerged out of variations made to the business letter genre and then ultimately evolved into a genre quite distinct from it (Yates and Orlikowski, 1992).

This structurational dynamic of genre reproduction and change raises an interesting issue: Given ongoing variations to existing genres, when can it be said that a new genre has emerged? In practice, it is impossible to define an exact point. The above definition of genres as socially recognized types of communicative action suggests that variants are communicative actions still recognizable as instances of the old genre, while a new genre can be said to have emerged when a new conjunction of form and purpose becomes recognized by its community as different from the old. Such recognition may be explicitly articulated within the community or be implicit in members' practices. Internal correspondence historically exhibited a new purpose and distinctive form for a decade or more before the label for such communication was explicitly changed from letter to memo.

GENRE REPERTOIRE

While we previously explored the nature of individual genres (Yates and Orlikowski, 1992), we did not consider the set of genres routinely enacted by a particular community. We propose that such a set of genres can be usefully analyzed in terms of the notion of a genre repertoire. Applying the notion of repertoire to communities has parallels in the organizational and rhetorical literatures. In the organizational literature, Gersick and Hackman (1990) examined the set of habitual routines that constitute a group's behavioral repertoire, March and Simon (1958) referred to an organization's performance programs, and Clark and Staunton (1989) defined an organization's structural repertoire as the set of typical mechanisms and ideologies from which particular structural responses are selected. Focusing specifically on communication behaviors, Donnellon, Gray, and Bougon (1986) identified a repertoire of discourse mechanisms, such as metaphor and logical argument, that enables an organization's members to produce organized action in the absence of shared meaning. In the rhetorical and sociolinguistic literatures, examples include Platt and Platt's (1975) suggestion that the range of linguistic varieties used by a discourse community constitutes its speech repertoire, Bakhtin's (1986) notion that a repertoire of speech genres is associated with a given sphere of activity, and Devitt's (1991) use of the term "genre set" to explore the genre repertoire of a particular professional community.

A community's genre repertoire indicates its established communicative practices. Hence, the concept of genre repertoire can serve as a useful analytic tool for investigating the structuring of a community's communicative practices over time. The following sections examine three different aspects of a community's genre repertoire to be elaborated later in the specific context of our study: (1) nature: What do the genres composing the genre repertoire tell us about the communicative practices of the community? (2) establishment: How and why do community members initially enact a particular set of genres? and (3) change: How and why does the repertoire of genres initially established in a community change over time?

The Nature of a Genre Repertoire

When members of a community enact genres constituting their community's genre repertoire, they not only signal and reaffirm their status as community members, but they also reproduce important aspects of that community's identity and its organizing process. Berkenkotter and Huckin (1993: 476) have argued that in academic communities, for example, genres of academic writing serve to enact and reflect the epistemological, ontological, and ideological assumptions of particular disciplines, and noted that in such communities: "Knowledge production is carried out and codified largely through generic forms of writing: lab reports, working papers, reviews, grant proposals, technical reports, conference papers, journal articles, monographs, and so forth. . . . [Genres thus] package information in ways that conform to [community] norms, values, and ideology." The

set of genres that community members use (and don't use) to conduct their interaction can reveal a great deal about a community, its communicative practices, and organizing process. Devitt (1991: 340) noted: "In examining the genre set of a community, we are examining the community's situations, its recurring activities and relationships."

Two major aspects of a community's genre repertoire may be examined: its composition, the set of genres making up the repertoire, and its use, the frequency with which specific genres are enacted at various times by members of the community. The composition of a repertoire reveals the kind of communicative activities that are practiced by community members. The presence of research grant proposals and various types of technical reports in a repertoire, for example, would suggest a research-oriented group, while a repertoire composed of the specific types of letters and memos found by Devitt (1991) would reveal a community of tax accountants. The use of a repertoire indicates how frequently and when various genres are realized and, hence, a community's different phases of interacting. The genre repertoire of a committee may include reports and face-to-face meetings. Knowing that the face-to-face meeting genre is invoked every month and reports every quarter provides more information about the committee's interactions and rhythms of work than knowledge of the repertoire's composition alone. Use patterns may also reveal something about the nature of interaction. The frequent use of letters and rare use of memos in a community, for example, would suggest a focus on documenting communication across organizational boundaries to external parties, rather than documenting internal coordination.

Establishment of a Genre Repertoire

We have defined genre repertoire as it exists for a given community, but how is such a repertoire initially established? One likely way is for members of a new community simply to start enacting genres they have used previously as members of other communities. Members of a newly formed task force or committee may draw on their past experience to decide that they will meet face to face in weekly, one-hour meetings and distribute hard-copy minutes and report drafts via interdepartmental mail. Although these decisions are shaped by a number of factors, including institutional procedures, task exigencies, and available media, they are also strongly influenced by members' expectations of how communication takes place in committees. These expectations are based on knowledge of genre rules, members' prior experiences in similar situations, and their sense of what forms of organizing and interacting would be appropriate for a committee such as theirs.

This tendency to invoke the familiar when faced with a new situation is widely acknowledged in cognitive sociology (Cicourel, 1974; Goffman, 1974) and organizational studies (Weick, 1979; Van Maanen, 1984). Van Maanen (1984: 238) noted that "Given a degree of similarity between an old and a new activity, the new will be approached in much the same way as the old." Existing research on the formation of norms within groups similarly suggests that at the formation

of a new community, members may import norms from other communities in which they have participated (e.g., Bettenhausen and Murnighan, 1985, 1991). Gersick (1988: 33) found that early patterns of group behavior "are influenced by material established before a group convenes. Such material includes members' expectations about the task, each other, and the context and their repertoires of behavioral routines and performance strategies." Gersick and Hackman (1990) observed that interaction rules are initially and often implicitly formed through members' prior experiences and exposure to certain cultural norms. They noted that, in the early stages of a group's life, when members "have common previous task experiences, or share a common set of subcultural norms," they "may simply proceed to do what everyone knows should be done, and a pattern of habitual behavior may be established without any explicit thought" (1990: 75–76). When members do not share previous task experiences or background, it may take longer for shared assumptions and conventions to emerge (Bettenhausen and Murnighan, 1985).

Change in a Genre Repertoire

Once a community has established a genre repertoire, that repertoire structures members' communicative actions, even as members continue to reinforce and change the genres that constitute it. The changes introduced by members, whether inadvertently or deliberately, may occur in the composition of a repertoire or in its use.

Variation in repertoire composition. In their discussion of organizations' structural repertoires, Clark and Staunton (1989: 188) suggested that the composition of repertoires may be varied through two different mechanisms, "custom" and "reflective agency." Custom refers to variations that occur unintendedly in the course of routine structuring: Participants intend to reproduce past custom, but variations emerge through inadvertent slippage or improvisation. In contrast, reflective agency refers to participants' deliberate modification of their routine actions. In this type of change, participants actively choose to adopt new routines or alter old ones, either by experimenting through trial and error (Levitt and March, 1988), learning from others (Bandura, 1986), or actively searching for and switching to alternative routines (Louis and Sutton, 1991).

The composition of a genre repertoire may similarly be varied through both custom, which we term inadvertent variation, and reflective agency, which we term deliberate variation. In the case of inadvertent variation, the composition of a genre repertoire may be varied when new genres or variants emerge alongside or in place of older ones. In the case of deliberate variation, new genres or variants may be introduced or designed through the deliberate action of one or more members, such as when members import a genre they have used in another community. Someone with a quality-control background, for example, might introduce quality circle meetings into the community. Such introduced genres only become part of a

community's genre repertoire when they are recognized and used by the other members of the community, whether this is accomplished implicitly through practice or explicitly by external or hierarchical mandate. For example, federal legislation required the addition of the environmental impact statement to the genre repertoires of communities dealing with land development.

