The Place of Face-to-Face Communication in Distributed Work

Bonnie A. Nardi
Agilent Technologies
Steve Whittaker
AT&T Labs-Research

Abstract

Most distributed work requires mediated communication, but the appropriate use of mediated, as compared with face-to-face communication, is not well understood. From our ethnographic research on workplace communication, we characterize unique aspects of face-to-face communication. Face to face communication supports touch, shared activities, eating and drinking together, as well as informal interactions and attention management. We argue that these activities are crucial for sustaining the *social relationships* that make distributed work possible. We contrast these social aspects of communication with the informational aspects emphasized by traditional communication theories, arguing that social linkages are a precondition of information exchange. We also document the disadvantages of face to face communication – that it can be disruptive, expensive and effortful – describing when mediated communication is preferable. We discuss the design of "media ecologies" that balance the advantages and disadvantages of mediated and face to face communication to provide cost-effective solutions for communication in distributed organizations.

Introduction

Most distributed work requires mediated communication but the appropriate use of mediated as compared with face-to-face communication is not well understood. Many theorists imply that face-to-face discussion is the gold standard of communication (Clark

and Brennan, 1991; Kiesler et al., 1984; Rutter, 1987; Short et al., 1976), possibly irreplaceable (Nohria & Eccles, 1992; Handy, 1995; Hallowell, 1999; Olson & Olson, 2001). On the other hand, in the distributed situation, face-to-face communication can be costly and disruptive. Mediated communication sometimes may be preferable to face-to-face communication (Hollan & Stornetta, 1992; Sproull & Keisler 1992; DeSanctis & Gallupe, 1987; Jarvenpaa & Leidner, 1999; Morley & Stephenson, 1969; Nardi, Whittaker, & Bradner, 2000; Walther, 1994).

From our ethnographic research on workplace communication, we characterize the uniquely valuable aspects of face-to-face communication, especially in sustaining social relationships, but document circumstances when other media are preferable. We discuss ways to design "media ecologies" that provide cost-effective solutions to the problems of distributed organizations.

The Value of Face-to-Face Communication

New technologies support remote interaction and global ventures, but business travel has increased so much that airports are nearly in gridlock. Why? An impressive body of research demonstrates that face-to-face communication is the most information-rich medium (Doherty-Sneddon et al., 1997; O'Conaill et al., 1993; Short, Williams, & Christie, 1976; Daft & Lengel, 1984; Clark & Brennan, 1991; Clark, 1996). Neverthless, we will argue that face-to-face communication persists in the workplace because it is the surest way to *establish and nurture the human relationships* underlying business relationships. These relationships are grounded in *social bonding* and *symbolic expressions of commitment*. We contrast social aspects of communication with information aspects--information transfer, finding common ground topically, repairing

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misunderstandings, and referring to shared objects in the environment. Our focus is not what people communicate about, but *how they create a social environment in which they can communicate at all.* Social linkages between people are a precondition of information exchange.

Information exchange is a key goal of communication, but by focusing our theories exclusively on information we overlook the social processes that scaffold information exchange. We theorize that people create social "fields" within which communication can take place. We call these fields "communication zones." A zone is *a potentiality for productive communication between two people.* In everyday human activity, the management of communicative zones involves long-term projects of creating appropriate *social bonds of connection,* which may stretch over years, or even decades, as well as much shorter term projects of *managing attention* (Nardi, Whittaker & Bradner, 2000).

We have documented communication zones in our research on instant messaging (Nardi, Whittaker, & Bradner, 2000). Here we further our goal of exploring communication zones by analyzing face-to-face communication. Unlike many aspects of communication that are clearly observable such as turn taking or head nodding, communication zones emerge only in informants' accounts of their communicative activities. These accounts include metaphoric language utilizing spatial metaphors, discussion of the problems of communication, and descriptions of the deliberate staging of communicative events.

Communication zones are like Shakespeare's "local habitations"—mutually constituted, local universes that people construct to communicate. Although Shakespeare

was talking about poetic creativity in the following passage from *A Midsummer Night's Dream*, he might well have been addressing the creative work of communicating:

> And as the imagination bodies forth
>
> The forms of things unknown, the poet's pen
>
> Turns them to shapes, and gives to airy nothing
>
> A local habitation and a name.

In our empirical data, "airy nothing" constantly threatens communication, and people go to a great deal of trouble to create and maintain local habitations within which communication can take place.

The creation and maintenance of communication zones involves two key processes: establishing social bonds that enable people to feel emotionally connected to one another, and managing "attentional contracts" in which people agree (sometimes fleetingly) to pay attention to one another's communications. Most media and communication theories address exchanges that are already underway. By contrast, we are interested in *how people get into a state where communication can take place*. Processes needed to attain that state are not peripheral to communication, but suffuse and shape it.

We report findings from a study of workers collaborating across organizational boundaries (Nardi, Whittaker, & Schwarz, 2000). We carried out in-depth interviews and observations in a sample of 22 people in 12 organizations. Our sample included public relations specialists, an executive who transfers technology across corporate boundaries, an attorney who appeals life sentence cases, graphic artists, Web designers, a non-profit consultant, small business owners, Internet company executives, and a secretary. Some in

our sample were independent contractors or consultants. Some worked for a very large telecommunications company, "TelCo," some for a medium size Internet portal company; and some for small companies of fewer than 100 people, including "CreativePix,"an animation and Web company, and MediaMax," a company that produced Web pages, CD-ROMs, and user interfaces for computer games. About half the sample was male and half female. Most were in their 30s or 40s. Most worked in California; some in New Jersey. All but one had a college degree. Some had been to film school, law school, or graduate school. All were proficient with a variety of communication technologies.

We tape recorded interviews in informants' workplaces and sometimes observed them at work. We asked them about the work they did and how they communicated. We learned about their use of communication media including phone, cell phone, voice mail, conference calls, fax, Federal Express, email, email attachments, videoconferencing, pagers, the Internet, FTP, the Web, chats, intranets, and extranets, as well as face to face. About 50 hours of interviews generated over 1000 pages of transcripts, which we analyzed for recurring patterns relating to the questions we asked about communication activities. Names attributed to the quotes from the interviews in this chapter are pseudonyms and details have been changed to provide anonymity.