Variation in the composition of a genre repertoire may also occur, inadvertently or deliberately, when genres become dormant or are eliminated. A genre may be said to be dormant when it has not been enacted for a significant amount of time, though no explicit acknowledgment of change has taken place in the community. The length of such time will vary, depending on how often the genre is normally invoked. If a specific weekly report is not used for a period of many weeks, it may be assumed to be dormant, while an annual meeting may be assumed to be dormant only after several years of nonuse. The dormant genre cannot be considered eliminated from the community's genre repertoire until it is either no longer socially recognized by the members, which may take considerable time, or explicitly rejected by the community as a whole or by someone with authority in the community. An internal or external mandate, for example, may result in the elimination of a particular genre, as happened in South Africa, where the abolition of apartheid laws led to the elimination of a whole range of regulatory genres, including the infamous passbook. As the examples of the environmental impact statement and the passbook illustrate, the presence or absence of certain genres in a repertoire can reveal much about the kinds of interactions, ways of working, and forms of organizing that are valued, sanctioned, and prohibited within a particular community during various periods.

Shifts in repertoire use. In addition to varying in composition, genre repertoires can change when their use shifts over time. While less striking than the addition or deletion of genres, shifts in the frequency with which genres constituting the repertoire are used provide further insight into a community's communicative practices and its organizing process. The genre repertoire of a project team, for example, may include progress reports issued quarterly and face-to-face meetings held monthly. A shift to weekly meetings, then, would signal an intensification in the team members' interactions and work effort.

As with variations in composition, shifts in the use of a genre repertoire may be unintended (inadvertent shifts) or intended (deliberate shifts). An inadvertent shift in genre repertoire use has occurred when, for example, a project team begins to meet less frequently without having made any explicit decision to do so. Deliberate shifts in genre repertoire use can be analyzed with Gersick's (1994) two mechanisms for triggering changes in members' attention and actions, temporal pacing and event-based pacing. In temporal pacing, members alter their communicative actions according to specified temporal milestones. The financial year-end, for example, typically triggers a flurry of meetings, memos, and reports to close the firm's books. In event-based pacing, members alter their actions when

specific events occur. Members of a research community may increase their production of research papers and public presentations after a major breakthrough is announced in their discipline, as occurred around the purported discovery of "cold fusion" a few years ago.

RESEARCH STUDY

Setting

We investigated a project conducted by computer language designers who, through the 1970s, had developed and used various, largely incompatible dialects of the artificial intelligence language LISP. In early 1981, the Defense Department (a funding source for much LISP work) put pressure on these designers to produce a standard LISP language so that programs written in that language would be portable across computer types. Over the next two and a half years, these LISP language designers engaged in complex and often controversial negotiations to produce what came to be known as the Common LISP (CL) language.

The designers were located at universities and company sites dispersed geographically throughout the U.S., and their interactions were conducted almost exclusively through electronic mail transmitted via the Defense Department's ARPANET network. According to the participants we interviewed, they were all regular users of electronic mail, already using it to communicate locally and within their geographically dispersed professional community. They agreed that most of their CL communication took place in electronic mail. One noted, "We wanted to do as much as we could by e-mail and as little any other way," while another observed that "about 95 percent of the [CL] interaction was on e-mail." In the introduction to the published CL reference manual, the project's final product, Steele (1984: xi) commented on the centrality of the electronic medium to the project:

The development of COMMON LISP would most probably not have been possible without the electronic message system provided by the ARPANET. Design decisions were made on several hundred distinct points, for the most part by consensus, and by simple majority vote when necessary. Except for two one-day face-to-face meetings, all of the language design and discussion was done through the ARPANET message system, which permitted effortless dissemination of messages to dozens of people, and several interchanges per day.

The CL project had its origins in April 1981, when a few key LISP designers came together at a large professional meeting and agreed to collaborate in the development of a standard LISP language. In a subsequent informal meeting in June 1981 designers at one specific site agreed to take responsibility for the manual's production. In August 1981 an initial draft of the manual was issued, based largely on the documentation of the LISP dialect at that site. This draft served as the basis of discussion at a more formal meeting in November 1981 (the first of the two referred to in Steele's comment). Between December 1981, when a central electronic archive was established (and when our dataset begins), and December 1983, when the manual was

essentially complete, there was only one more face-to-face meeting, in August 1982.

The group was a temporary, electronic organization, ad hoc and relatively informal in its operation, with no predefined timetable or formal structure. Nevertheless, the person who took responsibility for compiling the reference manual emerged as a de facto project coordinator, with several others playing key supporting roles. He issued various drafts of the manual, on paper and in electronic form, that served as milestones and foci for the group's work. Another participant took charge of the (electronic) mailing list, establishing a public archive. All e-mail messages that included the distribution list in the TO or CC (copy to) field were sent to everyone participating in the project and were automatically archived. During a period of over two years the group made hundreds of decisions, both major and minor and of varying levels of controversy, about how the language would work; as a result, a record of the discussion was seen as critical. The coordinator noted that the archive "proved invaluable in the preparation of [the] manual." The archive also made it possible for participants to revisit prior discussions and, for those joining the project after it had begun, to review what had already been said or decided on specific issues. The project was negotiated to its desired end product, a reference manual for the standard LISP language, published in 1984 as *Common LISP: The Language* (Steele, 1984).

Data Collection

The primary data for this study consist of the transcripts of almost 2,000 CL electronic mail messages archived from December 1981 to December 1983.[1] Background information and perspectives for interpreting these messages came from a series of two-phase, semistructured interviews. Because the interviews provided supplementary rather than primary data, we did not attempt to interview all the participants, conducting interviews with nine major players. We conducted the interviews after doing preliminary content analysis of the messages, which allowed us to draw on the results of this analysis in our interviews. The first phase of the interview, which was the same for each participant, focused on project history, membership, roles, and social norms. In the second phase, we used a variation of the discourse-based interview. As described in Odell, Goswami, and Herrington (1983), this technique is based on a previous analysis of text written by the interviewees. It involves showing interviewees specific passages along with one or more variations and then asking them to discuss their reasons for using the chosen alternative rather than other options. We did not pose alternatives in our interviews but rather posed customized questions about their own and others' message samples that probed the patterns we initially observed in the transcripts. These interviews grounded our interpretation of the messages, helped to elaborate and explain the patterns we detected, and provided some suggestions for additional patterns. We later communicated with some interviewees via e-mail to clarify issues that arose in subsequent analyses.

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We did not have access to private e-mail messages between specific CL participants, nor to other interactions they may have had, such as telephone conversations and chance encounters at professional meetings or in hallway corridors.

We analyzed the message transcripts both qualitatively and quantitatively. Our textual analysis, which involved reading hundreds of messages in the archive, provided the grounding for a coding scheme based on the two dimensions constituting the definition of genre: purpose and form. Purpose categories refer to the socially recognizable purposes of a message. Because we observed that many messages had multiple purposes (e.g., a message raising a question and proposing a solution), one or more of six purposes could be indicated. Form categories refer to a message's formatting features and linguistic characteristics, including those common in nonelectronic communication (e.g., subject line, greeting, and sign-off), as well as those more characteristic of electronic communication (e.g., informality and graphical elements such as the sideways smiley face :-) created with alphanumeric characters). These categories were coded simply as present or absent. We supplemented the observed features of form with standard text-formatting devices (e.g., Felker et al., 1981), such as lists and subheadings, to obtain our final set of purpose and form coding categories, which are listed and described in Table 1.

Table 1

Definition, Reliability, and Distribution of Coding Categories (N = 1332)

Coding category	Definition of coding category	Reliability (Cohen's k)	N	%
Purpose:				
FYI	Informational message ("For Your Information")	0.85	610	45.8
Meta-comment	Comment on group process or use of the medium	0.91	128	9.6
Proposal	Proposed rule, feature, or convention for CL	0.83	321	24.1
Question	Request for information, clarification, or elaboration	0.91	388	29.1
Response	Reply to previous message or messages	0.89	1068	80.2
Other	Residual category (e.g., ballots, thanks, apology)	0.68	146	11.0
Form:				
Aside to an individual	Group message includes a remark to a named individual	0.85	34	2.6
Embedded message	Message includes all or part of a previous message	0.96	284	21.3
Graphical element	Message includes graphical elements	1.0	13	1.0
Heading	Message includes a single main heading	0.90	5	0.4
Informal	Message indicates informality and colloquialism	0.84	883	66.3
LISP code	Message contains offset extracts of LISP code	0.95	235	17.6
List	Message includes lists in the body of the text	0.98	176	13.2
Nonstandard usage	Message includes nonstandard grammar or punctuation	0.91	50	3.8
Opening	Message includes an opening salutation or phrase	1.0	46	3.5
Sign-off	Message includes a closing remark or signature	0.96	466	35.0
Subheadings	Message includes subheadings in the body of the text	0.85	62	4.7
Subject line	Message includes a completed subject line in the header	1.0	1241	93.2
Word or phrase emphasis	Message emphasizes some words or phrases	0.94	203	15.2

A research assistant used this scheme to code all the electronic message transcripts. To judge coding reliability, one of the researchers independently coded a stratified sample of 124 messages selected by the other researcher to represent all coding categories. As shown in Table 1, intercoder reliabilities were high (Cohen's κ = .80 or above) for all categories used, except for the residual "other purpose" category, used primarily to locate interesting phenomena for later qualitative analysis.

Since communicative genres are socially based, we examined the frequency of participation by senders to

determine the data to be included in genre analysis. We found that 17 participants had sent a large number of messages during the project, while about a hundred had each sent less than 1 percent of the total messages (fewer than one per month). Based on this low level of participation and on information from the interviews that confirmed the peripheral status of such people in the CL group, we removed these peripheral participants' messages from the dataset. The resulting dataset contained 1332 messages sent by 17 participants during a 25-month period. Of the 17 participants in the dataset, five each generated over 5 percent of the messages. These five, all of whom we interviewed, were also consistently identified (by each other and by the other interviewees) as key players in the project. We thus treated the messages of these five participants individually and aggregated the remaining participants' messages (responsible for 33 percent of the archive) into an "other participants" composite.

Genre Definition

As the medium of electronic mail transmits written communication, we began our exploration with the assumption that certain traditional genres of written organizational communication (such as the memo) might be enacted by the project participants. We defined the typical form of each genre in terms of our coding categories by drawing on the historical evolution (Yates, 1989) and contemporary usage (e.g., Felker et al., 1981) of these traditional genres.

Genres are often modified to suit a group's task or a particular medium; hence, we expected to see some variants of traditional genres in the group's messages, particularly as most of the participants had been using electronic mail before the project began. We used inductive techniques to identify and define such genre variants. Frequencies of coding categories indicated which features were common and which were rare, while textual analysis and interviews provided some rationales for such patterns. In seeking genre variants, we used the frequencies to assess the categories that most limited the number of exemplars of a genre. We then determined which constraints could be dropped without violating the essence of a genre (its recognized purpose and salient characteristics of form). When one of these variants was more prevalent than the genre as initially defined, our analysis proceeded with that variant. In this exploratory study we wanted to be open to the possibility of other genres, including new electronic ones, so we also sought other patterns among the messages by iteratively examining interview data, message texts, and associations among the coding categories.

Genre Analysis

We examined both the presence of different genres in the CL repertoire and their change over time (in terms of variations in repertoire composition and shifts in repertoire use). Genre presence presumes that genres are socially recognized, implicitly or explicitly, within a community. To ensure that the genres we had identified in the archive were

recognized by most members, we analyzed the distribution of genre use across the 17 participants represented in our dataset. We found that all the identified genres were used by each of the five key participants in at least 3 percent of their messages (and in most cases at much higher levels), and in over 7 percent of the aggregated other participants' messages. One genre system we identified was an exception to this standard. This level of use indicates that a preponderance of the participants recognized and used the genres identified and provides, we believe, adequate evidence of the genres' social recognition within the community.

We analyzed both absolute and relative use of genres over time. While the absolute use by month allowed us to associate use patterns with project events, the fact that the messages were distributed quite unevenly over the 25 months studied precluded calculating meaningful percentages of genres for many time periods. Thus, to get an overview of relative change in the use of genres, we divided the chronological series of messages into fixed-size clusters (nine periods of 148 sequential messages each). Grouping by message cluster allowed us to analyze all the messages by genre over time, capturing the ongoing pattern of genre enactment within the community. In examining shifts in use over time, we checked for and eliminated the possibility that the genre use of specific participants might account for these shifts. We ensured that the change in the relative use of each genre was broad-based and did not simply reflect the different participation of people with different genre preferences.

COMMUNICATIVE PRACTICES OF THE CL GROUP

Our study of the CL project revealed that participants enacted a number of different genres in electronic mail to accomplish their collaborative work. Two other genres of communication—the formal face-to-face meeting (executed twice) and the manual with its six drafts—were also enacted by the group. We did not have access to these, and so our genre analysis reflects the group's electronic repertoire. The meetings and manual drafts served as important events in the project, however, and we consider this influence in our later discussion of shifts in CL repertoire use. We discuss the CL electronic genre repertoire in terms of its nature, establishment, and change over time.

Nature of the CL Genre Repertoire

We found that the CL group's genre repertoire was composed of three genres (memo, proposal, and dialogue) and one genre system (ballot) generated and distributed within electronic mail on a regular basis. Below, we first examine the genres that were present in the electronic genre repertoire, then consider the repertoire as a whole, including the genres that were absent from it.

Memo genre. A memo traditionally documents intraorganizational communication and is identified primarily by its distinct heading, rather than by any specific purpose. Table 2 gives our definition of the informal variant of the memo genre that we found in the messages, and Figure 1

provides an example. Forty-one percent of the messages in the dataset matched the characteristics of this memo genre. Our textual analysis and interviews had revealed a great deal of informality in the CL group. This impression was confirmed by the coding, which identified 66 percent of the messages as having informal language. Despite their informality, these e-mail messages were seen by the participants as serving a general communicative purpose similar to that of paper-based memos. As one participant noted in an interview, "We used them the same way we used interoffice memos."

Figure 1. Example of a memo.

Date: Monday, 26 July 1982, 14:07-EDT
From: DW
Subject: Re: Boole
To: Common-Lisp at SU-AI

I would like to state for the record that either BOOLE should be strictly limited to three arguments, or it should work as it does in Maclisp (any number of arguments, left-associative). It is unacceptable for it to do anything other than these two things, on the grounds that adding new arguments incompatible with Maclisp cannot possibly be so worthwhile that it is worth introducing the incompatibility. As to which of these two things it does, I'll be equally happy with either.

It is not surprising that this genre was commonly used in the CL interaction. Documentation was clearly an underlying purpose of the entire electronic exchange, as suggested by the archiving of all messages. While the members of the CL project worked for different organizations, they were part of the same professional community. The project, by nature, required these individuals to come together in at least a temporary electronic organization with a common goal, making an intraorganizational genre seem appropriate. Further, most of the participants used an electronic mail system that provided fields for the standard memo header, and the memo may thus have served as a default genre.

Dialogue genre. Dialogue is a form of written interaction that is modeled on oral dialogue, but it makes use of the documentary quality of written communication and of the capability provided by the electronic medium to insert all or part of a previous message, which we label an "embedded message," into a new message. This feature, when explicitly selected, visually differentiates the embedded message so as to suggest a dialogue. As defined in Table 2 and illustrated in Figure 2, this genre is characterized both by a shared communicative purpose (response to a previous message) and by specific features of form (the embedded message and the subject line). Analysis of the dataset identified 20 percent of the messages as dialogue messages.

Unlike the conventional (paper-based) memo, which typically stands alone, dialogue, as the name implies, embodies a continuity and interdependence among messages. Dialogue

Table 2

Definition and Distribution of Genres

Genre	Coding definition	N	%*
Memo	Subject line; no aside to individuals; no embedded message; no graphical elements; no heading; no nonstandard elements; no opening; no sign-off.	540	41
Dialogue	Purpose = "response"; embedded message; subject line.	260	20
Proposal	Purpose = "proposal"; LISP code.	106	8
Ballot genre system	Not captured by the coding categories; identified through textual analysis of messages coded with purpose = "other."	6†	0.5

* The numbers in this column do not add up to 100% because not all the messages in the dataset were uniquely classified as genres of communication. Further, some of the messages involved genre overlap.