Face-to-Face Interaction Engenders Social Bonding

Social bonding is effected through two linked processes: engagement of the human body in social interaction and informal conversation. So ubiquitous and ordinary are these arenas of social action that they have often been theoretically invisible. Media theories have considered the body as a source of information about communication and

the sense of "presence" of the person with whom one is communicating. Key aspects of presence are signaled by a specific sense of the other's body—physical appearance, body language, facial expressions—as well as accouterments including clothing, makeup, hairstyle, and jewelry (Daft and Lengel, 1984, Short et al., 1976).

In our interviews, informants had a complementary but more social perspective on the role of the body in communication. They talked about the importance of *shared bodily activities* in facilitating social bonding and showing commitment: (a) touching; (b) eating and drinking together; (c) engaging in mutually meaningful experiences in a common physical space; (d) "showing up" in person.

Understanding these activities is key to understanding the uniqueness of face-to-face communication because they are impossible in other media (though they can be simulated in MOOs, MUDS, and virtual worlds). The first three elements of what we might call "body work" lead directly to the creation and maintenance of social bonds. The fourth element, "showing up," symbolizes commitment to a particular social bond.

Interleaved with body work is informal, off-the-cuff conversation—jokes, gossip, how-are-the-kids questions, and other kinds of office chat. Such informal talk aids bonding and reinvigorates communicative ties. Previous research has shown that seemingly inconsequential informal interactions serve critical functions such as coordination and learning (Allen, 1977; Kraut & Streeter, 1996; Whittaker, Frohlich, & Daly-Jones 1994; Nardi & Engeström, 1999). Informal communications have also been shown to be extremely difficult to support using mediated communication (Kraut, 1987; Kraut et al., 1987; Kraut et al., 1990). Face-to-face communication provides support for such informal interactions.

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We now turn to an analysis of the interview data, reporting what informants said about body work and informal conversation..

Touching
Touch helps create social bonds that scaffold communication. The first requirement of managing zones is to create social bonds that make people feel connected to one another. We shake hands or otherwise touch each other upon being introduced. Face-to-face introductions are deeply valued, in part because people have the opportunity to make physical contact. The second requirement of managing communication zones is to keep them going. Communication zones appear to degrade over time. After being "out of touch," initiating communication can be problematic. So, when we have not seen each other for some time, we often exchange warm hugs. Communication zones require renewal and "refreshing" as one informant said, of the social bonds. In the following interview segment, touch was used to both create a new bond and to maintain an existing one. Carl, a public relations specialist at TelCo, described how he managed the introduction of a famous journalist to TelCo's CEO at a high profile invitational gathering for the American media:

Carl: In fact, "Ken Swift" [a well-known journalist], is a very important guy, obviously. I am probably a little far down the food chain for him to spend a whole lot of time with. But I can get a[n] [email] reply from him based on—he'll shoot me back an email, but it's based somewhat on the fact that when he walked in here [to the media event], he walks in and says, *"Hey, I'm sure there's a line to meet the big guy, right?"* [i.e., the CEO]. It's like, "Ken! Didn't I introduce you to the last big guy? Come on!" Actually I was able to kind of deliver him right

into—I looked around, saw where [the CEO] was, and actually, Gail was with him then. She was right at his elbow. So I like—I grabbed her. I said, "Ken wants to meet him. I'm bringing him right over." And Ken and Gail are good friends. I was able to like deliver Ken right into Gail's arms; you know, big hug, right at the elbow of [the CEO]. That's going to make him answer my next email.

Carl mentioned various bodies touching—"I grabbed her," "big hug," "right at the elbow," "into Gail's arms." The bodies belonged to Carl, Gail, the journalist, and the CEO. The leverage from the face-to-face communication stemmed from a richly physical moment of arms, elbows and hugs involving the four people needed for the crucial introduction. The encounter fostered both the new bond formed between the journalist and the CEO, and the intensification of existing social bonds (the journalist and Gail, Carl and Gail). The entire encounter was managed by Carl, who had to act quickly, in a highly unscripted way, to bring the bodies together in the right configuration. This kind of body work is only possible face to face.

A recurrent problem for Carl was the responsiveness of the journalists he dealt with. In our terms, Carl's problem was to maintain active communication zones with the journalists. His satisfaction with the success of the introduction is evident in his cheerful comment that Ken Swift will now "shoot me back an email." Evidence for the fragility of communicative zones—their tendency to degrade—comes from the fact that although Carl had introduced the journalist to a previous CEO (as he did not fail to remind the journalist), getting the journalist to respond was a continuing problem. Carl opportunistically solved the problem—at least temporarily—through the dramatic high-touch introduction. Elsewhere, Carl affirmed the general importance of maintaining

bonds, mentioning that the media event was a great way to "refresh my list," as he put it—to make personal contact with many journalists he dealt with, to refresh social bonds.

The ironic, calculating discourse in Carl's description ("a little far down the foodchain," "That's going to make him answer my next email") contrasts vividly with his engaged description of getting all those bodies in the right place at the right time. Although the media event was thrilling and Carl was closely attending to its emergent possibilities, he was also anticipating the mundane realities of accommodating familiar journalistic peccadilloes. The detached, objective work of monitoring the state of communication zones executed simultaneously with the exciting body work in which touch created and reinforced social bonds. Carl's focus (and that of many other informants) was not on the information being communicated in the encounter but on the trajectory and nature of the relationships among the conversational participants. The face-to-face meeting was exploited to develop these relationships.

Working within a mutually constituted communication zone, Carl invoked his history with the journalist in reminding him of the introduction to a previous CEO, and drew attention to the wider context of the zone which included the fact that Ken and Gail were "good friends." A zone seen as a local habitation suggests a "space" with a specific history and context, as well as a staging area for enacted bodily activity. People *inhabit* communicative zones which extend over time in order to accomplish communicative work embedded in a highly social, contextually nuanced matrix.