† These six instances of a genre system include 54 messages, viz., 6 ballot questionnaires, 42 ballot responses, and 6 ballot results. Additional responses to each ballot were deleted from the dataset when peripheral participants were eliminated.

messages were explicitly dependent on each other, as indicated by the inclusion of previous messages or pieces of messages and by the use of a subject line that usually repeated and occasionally varied an earlier subject line. The embedded message feature of many electronic mail systems is not easily available in the paper medium. The closest paper-based organizational analogue to this genre

Figure 2. Example of a dialogue.

```
Date:   Monday, 8 November 1982   21:40-EST
From:   DM
To:     SF
Cc:     common-lisp at SU-AI
Subject:   asterisks around variables
In-reply-to:  The message of 8 Nov 1982   20:56-EST from SF

          Date:    Monday, 8 November 1982   20:56-EST
          From:    SF

          (2)  To me, the purpose of the asterisks is to flag those variables that
               are "property of Lisp" so that the user doesn't accidentally
               blunder into them.

Hmm, that's an interesting and novel idea. We handle that by having DEFVAR
complain if you define the same variable in more than one file, and by
using packages to decrease the likelihood of that. The asterisks are not
there to distinguish the system's variables from the user's variables.
My philosophy is "the fewer magic distinctions between the system and the
user the better; anything the system can do the user should be able to
understand and to change."
```

would be a memo on which a response has been written by hand or to which one has been attached. In that analogue, however, the exchange is unlikely to continue beyond a single reply. In contrast, dialogue messages occurred in a chain of interwoven messages, creating what one participant called "the metaphor of a conversation." Participants noted the usefulness of this type of communication in interviews, saying, for example, "It was a way of making a connection with what had come before" and "I use embedded messages all the time as a way of letting people know what I am referring to."

Proposal genre. A proposal is most commonly distinguished by its specific communicative purpose—advocating or proposing a course of action for consideration by others. As its form can vary, we defined it by the feature of the particular variant found in the messages—set-apart strings of CL code that specified or illustrated the content of the proposal—as shown in Table 2 and the example in Figure 3. Analysis of the dataset revealed that 8 percent of the messages matched this definition.

Figure 3. Example of a proposal.

```
Date:   27 April 1983  15:30-EDT
From:   KP
To:     MM
Cc:     Common-Lisp @ SU-AI

The T dialect has a family of special forms called things like CASE, SELECT, etc.
nd a related family called XCASE, XSELECT, etc. meaning "exhaustive". I suggest
that Common-Lisp could adopt a similar convention.
                (XSELECTQ FOO .. forms ..)
would be like
                (SELECTQ FOO .. forms .. (OTHERWISE .. error ..))

Is this what you're looking for?
```

This genre appears to be a variant of the traditional written proposal, sharing its social purpose of proposing some idea or action for approval, though restricted in subject matter to the LISP language. Many CL proposals indicated the specific subject matter in subject lines that identified the aspect of the LISP language dealt with and assisted in later retrieval. As is often the case with paper-based proposals, we found that the CL proposal overlapped with other genres in the CL repertoire. Of the 106 messages classified as proposals, 42 percent were also classified as memos and 13 percent as dialogues. This realization of the proposal genre within the informal memo and dialogue genres, rather than within more formal scientific proposal or letter genres, reflects the group's informality and collegiality.

Ballot genre system. The activity the group referred to as balloting, clearly a variant of paper-based forms of voting, is an instance of what Bazerman (1995) terms a genre system. The ballot genre system comprises three interrelated types of messages: (1) the ballot questionnaire, which was a

message from one group member listing and describing the issues to be voted on; (2) the ballot responses, which were messages from the members containing their votes and comments on each of the issues in the ballot; and (3) the ballot result, which was a message from the ballot initiator summarizing the results of the voting. The ballot questionnaire shaped the form of responses and results. Its form consisted of an opening statement soliciting participation in the ballot and providing instructions on voting, followed by a numbered list of items phrased as questions or alternative ways of resolving an issue. Each item also included a statement of the initiator's sense of the group's and/or his own current preference for handling the issue, as shown in the example in Figure 4a. The responses tended to include a simple statement of agreement or disagreement for each item on the questionnaire, a statement of reasons for the positions taken, and, occasionally, alternative proposals, as in the example in Figure 4b. Ballot results were generally copies of the ballot questionnaire with a summary of the members' votes on each item, along with comments inserted from their responses.

Six ballots were found in the dataset, each with all three interdependent message types, including varying numbers of electronic responses to each. Some individual messages included in each instance of the ballot genre system were found to overlap with other genres, but when considered as instances of a genre system, the six ballots were unique in the dataset. While there was some variation in the form features of these messages, all followed the basic structure and exhibited the distinctive purpose of their ballot message type. Of the six ballot instances, the ones in October 1982 and May 1983 were major, each representing significant decision points on over twenty unresolved issues. Our interviews revealed that these two ballots served as important milestones for the project, highlighting what had been accomplished to date and what still needed to be done. The other four ballots, some of which were referred to by participants as "mini-ballots," covered fewer issues and were treated as less important events.

While all the ballot questionnaires and results were issued by only two people, all key participants and most other participants sent ballot responses. The three ballot messages had readily identifiable forms, and the socially recognized purpose of balloting—to get a sense of members' positions on various unresolved issues—was explicitly discussed in the messages. For example, the project coordinator, who issued the first major ballot, described its purpose in its preamble:

Here is what you have all been waiting for! I need an indication of consensus or lack thereof on the issues that have been discussed by network mail since the August 1982 meeting, particularly on those issues that were deferred for proposal, for which proposals have now been made.

Similarly, the initiator of the second major ballot in May 1983 indicated that it was occasioned by the increased number of issues raised in recent discussions: "I was going to send

Figure 4a. Example of ballot questionnaire (excerpt).

```
Date:   Mon, 30 May 1983  02:18-EDT
From:  SF
To:     common-lisp@su-ai
Subject: Memorial Day Ballot

Memorial Day Ballot:

I was going to send these out in smaller doses, but a bunch of issues
built up and I decided that a real ballot would be easier.  A few more
issues will be sent out for consideration as soon as we have come up
with some coherent proposals and analyses.  Please reply by Wednesday
afternoon to SF and/or Common LISP.

Recommendations in square brackets are by SF.
-------------------------------------------------------------------------------------------
1.  It is proposed that we eliminate PARSE-NUMBER from the manual.

[I am strongly in favor of this.  This function is hard to document
properly, hard to implement in its full generality, and useless.  Most
of what this function does can be handled simply by calling READ on the
string.  Other cases, such as Teco-like integer prefixes, can easily be
handled by application-specific user functions to scan a string for the
first non-digit, etc.]
-------------------------------------------------------------------------------------------
2.  LOOP should create a BLOCK NIL around the TAGBODY, so that RETURN
works.

[I am strongly in favor.  If LOOP doesn't do this, the user will almost
always have to, and any future complex LOOP package would have to create
such blocks as well.]
-------------------------------------------------------------------------------------------
3.  Define GET-INTERNAL-TIME to get some implementation-dependent form
of runtime.  Add a second function, GET-REAL-TIME that returns some measure
of elapsed real time in the same internal-time format.  On some
machines, especially personal ones, these times will be identical, and
implementations may not be able to supply one or the other, but where
both are available (as on the Vax), there are legitimate needs for both.

[I am strongly in favor.]
-------------------------------------------------------------------------------------------
...
```

these out in smaller doses, but a bunch of issues built up and I decided that a real ballot would be easier."

Our interviews indicated that balloting was a mechanism for identifying whether agreement had emerged. A key participant told us, "it was a way of seeing if we had consensus and a way of putting all the little details away—a way of sticking a pin through our decisions," while another commented, "We used balloting as a way to decide after we had discussed various positions." Balloting was also a mechanism for identifying whether and where more deliberation was needed. Issues in which an adequate consensus did not emerge were recycled for more discussion, as the coordinator explained in his interview:

I eyeballed each cluster of responses. If there was a clear consensus, I noted it as such. If the consensus was not clear then I noted the preponderance of opinion. And if it was undecided, that

Figure 4b. Example of ballot response (excerpt).

```
Date: 30 May 1983   16:54  EDT
From:  KP
Subject:  Memorial Day Ballot
To:  SF
cc:  Common-Lisp@SU-AI


Summary:

     YES        on: 1-2, 4, 7-16, 19, 21.
     NO         on: 3, 6, 18, 20.
     no opinion  on: 5, 17.

Comments:

3. No: Do not add GET-INTERNAL-TIME and/or GET-REAL-TIME without
specifying the format of the time. My experience with code that hacks time says
this is frequently worthless and often dangerous.
...


8. Yes: This is quite useful. Many people prefer destructuring to &keywords.
I recommend, in fact, allowing (DEFMACRO FOO (A . B) ...) to mean
(DEFMACRO FOO (A &REST B) ...) and even (DEFMACRO FOO X ...) to
mean (DEFMACRO FOO (&REST X) ...) as I'm pretty sure the Maclisp family
now allows.
...


9. Yes: This sounds harmless and might do some good.


...


18. No: I would like to see a more coherent description of what this means before
I say yes. In general this sounds right, but I'm increasingly bothered by the
off-and-on way we seem to treat package prefixes as either strings or symbols.
...


21. Yes: This problem may be more general than just FEATURES, but this is
a good start.
```

is, if the votes were all over the place, I marked that for further discussion.

While balloting involved all CL participants, its intent was not simply to find out what the majority favored. One key participant, in a message reporting the results of a major ballot, explained the balloting process this way:

Note that the raw vote-count doesn't decide the issue here. One good argument pointing out why something is workable is stronger than any number of "OK, I'll go along with the proposal" votes, especially if those votes come before the argument. On questions of mechanics, people speaking for an implementation group carry more weight than others. On questions of taste, the process is pretty democratic, but perhaps weighted slightly for experience. Again, in matters of taste, a cogent argument carries extra weight.

This process was confirmed by several other participants in our interviews. One told us, "Our voting process was never democratic. We had to balance those with knowledge and power. So [the project coordinator's] decisions were never just a simple count; his was weighted voting," and another said, "Some people's positions [were] not as important as others. . . . Some groups had veto power. Key sites carried more weight." Within the CL community, the balloting communicative practice was used in ways that went beyond

simple registration of votes, being used to identify settled and contentious issues, reveal areas in which further work was needed, and indicate whose concerns had to be attended to.

Nature of CL genre repertoire as a whole. The presence of genres in the CL electronic repertoire as a whole reveals that the group drew on three different genres and one genre system to arrive at its ultimate goal—a published manual documenting and communicating the official Common LISP language to the broader computer community. These genres indicate a group that organized itself around an informal yet intellectual exchange among peers rather than a formal project structure and methodology. The group engaged in communicative practices that accomplished the work of the CL project by soliciting and volunteering informal individual proposals from a wide range of group members, engaging in considerable and often protracted discussion and debate of these proposals and their implications, and then resolving issues and reaching collective decisions by using a more formal balloting mechanism that nevertheless allowed for interpretation and weighting of opinions that considered expertise, experience, implementation commitments, and cogency of arguments.

While the presence of various genres in a repertoire provides clues about a community's organizing process, the absence of genres from a repertoire is also particularly revealing about what forms of interacting are not valued or salient to a community. We searched for something resembling the business letter genre in the CL genre repertoire. Because the group included members from various organizations, the business letter—traditionally used to communicate across organizational boundaries—could have been appropriate. In spite of a definition that was as loose as possible without rendering the genre unrecognizable or undifferentiable from a memo, we found only four examples (0.3 percent) in the entire dataset. In interviews, respondents indicated that they did not distinguish their local (intraorganizational) electronic mail messages from those used to communicate with their CL colleagues in other organizations. As a participant noted, "I saw them all just as colleagues." It appears that in this community—in which professional ties were strong and informality was the norm—and for this type of work—extended, complex, and documented negotiations among peers—letters were not seen as appropriate or effective types of written communication.

Given the informality of the group, we also looked for the least formal genre of written organizational communication: the note. A note is used to communicate briefly, informally, and relatively personally, and is typically considered ephemeral rather than documentary. Only three (0.2 percent) of the messages fit our definition of note. Opening greetings, which appeared in only 3 percent of the messages, were a major factor limiting the note genre. As one participant said in an interview, using openings in CL messages "would be like saying hello all the time during a conversation." The note genre may have appeared in

personal e-mail exchanges among project members, but it did not play a role in the ongoing CL group communication.

The absence of another common task-related genre, the report, in the group's repertoire provides information about the group's relationship to outside constituencies. If this project had been explicitly funded and authorized (rather than simply recommended) by the Defense Department, the group would probably have had to submit a series of progress reports and a final report. The project activity, however, was documented in a published manual rather than in formal reports. Moreover, the report genre, an extended and analytic documentation of a subject or situation, was not consistent with the messages, which tended to be short and rapid exchanges. The absence of formal reports, along with the presence of the manual, reveals that the group felt itself answerable primarily to its community of practice (LISP designers and implementors), rather than to an external funding institution. The presence of informal proposals to the group itself, rather than more formal proposals to external agencies, further points to this interpretation.

Establishment of the CL Genre Repertoire

Figure 5, which graphs the relative use of genres over time, indicates that from the beginning of the project, participants drew on the memo, dialogue, and proposal genres. Our interviews indicate that no explicit discussion of genre rules, organizing structures, or interaction norms took place at the start of the project. The participants appear to have initially and implicitly imported into the project the communicative practices they had used in other contexts. For example, one participant noted in his interview that "inserting quotes from a previous message so it gets more like a conversation was not invented by this group, [but] imported from outside."

Figure 5. Relative use of Common LISP genres by period.
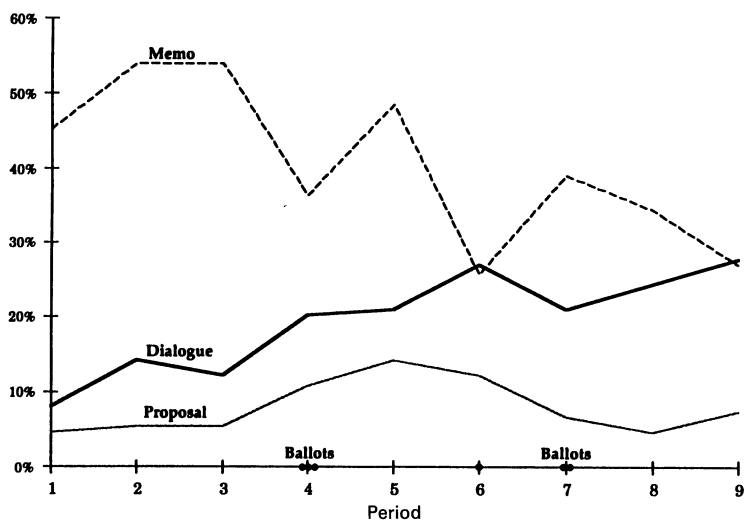
All the participants were computer language designers and active members of the artificial intelligence community,

meeting periodically at professional conferences. Most of them had been trained at one of two institutions— Massachusetts Institute of Technology (MIT) and Stanford—and, as interview comments indicate, most had worked together or at least knew each other prior to the CL project. One participant noted, "We were a pretty small community in Computer Science working on Common LISP. Lots of [the participants] were at MIT, and when they left they still maintained their connections," while another said, "Most of the people [on the CL project] knew each other and had met before we started." As members of the same occupational community, the CL participants shared background knowledge, experiences, values, and interpretive schemes, including knowledge of the project's task (designing computer languages), its domain (LISP dialects), and its process (the practice of language design and norms about using electronic mail). One participant observed, "We already had norms of e-mail . . . the peripheral people who joined just conformed." Thus they were able to adopt, without apparent discussion or dissent, a set of practices, rules, norms, and conventions of interactions based on their shared a priori knowledge and assumptions about how their community of practice organized around and worked on language design. This shared, largely implicit knowledge of interaction norms and rules was then exhibited and reinforced through the CL participants' enactment of the memo, dialogue, and proposal genres.