Eating and drinking together
Eating and drinking together perhaps comprise the most fundamental way in which people come to feel connected. We all know this from personal experience, but

researchers have largely ignored these prosaic activities, missing an important contribution of face-to-face communication (although see Short et al., 1976). Greg managed a small media firm in San Francisco. In our interview, he explained how "bonding" occurred between him and his clients through shared meals:

Greg: We were talking about the lunch/dinner thing. That's, that's kinda where the bonding happens. Especially if we've had a successful pre-pro [pre-production meeting], everybody feels it's gonna be a good job, the agency feels that they've brought their client into a professional house, we've all had our acts together…So then we go out to some fancy restaurant here in San Francisco, which they love, you know, we always try and keep the most trendy, up-to-date kind of thing, and everyone gets a little drunk, and the client generally holds court talking about how hard it is to work for Proctor and Gamble, or whatever, you know. It's kind of…they're usually pretty high energy fun.

The dinner was not a forum for exchanging business information; rather, clients used the occasion to share details of the minor miseries of their work lives. It facilitated social bonding after the initial, task-focused pre-production meeting. As far as the work itself was concerned, that was already accomplished. Apparently trust had been established as "...everybody feels it's gonna be a good job" and the company's credentials as a "professional house" were in good standing.

Why then did the dinner take place? We believe it took place to deepen and enrich the social bonds shaping the communication zone inhabited by the consultants and clients, to make the zone a more congenial habitation for the future work, following the pre-production meeting. The meal also provided a context for informal conversation

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where the clients could share personal information in a relaxed setting. The language in this interview again reveals the juxtaposition of terms connoting detached calculation, with words suggesting human connection. Greg revealed the premeditation of identifying a special restaurant as the perfect staging area for the bonding. But then he rapidly shifted to chummy phrases about everyone getting a "little drunk" and having "high energy fun." It seems that however much we calculatedly manage our relationships, it is easy to get emotionally caught up in the human connections we forge. People deliberately plan to exploit face-to-face communication to create, renew, and deepen social bonds, while at the same time participating fully in the social encounter. Relationship management is then, an arena for a constructed set of staged events—hastily improvised in Carl's case, or well-planned in Greg's case—that may come to be a site of authentic human connection enacted in face-to-face communication through shared bodily activity.

Sharing experience in a common space
Another means of social bonding enabled in face-to-face communication is sharing mutually meaningful experience in a common physical space. Carl discussed how he established relationships with the press through the shared experience of attending trade shows and other industry events:

Carl: I think you need to come to know them [new press contacts] as a person at some point and have some physical engagement with them, be at the same place for some reason. You know—whether that's a trade show or some industry event or something like that—it's a chance to meet them in that context— what's going on in the industry. But then, it's nice because there's the physical connection which has been fun for me.

Carl wanted to "be at the same place *for some reason*." The bond was fostered through an experience that involved shared interest in about "what's going on in the industry." Carl emphasized *physical connection in context*, using the word "physical" twice in this short segment, first speaking of "physical engagement" and then "physical connection." Again the word "fun" is used to characterize face-to-face communication.

Carl's coworkers were located a continent away, on the opposite U.S. coast. Describing informal meetings with coworkers when he traveled to their site, Carl noted the "physical engagement" needed to renew bonds in communicative zones he had previously established:

> Carl: In [one] three-day swoop you can hear an awful lot of what's going on in [the remote office] and physically see a lot of these people which you need to do. Same as with the press. You can never cultivate these relationships without physically engaging in people as part of it.

Carl observed that "you need to...physically see" and "physically engage" people in order to renew relationships. In theory, Carl should have been able to "hear" what was going on in the remote office on the phone, but instead, he needed to get the latest gossip and updates face to face. Face-to-face communication was instrumental as a means of "cultivating" relationships and it facilitated the informal conversation—"what's going on in the office"—in a way that the telephone did not.

Kathy, an independent marketing consultant, used another term of physicality, "touchy-feely," to express how she regarded face-to-face communication:

Kathy: Well, when you're interacting [face to face] , you're much more involved, much more—how am I going to say this? I don't know, it's just more touchy-feely, we're in this together kind of thing.

Interestingly, Kathy used the word "touchy-feely" metaphorically to describe the feeling of closeness she got from face-to-face communication. She wasn't actually touching anyone, but she invoked the power of touch we described in earlier examples where people really did touch in face-to-face communication.

Barry, a public relations executive at TelCo, pointed to the importance of sharing physical space and experience in his networking activities:

Barry: Well, I think a tremendous amount of the networking that's done on a business level is personal, spatial, geographical. It's being in and of the same space and having the same experience of the surroundings. So I've never experienced a situation in which we've been able to use technology as an effective substitute to travel. Even though we've tried many times—we've done interviews by videoconference with reporters in one city, with [our people] in another city.

Barry emphasized shared physical space as critical to face to face in his use of the words "spatial" and "geographical," and having "the same experience of the surroundings." Having a common experience of surroundings is undoubtedly partly related to practicalities such as deictic reference and having easy access to shared artifacts (Clark & Brennan, 1991, Olson & Olson, 2001, Whittaker et al., 1994). However, our interviews also support a social bonding interpretation. Phrases such as "physical connection," "being in and of the same space," and "we're in this together" signify the

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social and emotional connection people can establish when engaged in face-to-face communication

Evidence for the fact that informants thought of the communication zone as a *space* came from their metaphorical use of locational terms to describe mediated communication. Rachel, a producer at MediaMax told us how she managed phone communication with contractors working out of their homes:

> Rachel: [And] what I try to foster in all of our independent contractors is an allegiance to the company—to this company. .... I realize that they are at home in their home setting. I don't call them up and talk business right away. I'll call them up, for example one of my programmers off site is working on fixing up his house. I'll call him up and say, "Hey! How's your floor going?" or "Your windows!" and kind of get into his world. And he'll talk to me and we'll chat about this and that and then I'll get to work stuff. 'Cause I know, I've worked at home before. I know what it's like when you get this business call and you're in your home setting. It's just kind of sometimes invasive or intrusive, and you need to walk a fine line whereby you have that kind of intermediary language. And I don't think it's a ruse. I think it's just a part of conversation that you're meeting each other somewhere.