Implicit importation and adoption of established genre norms was also evident in the participants' use of the manual genre. While we could not analyze this genre, our interviews revealed that the CL group based the first draft of their CL manual (which was known as the "Swiss Cheese" edition and subtitled "Full of Holes—Very Drafty") on the manual of one of the existing dialects. A key participant recalled, "[The project coordinator and I] were . . . drafting the manual for SpiceLISP. Then when we got involved in Common LISP, we just transferred parts of the manual we were already working on to get the Common LISP effort going." The existing SpiceLISP manual thus served as an organizing template for the project's manual drafts and the CL reference manual that was eventually published.

Change in CL Genre Repertoire

The establishment of an initial genre repertoire is typically a stabilizing force, preserving familiar norms and practices in a new situation. But as a structuring process, genre use always creates the possibility of change, both deliberate and inadvertent, over time. The composition and use of an original genre repertoire is likely to change as members respond to changes in their context and their tasks, or as their experiences in the community and with available media grow.

Variation in CL repertoire composition. There was no evidence of inadvertent variation in CL repertoire composition, but the introduction of the ballot genre system in period 4 (see Figure 5, above) clearly represents deliberate

variation in repertoire composition. This genre system was added to the genre repertoire deliberately by the project coordinator, who designed and introduced the electronic form. He explained in his interview that he borrowed the balloting conventions from the paper ballots he had experienced in other contexts: "I probably invented the form, but I was modeling it on paper formats." Here again, we see a familiar template established in one setting being transferred into a new one. The addition of the ballot genre system to the CL repertoire was reinforced by the deliberate action of the other participants who accepted and used it, including members who responded to the ballot questionnaires and the other key participant who subsequently initiated his own ballot questionnaires. Unlike the initial establishment of the genre repertoire, in which the transfer of genres was largely implicit and unreflective, this transfer of a familiar genre system into the CL genre repertoire some time after its establishment was clearly the result of deliberate and reflective agency.

Shifts in CL repertoire use. Relative use of the genre repertoire shifted noticeably over the 25 months of the CL project. As evident in Figure 5, above, use of the memo genre was initially quite frequent but dropped off later. From an initial level of 45 percent, its use rose to 54 percent during period 2, then dipped in periods 4 and 6 to a low of 26 percent in period 6. If we smooth out these dips, we see a general decline from period 3 to the end of the project, when it stood at 27 percent. Over time, then, the group gradually decreased its use of the memo. We see a general rise in use of the dialogue genre over the project, from a relatively low 8 percent of all messages to a high of 28 percent. The pattern of shifts in use revealed in Figure 5 suggests that while dialogue was a small part of the CL repertoire at the beginning of the project, it became an increasingly accepted and used genre during the course of the project. Because the proposal genre was very specific to the task at hand, shifts in its use over time, not surprisingly, reflected specific events in and tasks of the project, as we discuss below, rather than simply increases or decreases over time. Relative use of the proposal genre peaked in periods 4 through 6, with a high of 14 percent in period 5, and declined to its earlier level of 5 percent in period 8 before picking up slightly near the end when all outstanding matters had to be resolved (increasing to 7 percent of messages in period 9). Use of the ballot genre system was intermittent, clustering in periods 4, 6, and 7 and reflecting project circumstances.

Inadvertent shifts in repertoire use. Inspection and comparison of the relative shifts in genre use shown in Figure 5, above, reveal that the use of the genre repertoire in the initial periods of the project, when use of the memo genre dominated that of the dialogue genre, contrasts with that at the end of the project, when participants were drawing as much on the dialogue as on the memo genre. These shifts in use patterns—a sporadic decline in use of the memo genre and a gentle increase in use of the dialogue—are not associated with any explicit event,

milestone, or deliberation, and hence appear to reflect inadvertent shifts in the use of the CL genre repertoire.

Our interviews illuminated these shifts in use patterns over the course of the project. The CL participants became increasingly likely to use embedded messages to enact the dialogue genre, which maintains discussion threads and lends a more conversational tone to the deliberations. As one participant told us, "There definitely is a trend towards increased use of embedded messages." This convergence of norms concerning the use of the dialogue genre reflects Bettenhausen and Murnighan's (1985) result that a group's shared experiences lead members to develop a "common definition of appropriate group behavior," which then forms the basis of expectations about future interactions. It is also consistent with Fulk's (1993) finding that members of work groups share identifiable patterns of meaning and action about the use of communication technology.

In addition to this long-term trend toward increased use of dialogue, there were two incidents during the project—shown in Figure 6, which displays the absolute use of CL genres by month—that seemed to occasion inadvertent but significant short-term shifts in repertoire use. First, at the end of February 1982, participants began debating the use of the symbol "NIL" in the language. As one key participant told us, "The issue of whether NIL is a symbol was one of the most divisive and religious of issues

Figure 6. Absolute use of Common LISP genres by month.
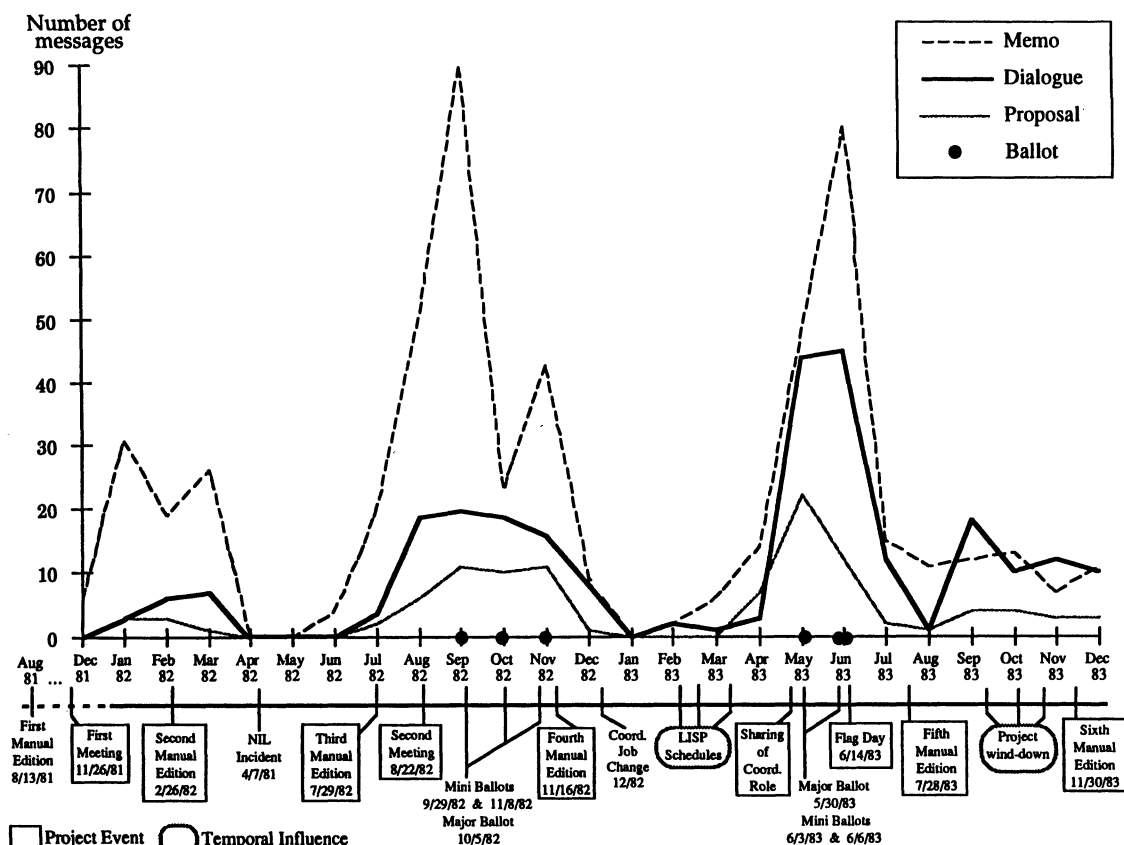
in the LISP community. In some cases significant implementation decisions hinged on the answer to that question." An intense debate continued throughout March and into the beginning of April and was only resolved after a number of key players agreed to compromise their positions. This compromise in early April 1982, referred to in interviews as the "NIL incident," led to an unintended drop-off in all communicative activity for a couple of months. As one of the key participants told us: "[After a few of us compromised] the list went dead . . . decompression from this debate was the essential cause." The second incident occurred in December 1982, when the project coordinator changed jobs. As he indicated in his interview, "I was starting a new job, so there was a real drop-off in my participation. I was tired." Because he was the de facto coordinator of the project, a decline in his attention and participation led to an inadvertent decline in activity for the whole group, evident in the low use of all genres from December 1982 to April 1983. These inadvertent shifts also interacted with a number of deliberate shifts in repertoire use.

Deliberate shifts in repertoire use. Such shifts in repertoire use clustered around four distinct episodes of project activity. We can relate these deliberate shifts to Gersick's (1994) mechanisms for triggering change: event-based pacing, which describes shifts in members' attention and actions around the occurrence of salient events; and temporal pacing, which describes shifts in members' attentions and actions due to the recognition of temporal milestones.

The first episode of project activity (January—March 1982) shows changes in use of the memo, dialogue, and proposal genres clustered around two project events: the face-to-face meeting in November 1981 and the release of the second draft of the manual in February 1982. At the November meeting, preliminary decisions about language design were made, and many other issues were raised but not resolved. The unresolved issues generated a rise in memo, dialogue, and proposal messages, which led up to the release of the second draft of the manual. This draft, the "Flat Iron" edition (subtitled "Still a Few Odd Wrinkles Left"), sparked a major discussion among the participants (evident in the second rise of memo and dialogue, but not of proposal messages in March 1982) having to do with the NIL symbol and ending with the incident discussed above.

The second episode of project activity (July–November 1982) includes three project events: the release of the third draft of the manual in July 1982; a face-to-face meeting in August 1982; and the release of the fourth draft of the manual in November 1982. The dissemination in late July 1982 of the third draft of the manual, the "Colander" edition ("Even More Holes Than Before—But They're Smaller!"), increased interaction among CL participants, evident in the rise of memo, dialogue, and proposal messages during August 1982. This draft also served as the basis of discussion during the August meeting, as indicated in a message sent by the project coordinator in early July 1982: "Preparatory to [the meeting] I will strive mightily to get [third] draft copies of the Common LISP manual with all the latest revisions to people

as soon as possible, along with a summary of outstanding issues that might be resolved." The face-to-face meeting was scheduled to coincide with a professional conference that most CL participants would be attending, as indicated in the same message sent by the coordinator: "Inasmuch as lots of LISP people will be in Pittsburgh the week of the LISP and AAAI conferences, it has been suggested that another Common LISP meeting be held at CMU on Saturday August 22, 1982." Our interviews indicate that during the meeting a number of unresolved issues were delegated to various participants, who were to prepare proposals on the issues and present them to other participants through electronic mail. This procedure was confirmed by statements in proposal messages, such as: "At the meeting in August I was assigned to make a proposal on . . ."; and "At the meeting I volunteered to produce a new proposal for. . . ." These proposals generated considerable debate (evident in the high use of the memo, dialogue, and proposal genres following the August meeting) and spawned the project's first electronic balloting activity (two mini-ballots in September and November 1982 and one major ballot in October 1982) to evaluate the proposals and counterproposals and achieve some closure. The decisions reached through this balloting activity were reflected in the fourth draft of the manual, the "Laser" edition ("Supposed To Be Completely Coherent"), which was released in November 1982 and which resulted in the drop-off in communicative activity in December 1982.

The third episode of project activity (May–July 1983) includes three project events: a shift in coordinator responsibilities from one to two participants in May 1983; the release of the fifth draft of the manual in July 1983; and the designation of a cut-off date for accepting changes to the CL language. This episode also reveals a temporal influence on the project's communication—the pressure of LISP implementation schedules. The shift to shared coordinator responsibilities was necessitated by the coordinator's change of jobs in December 1982, which, as we described above, led to an inadvertent decline in project activity. Over time, this delay became increasingly problematic for those participants involved in LISP implementations, which were long and expensive product development efforts involving multiple people and external vendors. Because LISP implementation schedules were critically dependent on the completion of the CL reference manual, these schedules exerted considerable temporal pressure on the participants to move the CL project forward. In early May 1983, one such participant became sufficiently frustrated to act. He contacted the coordinator directly and offered to share responsibility for completing the manual. As he recalled:

We were waiting for the final draft of the manual from [the coordinator]. Time was running out, and we were hanging from our fingertips. [The coordinator] was not sending any messages. So I took some back channel action. . . . That's when I became the moderator even though [the coordinator] kept responsibility for the manual. I was moving the discussion process forward.

This participant, or as he labeled himself in his interview, "the moderator du jour," announced the change in

responsibilities to the rest of the group in a message sent in early May 1983:

For reasons too complicated to discuss here, progress on the Common Lisp Manual has been rather slow lately. [The coordinator] and I have discussed how to fix this, and we have decided that the best way to converge quickly is for him to concentrate on editing in the relatively non-controversial things and those items on which decisions have been reached, and for me to orchestrate the arpanet-intensive process of reaching some sort of consensus (or at least a decision) on those issues that still require some debate.

This announcement led to an increase in CL discussion and the issuing of new proposals, evident in the rise in memo, dialogue, and proposal messages in May 1983. This renewed interaction provoked the moderator to issue a series of three ballots—a major ballot held at the end of May 1983 and two follow-up mini-ballots at the beginning of June 1983. This balloting activity generated a further increase in memo and dialogue messages during June 1983, which was also sparked by the designation of "Flag Day" (June 14, 1983) as the final date for submitting substantive changes to the manual. Until this point the debate about language features had proceeded without any specific endpoint, but there was now considerable pressure on all participants to complete the project expeditiously, as expressed in this cautionary comment made by the moderator in a ballot results message he sent on June 2, 1983:

If any of the decisions made here strike you as something that you just cannot live with, let me know right away. But before you complain, think about the fact that getting the manual completed and out very soon is extremely important to some of the implementation efforts.

The project coordinator was equally anxious to conclude the manual, and on June 9, 1983 he sent a message to the group in which he nominated Flag Day as the final date by which changes to the language would be accepted. He wrote:

The Great Mail Blizzard of '83 appears to have subsided, and the outstanding issues, nasty and otherwise, appear to be suitably dealt with. We have to choose a cutoff date, and now seems to be a good time. I propose to give yet another meaning to "Flag Day." . . . After that point (23:59 on June 14, 1983) I propose to terminate "elective" changes to the Common LISP manual.

Flag Day came to represent a significant event in the project, and its passage occasioned a marked transition in repertoire use from high to low use of all genres. The discussions and decisions over the months of May and June 1983 were reflected in the modifications integrated into the fifth draft of the manual—the "Excelsior" edition ("Suitable For Framing or Wrapping Fish!")—which was released in late July 1983. This fifth edition did not generate much discussion among the CL participants (evident in the decline of project activity in July and August 1983), because it represented a nearly complete reference manual. As the coordinator explained in a message, he sent the fifth edition out solely "for the purpose of proofreading and implementation" and wanted feedback "only on typographical errors, outright errors or lies, and necessary improvements to the presentation."

The fourth episode of project activity (September–December 1983) is influenced by one project event, the release of the

sixth and final edition of the manual in November 1983, and one temporal influence, the final wind-down of the project. The increased project activity from September through November 1983 (evident in the slight rise of memo and proposal messages and the steeper rise in dialogue messages) reflected participants' last efforts to debate the implications of certain decisions and to achieve closure on a few unsettled issues. Participants apparently recognized that they had one final opportunity to get their changes into the CL reference manual. Many of these messages referred specifically to their "last minute" nature. For example, one message (sent at 11:26 PM) began with the comment, "Okay guys, here is a (literally) eleventh-hour proposal for. . . ." This communicative activity ended with the release in late November 1983 of the sixth and final draft of the manual, the "Mary Poppins" edition ("Practically Perfect In Every Way"). A temporal influence was evident in the continued use of memo, dialogue, and proposal genres even after the final draft of the manual had been issued (December 1983). This communicative activity in the last few weeks reflected participants' recognition that the project was winding down and that it was time to shift gears, cognitively and communicatively, to begin discussing LISP implementations and next versions of the manual. One proposal sent during this time was introduced with the comment: "As long as we're tossing off random ideas, here's one from me. For the second edition only, of course. . . ." Such discussions and speculations were invited by one key participant who had sent the following message in early December 1983:

A bunch of things were put off without decisions or were patched over in the effort to get agreement on the first edition. . . . However, it is perhaps not too soon to begin thinking about what major additions/changes we want to get into the second edition, so that those who want to make proposals can begin preparing them and so that people can make their plans in light of what is likely to be coming.