Rachel was getting into the contractor's world; managing the communication zone, attempting to shape it to her own ends which were, quite calculatingly, to "foster...allegiance...to this company." She defended her tactical use of language, claiming it was "not a ruse." Rachel could not share physical space with the contractor, but she tried to do the next best thing, which was to imagine and respond to the

contractor's space. Her topic of informal conversation was the contractor's physical space—his floor and windows. Rachel was crafting an effective communication zone by taking account of the physical surroundings of the contractor, to manage the contractor's transition from home to work. Rachel denoted the communication zone as a space, saying that she and the contractor were "meeting each other *somewhere*." To Rachel this meeting "somewhere" was intrinsically part of communication; as she said "*...it's just part of conversation* that you're meeting each other somewhere."

In conclusion, then, sharing a common space has many of the same emotional effects as touching or eating and drinking together. It allows connections to be established or strengthened, and also provides an ideal context for informal conversation.

Showing commitment by showing up "in person"
A more symbolic aspect of face-to-face communication can serve to underscore the importance of a particular social bond. Informants described the value of simply "showing up" and what that communicated about social bonds.

> Barry: And you know, relationships are managed and fed over time, much as plants are. [You] demonstrate an enormous amount of unconscious commitment when you actually take the time and the trouble to put yourself in the same place as the person you want to build a relationship with. And if you arrive early at a seminar in advance of the time you're to give a presentation, and if you give a presentation and then remain for an hour or two or the rest of the day and participate in other discussion, that's noted and remarked upon, versus the busy executive who comes in, gives the presentation and leaves, or the person who in some fashion is participating as a disembodied voice over television. The

information is still received; but the relationship management aspects are not really...are not really handled at all.

Barry echoed our views about relationship management in communication by distinguishing the "information being received" from "the relationship management aspects." He remarked that mediated communication - the "disembodied voice over television"- didn't work for relationship management. Instead, the body itself was required to achieve the highest levels of bonding. Showing up differs from sharing experience in a common space: informants drew attention to the fact that one party had made a decision to attend "in person" and communicate face to face, often at some cost to themselves. In Barry's case, not only was the executive traveling to his colleagues' location, he was generously offering his time in staying around for further discussion, and, "That's noted and remarked upon." In a similar vein, Nora, an independent public relations consultant, explained why she preferred to work with local clients.

Nora: Well, actually I prefer to work with local clients because I think that face to face contact is important. It certainly helps me to see them even every week, but a couple of times a month is good. I think what we call "face time" is very important.

Interviewer: Why is that?

Nora: Because they tell you stuff they don't tell you over the telephone. You see other people in the office. They know that, "Oh, we really do have a PR person, it's not just some disembodied voice out somewhere in Palo Alto."

The disembodied voice again. Both Barry and Nora stated that mediated communication in which a voice has no body does not serve the same ends as face-to-face communication. Informants made a kind of *habeas corpus* argument about commitment and face-to-face communication. Nora noted that her clients needed to know that "...we really do have a PR person." The identity of the PR person could not be established with voice only. Nora's body must be produced.

Like Carl, Nora noted that she received information in informal conversations face to face that was not forthcoming over the phone. She also talked about "seeing," as Carl and many others did. Bonding happens most easily when people *see* each other in person, with the body in full view. With showing up, any body (not anybody) will do; it is the living flesh that is required. Technology cannot simulate showing up because meaning derives from the symbolic value of people offering their actual bodies in space.

These interviews provide more evidence that communication zones decay. Nora remarked that a regular program of "seeing" was crucial. Barry too had a regularly scheduled bonding program in mind. He compared it with caring for plants (which presumably would wither if not tended). The communication zone is a dynamic, often fragile field of connection that persists only with careful attention. Kathy, who worked out of her home, spoke of face-to-face communication as "replenishing her spirit" with clients, emphasizing how it allowed her to reconnect with them:

Interviewer: So why do you actually go down to [the customer] site?

Kathy: Well, you have to have face time with people…They need to see that you're alive (laughs). They do! They need to get reconnected with you. What I've found is that if you don't go and have face time with people periodically,

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they'll start to make assumptions about you, like very funny, like, "Oh, I couldn't have gotten a hold of Kathy, so she must not be working on my stuff." …So you need to go kind of be there and say, "Hi, I'm here," you know? You need to share, talk a little bit, and you go on. And it's kind of like replenishing your spirit with them in a way. … It's their needs. I mean, I can stay here (at home) all day, all alone. I don't have to go see them … to do my job.

Again the detached language of business calculation is coupled with emotional warmth as Kathy "replenished her spirit" with her clients, while noting that the actual work of the job could be done from home. Her clients wanted her to "go see them." They demanded her body ("see that you're alive") as an assurance that she was really working for them. As a business strategy, Kathy made sure she had sufficient face time with clients to "share" and "talk," as ways of maintaining social bonds within her communication zones. In all of these examples, face-to-face communication signaled the highest level of commitment to others through the presentation of the body. It also afforded the best opportunities for vital informal conversation.

Symbolic interactionist theories point to symbolic reasons for choosing a particular medium such as "a desire for teamwork, to build trust, or convey informality...urgency,...personal concern...or [deference]" (Trevino, Lengel, & Daft, 1987). The importance of showing up fits within this paradigm; the symbolism of showing commitment is a key aspect of face-to-face communication.

There are undoubtedly many interesting power relations involved in summoning another's body as a condition of free communication in mutually constituted communication zones. Our data only begin to hint at these relations. The telecommuting

literature reveals that managers often feel a loss of control over employees working at home where they cannot see them or talk to them face to face (Kraut, 1987). Our data also suggest the flip side of the power of the presentation of the body: while those in power may summon the body of others to ground communication, we can also marshal our own bodies to show up, signaling high levels of commitment and binding others to us. The use of the body as a trading currency in face-to-face communication is a indication of the continual work needed to manage communication zones. It illuminates the lengths to which we sometimes go to accomplish communication.

Managing Attention

Many informants brought up the subject of gaze or "eye contact" as crucial to face to face interaction. Eye contact sometimes had to do with social bonding, with making a primitive (mammalian?) connection to others by "looking people in the eye," a phrase many used. This fits with our understanding of making connection through body work. But informants also discussed how eye contact served a shorter term purpose of commanding people's attention. Our interviews suggest that attention is activated *within communication zones.* The potential zone becomes an active field of communication when attention is engaged.

Wanda, a technology transfer specialist at TelCo, was one of many informants who referred to the importance of eye contact in face-to-face communication. Her language strongly suggests a communication zone:

Wanda: When you're in a conference room and you're at a conference

table and all these conversations are going on and people are going back and forth

and they look at each other, and they look at the other people in the room, and

they're trying to convey a point or trying to persuade someone, uhm, eye contact and body language mean a lot. If your eyes are on a computer, you may as well not even be there. You may as well be a secretary taking notes.

Wanda's "you may as well not even be there" posits a "there" that we interpret as a communication zone bounded by those who were, at minimum, making eye contact. She contrasted those within the zone and those outside it; a hypothetical secretary could be physically present, but outside the zone, as would anyone with their eyes on their computer. The secretary is also not a participant in the activity. A zone is bounded by an activity in which some people are legitimate participants and others are not.

Accounts of information richness stress how people read facial expressions and body language as clues to the speaker's meaning and affective state. These accounts take the *recipient's* perspective in decoding information about the content of messages being sent. By contrast, Wanda described how *speakers* use eye contact and body language to engage the others in the room. When attention is commanded, the communication zone is activated for information exchange.

Ashley, a producer-manager at MediaMax, observed that face to face meetings were useful for managing her staff because people and things were ready-to-hand. She then less fluently, but with feeling, to note the uniqueness of face-to-face communication for engaging attention:

Ashley: Well, there's nothing like everybody being in the same place and working on the same problem. It's just—there's an immediacy that you're never far away from what's going on, whereas when people are off site, it takes a lot more management time because you've got to [keep track of things]. On the phone, or

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setting up those meetings, it's harder to check in on the minute process of a project...Every time you walk to the back of the office, you are passing someone's computer and you see what they are working on, you see what the mood is on their face. You know, if a question comes up you can ask that person as opposed to writing yourself a note to e-mail them or call them later on. It definitely facilitates interaction, there's no question about. And there's also you know, face to face, which—we're all human beings. That's the best way to interact with people is to look them in the eye and talk to them, and, you can't do that over the telephone as easily. Certainly not e-mail. E-mail!

Ashley juxtaposed the practicalities of face to face ("you see what they are working on") with the vague but far-reaching notion that face to face is effective because "We're all human beings." Attention is engaged at a deeper level through looking people in the eye while talking to them. Ashley seemed quite sure this same kind of attention was not achieved on the phone or email. As often happened when people discussed the more profound aspects of face-to-face communication, hesitation and searching for words characterized Ashley's discourse. People seemed to feel deeply about face to face but (like researchers) did not always have the vocabulary to describe its unique features precisely.

Negative aspects of face-to-face communication

We have described advantages of face-to-face communication, and located them in our theory of communication zones. Our account thus far, and the bulk of other research (Short, Williams, & Christie, 1976; Daft & Lengel; 1984; Kraut, Galegher, & Egido, 1987; Clark & Brennan; 1991; Nohria & Eccles, 1992; Hallowell, 1999; Olson &

Olson, 2001), paint a very positive picture of the benefits of face-to-face communication. However, data from our interviews and observations also revealed significant negative aspects of face-to-face communication in many situations. These include: (a) *Interruptions;* (b) *Expense;* (c) *Low-productivity in a common face to face setting—meetings*.

For many workers, a little face to face may go a long way. Being "radically colocated" (Olson & Olson, 2001), for example, in studio configurations or in "war rooms" lacking private space, may not be optimal for many kinds of work. Our data show that despite the many advantages of face-to-face communication, people still sought to avoid it at certain times. Sometimes people chose to remove themselves from the office or other venues of face-to-face communication, or they chose other communication media to avoid the negative aspects of face to face.

Interruptions
We have all been interrupted when we were about to finish something. People may try to gauge our availability, but they can be so taken with their own problems that they interrupt us anyway. Or they misread the cues. Informal, unscheduled face-to-face communication exhibits strong *participant asymmetry*; the intended recipient of a communication has less control over the exchange than does the initiator, due to norms of politeness (Nardi et al., 2000; O'Conaill & Frohlich, 1995; Whittaker et al., 1997). There is often a social cost to refusing communication.

Kathy explained that for her marketing research, she felt she was more productive in a consulting role because she had greater control of her time.

Kathy: A lot of times in order for me to be effective [I must do concentrated work]...The benefit of a consultant is that they *don't* work inside the company, therefore, they're not interrupted all the time.

In our study, almost everyone described strategies for withdrawing from communication (mediated and face to face), including leaving the site of face-to-face communications, and turning off pagers, phones and so forth. We will concentrate here on strategies to avoid face to face, but the general point is that most people need time alone, when they can concentrate on difficult work.

Managers worried about the productivity of their staff and the effect of too many meetings and informal conversation, or "chit-chat in the hallways" as one put it:

Rachel: There is an advantage to having people work off site in that often they can concentrate more and they're not badgered by company meetings or chit-chat in the hallways or whatever.

Many people in our study discussed separating themselves from the interruptions of the office by working at home on a regular basis, or when they had specific deadlines:

Interviewer: So what would be the kinds of activities where you don't want to be distracted? Where you feel like you want to work from home?