This participant then went on to list a number of issues that he believed remained problematic and invited ideas, opinions, and suggestions from the group.

The four episodes of project activity indicate that both event-based pacing and temporal pacing influenced how and when CL participants organized their work and interaction during the project. It is not surprising that project events (in the form of meetings, drafts of the manual, and a cut-off date) should have a significant influence on deliberate shifts in repertoire use, given that the strength of event-based pacing is the potential "to gain the rewards of pursuing a course indefinitely until the desired events indicate success" (Gersick, 1994: 41). In this case, the CL group continued their interaction until the "desired event" had been achieved—a publishable draft of the manual that satisfied all key participants. It is interesting, however, that temporal pacing should have some influence on project activity, given that the CL group had not established an a priori deadline and the project did not have specific, predefined milestones. Nevertheless, temporal pacing (in the form of participants'

LISP implementation schedules and project wind-down) can be seen to account for some deliberate shifts in CL genre repertoire use, one of which proved particularly important to the project—the resumption of CL deliberations triggered by implementation schedules.

IMPLICATIONS

In this paper, we demonstrated that the concept of genres introduced previously (Yates and Orlikowski, 1992) may be operationally defined and used to analyze a community's communicative practices. Further, we developed the concept of genre repertoire and showed that the set of genres routinely enacted by a community may be understood in terms of such a repertoire. We also charted changes in a community's repertoire, analyzing deliberate and inadvertent structuring of that community's communicative practices.

Examining the changing genre repertoire of the CL community was not merely an exercise in classifying discourse or communication types. Rather, genre and genre repertoire proved to be powerful tools for revealing certain aspects of the CL community's organizing process. The presence of the memo genre and the absence of the letter genre in the repertoire, for example, reveal that the CL participants implicitly organized themselves as a temporary organization. The absence of the report genre, combined with the focus on creating a reference manual, reveals that the members held themselves accountable to their own professional community rather than to external parties. This characteristic of the community's organizing process is also revealed by the realization of the proposal genre within the informal memo and dialogue genres rather than in the more formal scientific proposal or letter genres. The rising use of the dialogue genre over the course of the project suggests that the CL participants came to rely increasingly on ongoing conversations as an effective means for conducting their deliberations about language design. The introduction of the ballot genre system and its particular use indicate the CL coordinator's recognition that the group was engaged in a participative rather than autocratic or anarchic decision-making process, but also his acknowledgment that it was necessary to take into account different levels of expertise and experience and to consider the practicality of LISP implementations.

Implications of Genre Repertoire for Organizational Research

Although we cannot generalize from this study of a single community, we can draw on this study's findings, together with those of other researchers, to generate some speculative claims for further investigation. We suggest that when a community is formed, its members come to some understanding, whether tacit or explicit, about the set of genres they will use to interact as a collectivity. This initial set of genres is often based on members' communicative experiences and genre knowledge gained in other communities. As members engage in communicative practices based on their initial understanding, they produce a structured pattern of social interactions that defines and

establishes the genre repertoire of the community. Ongoing interaction by members of the community will tend to draw on and reinforce the genres established within the community, and, over time, the genre repertoire will become increasingly taken for granted as an aspect of the community's organizing process. The establishment and reinforcement of a genre repertoire reflects the tendency within communities toward institutionalization and results in the habitual enactment of particular behavioral routines (Zucker, 1977). Once institutionalized in this way, the genres constituting a community's genre repertoire are organizing structures, serving as "behavioral and interpretive templates" (Barley, 1988: 49) for the community's organizing process. Such a genre repertoire is likely to be a stabilizing and defining element of the community.

Despite the conservative influence of institutionalized genre repertoires, they can and do change over time and with changing circumstances. Genres as organizing structures are highly influential, but they do not determine the particular ways in which members engage in everyday communicative actions. Because genres are enacted through a process of structuring, members are always negotiating, interpreting, and improvising in ways that allow for changes to their organizing structures. Changes may arise inadvertently, when there is "slippage between institutional templates and the actualities of daily life" (Barley, 1988: 51), when community norms converge, and when incidents occasion unintended reactions. Changes may also arise deliberately. As reflective agents, members may respond to time pressures, project milestones, and media capabilities by changing their communicative actions. If such changes in behavior spread and are sustained by the community, they will result in changes to the composition and use of the community's genre repertoire.

The concepts of genre and genre repertoire offer organizational research analytical tools for operationalizing and investigating communicative practices in communities. Because they focus on the structuring of communicative practices over time, these concepts would allow the recognition and tracking of change within a community over time. In addition, these concepts would also allow for comparative analysis across communities by revealing similarities and differences in genre repertoires. Such analyses could be used to indicate how different groups or organizations interact and organize to accomplish similar kinds of work, possibly accounting for observed differences in structure, outcomes, and performance. The presence of informal memo, proposal, and dialogue genres as well as the ballot genre system in the CL group's genre repertoire, along with the absence of commonplace genres such as the letter and report, differentiate this project group from others that may be more formal and include, for example, regular progress reports. Genre repertoires might also be a useful lens for studying institutional isomorphism (DiMaggio and Powell, 1983) and whether, how, why, and to what extent certain communities come to resemble each other in form and practices. The concepts of genre and genre repertoire may also be used to investigate how different communities

respond to the same innovation (cf. Barley, 1986), for example, the implementation of new work arrangements, such as teams, or the introduction of a new communication medium, such as electronic mail.

Implications of Genre and Genre Repertoire for Studying New Media

Genre and genre repertoire may be particularly useful for conceptualizing and investigating the introduction, use, and influence of new media in organizations. By examining the structuring of communicative practices in detail, we should be able to gain insights into the types of changes that may occur as a result of introducing new media. Just as people import established genres into new situations, we speculate that they may import established genres into a newly introduced medium. Most obviously, the design of the electronic mail template is based on the memo heading imported from the paper medium. Orlikowski and Gash (1994) showed how users of a new electronic medium (computer conferencing) attempted to make sense of it in terms of more familiar technologies such as fax and voice-mail. Some of our results provide further support for such a process. When faced with a need to test for consensus in the relatively new electronic medium, for example, the CL project coordinator copied the ballots he was familiar with in paper form. Similarly, we might see the development of genre variants and new genres in new media, just as communities develop variants and new genres over time. It seems likely, for example, that the unique ability of electronic media to allow users to embed parts of previous messages in new messages occasioned the emergence of the dialogue genre in the computer community at some point before the start of the CL project and that the genre continued to gain currency during the project.

Our study examined the interactions of multiple, distributed participants over an extended period of time. We found that these interactions, which were conducted almost exclusively within the single medium of electronic mail, exhibited a rich and varied array of communicative practices that changed over time. These findings suggest that approaches that concentrate on the characteristics of new media may be less useful for certain purposes than those that focus on communicative practices. By focusing on a community's genre repertoire, our perspective differentiated uses of new media, highlighting changes in use over time that may be occasioned by changes in context, task, membership, and media capabilities. More generally, this study suggests that any specific communication technology is likely to support multiple organizing processes that depend on the context and that vary over time.

Understanding organizing processes mediated by new technologies becomes increasingly important as more and more organizational work becomes a matter of electronic symbol manipulation and information exchange. The genres through which information is shaped and shared for particular purposes (reports, spreadsheets, meetings, or teleconferences) are no longer merely an aspect of organizational work; rather, they *are* the organizational work.

Genre Repertoire

The project we studied may serve as a useful prototype for the kinds of organizing anticipated in future communities—distributed, temporary, information-intensive, and networked through electronic communication technologies.

Genres and genre repertoires focus attention on the practice of communication as an essential element in a community's ongoing organizing process. Understanding how communicative action shapes various genres, and how these organizing structures in turn shape communicative action, is valuable to organizational researchers interested in understanding a community's nature and activities and how they change over time.

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