Alan: Uhm, when I have to get a deliverable done, a presentation, or white paper or something. And it's just, I need a chunk of time to just focus, and that's hard to do from the office, because it's so easy to be distracted.

Nevertheless, our informants rarely chose to cut themselves off completely, and found that being accessible by phone and email often sufficed. Jane, in business

development at an Internet portal company, described how she could stay accessible enough when working at home one day a week:

>Jane: So, internally, people know I'm at home working. And normally they don't have the number. My secretary has it, but unless they've like gone out of the way to ask my secretary for the number, they [don't call].

>Interviewer: So they have to go one more step.

>Jane: Right. So they will send me e-mail. But you can avoid answering e-mail. You don't have to answer it.

It is easy to overlook the significance of interruptions in assessing face-to-face communication. A focus on the creation and maintenance of communication zones encourages us to pay more attention to interruptions as we consider the processes surrounding and scaffolding information exchange and not just the information exchange itself. Strategic efforts to withdraw oneself from communication arenas are not visible if self-contained interactions are the sole focus of attention.

Meetings
Reactions to interruptions were mild compared with the intense annoyance people in our study expressed about formal meetings. While informants described many productive meetings (especially the ones they themselves called), more often meetings were seen as a time-wasting drain. Meetings, a ubiquitous institution in virtually all organizations, often failed both to transmit rich information and to deepen social bonds. Some organized themselves to work remotely, usually from home, to avoid this distasteful form of face to face interaction: Jane observed:

And there's just a lot of meetings. I mean, there's—you can't fit 'em in all every day. But when I can work from home, it's amazing, it's just amazing how much work I get done...It's just, uh, heaven!

Jane went on to describe how meetings were generally recognized to be problematic in her organization, and their generally unsuccessful attempts to address this:

Jane: Fred [an executive] is very keen on, I mean, we have these timers on here, these hour glasses.

Interviewer: Oh!

Jane: And you start a meeting and they're an hour, and there should be like no more than six or seven people in a meeting, there should be an agenda set, it should only have to go an hour, and you should get everything completed. And if you don't have those, if you don't have an agenda and you have more people in the room that you need, then cancel the meeting and schedule it when you're ready, because it's not going to be useful.

Nora liked working at home because she could avoid the "tedious" and "goofy" meetings her clients had to attend. Ella, an independent consultant to non-profit organizations, noted that perhaps meetings are becoming even worse with people staring at their laptops and responding to pagers.

Ella: I hate it [being in meetings]. I remember, I mean I've been in meetings where everyone's been looking at their laptop, typing, and no one's, you know, to me it's like, "Why are we here? Let's go home." That's a perfect

example where we should be using a computer conference or something. Rather than being in person. If we're all gonna be typing on our computers....

Ella proposed a remote experience in lieu of a degraded face to face experience. Of course laptops and pagers in meetings are themselves symptoms of the low productivity of meetings. The feeling seems to be "If I have to be there, I might as well get something done."

Jane did not like to bring her laptop or pager to meetings and she wished others wouldn't. On the other hand, she sympathetically explained why she believed others read e-mail during meetings:

Jane: I mean...the reason why people do that is you're really busy, right? So if you have eight hours of meetings and then you go back to your desk and you have 200 e-mails, right? And you don't want to work 14 hours a day, then what do you do, right?

Interviewer: You try to do your email in meetings.

Jane: You try to do your emails in meetings...And like it's a bad habit, but once you get used to using that meeting time to do email, you're caught up, you actually don't have to work those 14 hours.

Interviewer: Yeah, but on the other side, the meeting cannot be as effective.

Jane: Well, you wouldn't think so. So one of the challenges that we've had here and we're trying to balance a lot, is if you're just there to be there, and it's so ineffective for you that you can sit there and do e-mail, then just leave and go back

to your desk and do e-mail. And we have a lot of these "Oh, but you have to be there" meetings, and we're trying to really cut them back to be like only if you want to, only if it's valuable, type meetings so that we can get out of the habit of actually bringing in computers and doing e-mail during those meetings.

Meetings seemed to be so universally loathed because they routinely assembled fairly sizable groups of people (too large for any but covert chitchat) to convey standard information that could be delivered in other media such as email. Meetings brought bodies together, then frustrated body work and informal conversation. At the meeting's end, often little had been learned. Few but the speaker had talked.

Expense
Informants often followed discussions of the benefits of face to face contact with discussion of its limits. Here, Nora had been describing how much more impact she could have when describing a new product to a client in person:

Interviewer*:* Now from all you're saying it would be always preferable to actually meet with them in person. So then why...

Nora: Well, no, because sometimes it costs too much. And sometimes the news isn't earth-shattering and it doesn't warrant a face-to-face meeting.

Interviewer: Oh, I see.

Nora: You can talk to them, you can talk to them for 10 minutes or 15 minutes and that's all they need. And they don't want to spend the time to meet with you, because if you're gonna go to Boston and drive in Framingham, to spend 15 minutes...that doesn't serve anyone. So the face-to-face meetings are

really best reserved for major announcements or big developments in the life of the company.

Many informants told the same tale: face to face is an "expensive" medium that has to be used judiciously. People also spoke of the emotional expense of face to face: the need to pay attention, to engage in diverting chat, to be pleasant, to wear presentable clothing. Sometimes face-to-face communication was exhausting. Gary described how as a manager he struggled to keep communication alive in his small company. He needed meetings, but their emotional cost was sometimes felt by all:

Gary: The best way to get the information out is to have, is to have everybody in the room. I mean, it's amazing with a 10-person company, communications can totally break down. It's unbelievable. ..... If you don't really make a conscious effort, the human mind would rather not have to communicate because of all the issues involved in it. It's a pain in the ass. [There can be] conflict sometimes.

Interviewer: Why is that?

Gary: Because it usually means work for the individual. ...

Gary is saying communication is necessary but effortful, so people will try to avoid it. These examples also illustrate the "hidden costs" of preparing for face to face communication, for example travel, wearing presentable clothes and so on.

Media Ecologies

Given that we know what's good and what's bad about face-to-face communication, how can we best utilize it in distributed work? We propose the design of

media ecologies where a particular mix of media is specified depending upon the nature of the work and contextual aspects of the workplace situation. Our findings on the costs and benefits of face to face show that searching for a single technology to substitute for face-to-face communication misconstrues the problem. Rather we need to devise an appropriate mix of face to face and other media depending on the work, its temporal sequence, context, and the distances to be traveled. These congenial patterns of mixed media operate within "media ecologies." Media ecologies are an "information ecology"-local habitations of *people*, *practices*, *technologies* and *values* (Nardi & O'Day, 1999).

A key question for the design of a media ecology for distributed work is: How much face-to-face communication is needed? Our findings and other research suggest that the appropriate infusion of face-to-face communication depends on the context of the work. The automotive engineers in the successful war rooms described by Olson et al., 2001 [see chapter xx]had no other concurrent projects to do. They were in a phase of the design requiring frequent interchanges, and some of them had left their homes and moved temporarily to where the work was being done. In other words, intense face-to-face communication with a small tightly knit group of people was a likely route to productivity. By contrast, our informants were almost always engaged in multiple projects, they worked within broad social networks that crossed many organizational boundaries, and their concurrent projects ranged from trying to get new business to wrapping up existing projects. The "blitzkreig" nature of the software project at the automotive plant may be a less common scenario for work in the information economy than the more typical networked, overlapping projects of our informants (Ancona & Caldwell, 1988; Nohria and Eccles, 1992; Smith, 1994; Castells, 1996; Oravec, 1996;

Wildeman, 1998; Engeström, Engeström, & Vähäaho, 1999). Nevertheless, the war room provides an excellent empirical anchor defining one end of a spectrum of media ecologies, the end in which prolonged intense face-to-face communication aids productivity.

On the opposite end of the spectrum, fully mediated communication may be adequate under some circumstances (see for example, Moon & Sproull, 2001 [chapter xx]). Dale, a secretary in public relations at TelCo, was located on the West Coast. She described how she supported a group on the East Coast after a layoff. She had never met anyone in the East Coast group, but there just wasn't anyone else to do the work:

Interviewer: So, was it hard to do this without ever having met them?

Dale: No, it was, I dealt with them on the phone a lot.

Interviewer: So that worked okay?

Dale: Oh, yeah. It was no problem. The only occasional problem was the hours—the difference in the hours, you know, as far as we're still working like three hours after they've gone home... And so, if we needed something, it was like "Okay. We can't get 'em at work, you know? We have to page 'em. But in P.R. [public relations], people are on call 24-hours a day.

Interviewer: So they expected that they would be paged?

Dale: Oh, yes...In fact, most of them had like fax machines and computers at home, and they most likely were still working, you know, but at home. A lot of them telecommuted, so calling them at home or work was no problem.

In this situation, even a three hour time difference was not an impediment as people worked in well equipped home offices. This situation was probably not optimal in many regards, but it does show what can be done with phone, fax and email when necessary, and apparently without undue stress. The telecommuting literature also documents examples of certain types of work such as consultancy or answering phone help lines that can be executed in an exclusively distributed way (Kraut, 1987).

Another informant, Lynn, a contract attorney who appealed life sentence cases for the state of California, described how she used U.S. mail and phone calls to deal with her clients on death row. When she was first undertaking a case she wrote to the client and offered her phone number:

Lynn: I get a little bit of information about the case and the client's address. I then write to the client. That often starts a letter writing campaign back and forth depending on, you know, how interested in the process the person is. I also accept collect phone calls from them. You can't call somebody who's in prison, but they can call you.

In twenty years of practice, Lynn had met only a tiny handful of her clients face to face. The state did not fund trips to prisons for contract attorneys, so she used the phone. She felt that she could establish good rapport with many of her clients through phone conversation:

Interviewer: What about the contact with your clients? Do you ever miss that? That's the first thing I would think of because you work for a client, you want to get an impression who the person is, you want to understand the case from their perspective and all that...

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Lynn: No. You know, I think that I do have relationships with certain of them that are very intense. There are others--it really sort of comes from the client. I'm available to them if they want to contact me. I never refuse a phone call, ever, and so I have some people who get to the phone all the time. The woman that I have in Federal Court right now I've been representing since 1994 maybe. She calls me all the time. We've become not exactly friends, but our conversations go far beyond what's going on with her case.

In her policy of never refusing a phone call, Lynn was showing commitment to clients, much as people do with face-to-face communication. In the media ecology of Lynn and the prisoners, with its peculiar constraints, the open phone was an effective substitute for the commitment usually signaled through face-to-face communication. Again, although the situation was not optimal, Lynn was able to find ways to use mediated communication to establish working relationships. This example underscores our point that a media ecology is designed with respect to some particular set of circumstances, and that we experience the media themselves differently under different circumstances.

A number of researchers have argued against a strong form of media determinism (Cherny, 1999, Lea and Spears, 1991; Walther, 2001 [chapter xx]). They observe that when there are established relationships between participants, the so-called "leaner" media such as email and the phone can indeed be very expressive, and adequately fulfill the demands of many situations. Our own observations bear this out. Jill at CreativePix remarked:

Jill: we know Ed very well so, if he were on his phone at home I think there would still be a tight link between us and him, as opposed to the reading between the lines that one does on a conference call with somebody else you don't know as well.

A key part of the "context" of an interaction is the quality of the relationship between participants. Shared personal history and social bonds often make it possible to overcome the "limitations" of mediated communication.

On the other hand, while Lynn used the phone effectively with her clients, she was adamant about her dislike of arguing a case by phone (which is allowed in some courts in California). Again this is consistent with other research showing the problematic nature of emotional communication in mediated settings (Morley & Stephenson, 1969, Short et al., 1976, Williams, 1977). While Lynn could have fruitful interactions with clients on the phone because of their personal relationship and circumstances, this was not possible in court:

Lynn: ...San Francisco and Fresno are the two courts that allow argument by telephone.

Interviewer: Oh.

Lynn: Which is a disaster! I've done it once, I will never do it again.

Interviewer: What is that like? Describe it to me.

Lynn: Well, I've been in San Francisco when I was in court and my opponent wasn't, and it's a very strange thing of being in this courtroom with the three judges and a voice coming from a speaker. When I've done it, I did it rather

than go to Fresno, once. It was horrible. I could not read where these people were coming from, who was speaking, how they were taking my argument, what I should sort of--you can pick up a lot from watching somebody's face.

Interviewer: Mm-hm. Mm-hm.

Lynn: Plus, this included one judge who was extraordinarily rude who was yelling at my co-counsel and I who were both on the telephone. The AG [Attorney General], I think might have been there, my opponent might have been in the room, but it was a very awkward and unpleasant thing. I would never do it again. As much as I hate going to Fresno, I would be there.

We present these somewhat extreme examples from our data to make the point that the context of work varies tremendously so that there is no single recipe for a balanced media ecology. Three key elements of context for designing media ecologies are: (a) the work tasks themselves; (b) the quality of the relationships between participants; (c) the temporal flow of the work.

Our informants talked about the desirability—necessity in some cases—of early face to face meetings to establish relationships. Research on videoconferencing suggests that videoconferencing works more effectively when people already know each other (Short et al., 1976 Johansen, 1988). Judicious use of face time can have large impacts on subsequent mediated communications, by "priming" those other interactions.

We know from our research that communicative zones degrade over time. Thus some regular program of face to face contact would also appear desirable in many settings. Nohria and Eccles (1992) suggest that in the networked organizations of the

global economy, the ratio of face to face to mediated communication will have to increase to accommodate the personal relationships that buttress the network. Hallowell (1999) and Olson and Olson (2001) prescribe regular doses of face to face contact.

While there is a strong case for some face-to-face communication in distributed projects, the issue of cost looms large. At stake are the costs to organizations of transporting and housing people remotely, and the costs to workers of being away from their local work setting, families and communities. When the costs of distribution are too high, projects may be abandoned, the work reorganized (Olson & Olson, 2001), or workers may seek other jobs. If distributed projects are to function effectively, we see a strong incentive to use technologies of mediation to keep the costs to both organizations and workers within bounds. For example, while the workers in the war rooms reported on by Olson et al., 2001 [chapter xx]) seemed to have a generally positive experience, it is also possible that workers who had to temporarily relocate incurred hidden personal costs that did not come to light because the research focused on measuring productivity

We believe that in general as little travel as possible is the optimal solution to the problem of distributed work, to minimize the substantial personal and organizational costs. However, quantifying "as little as possible," is not straightforward. It depends on many varied situational factors, as our data indicate. To make matters worse, the realities of distributed work sometimes place workers astride the horns of a dilemma. Too little face time may lead to miscommunication and stress (Hallowell, 1999). In our study, informants told us that they sometimes lost business or worked under duress when they could not meet with people face to face. Nora described difficulties in dealing with a San Diego client from her San Francisco base:

Nora: Yeah, there was actually a client that I felt in retrospect would have stayed with me longer if I had insisted on face to face meetings. They were located in San Diego, and frankly the manager was a bit of a cheapskate, so I only had a few face to face meetings with them. But I think that that really hampered our effectiveness. And I really should have noticed, jumped up and down and pounded the desk and said, "We have to see each other! If I can't come down there, you HAVE to come up here." Because I think we needed more face time.

Here the expense of face-to-face communication ran directly counter to the communicative demands of the work. Nora paid by losing a client. She not only lost money, she paid an emotional price in blaming herself for the problem. Such costs to workers have been largely invisible in the overheated rhetoric enjoining "virtual teams," "virtual organizations," "anywhere, anytime work" (Bishop, 1999, Schwarz, Nardi & Whittaker, 2000). Nora needed to be *with her clients,* at a particular time, in a real place where they could look each other in the eye. As she said, "We have to see each other!"

The competitive marketplace may make scenarios such as those Nora experienced all too common. High level executives such as Barry at TelCo will demand face-to-face communication, and will have the status to access the resources of their organizations to get it. Small businesses such as MediaMax and CreativePix will be compelled to find ways to meet their clients and prospective clients. The workers who will be most compromised in the rush to virtuality will be mid-level employees in medium to large organizations who cannot access organizational resources or reorganize themselves (as Nora later did) to build face time into their work. They will shoulder the burden of failed projects, additional stress at work, the increased work of undertaking mediated

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communication when face to face would have served better, and the satisfactions of social bonding

Although we agree face time will be needed sometimes, we are optimistic that some technologies can aid a sense of social connection. One of those technologies is instant messaging. In a study of instant messaging in two workplaces (Nardi, Whittaker & Bradner, 2000) we found that people using the system experienced a strong sense of others that helped them establish effective communication zones. People were extremely positive about knowing who was "around" even if they did not want to directly communicate. These experiences, which we call "awareness moments," were no substitute for face-to-face communication, but they provided a sense of social connection when people couldn't meet face to face. Awareness moments slow the degradation of communication zones when people are not colocated. On the other hand, technologies such as videoconferencing, that attempt to replicate the face to face experience may fail because they provide neither the high fidelity interactivity of face to face nor the social benefits of sharing a common physical space (Doherty-Sneddon et al., 1997, Heath & Luff, 1991, O'Conaill et al., 1993, Whittaker, 1995). Videoconferencing may create misleading assumptions about shared space that can be highly disruptive of communication. (Heath & Luff, 1991).

Designing "convivial" media ecologies, to borrow Illich's (1973) term, remains a challenge, not least because technologies and markets change so rapidly. A paradox is at hand as well. The diverse distributed webs of personal relationships and cross-cutting organizational coalitions that underlie the new economy depend for their existence on sophisticated communication and transportation technologies. But even as our day to day

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activity is enacted in increasingly complex global organizations and social networks, we cannot do without our most basic form of human interaction—face-to-face communication

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