Introduction to This Special Issue* on

Talking about Things in Mediated Conversations

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RUNNING HEAD: INTRODUCTION

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*Special Issue of *Human-Computer Interaction*, Volume 18 (2003), Numbers 1 & 2.

Over the last decade there has been considerable interest in computer-mediated conversation. Interest has ranged from explicitly conversational, informal technologies like chat and instant messaging, to asynchronous conversational communications occurring via email and bulletin board systems. More elaborate technologies like Collaborative Virtual Environments (CVEs) offer virtual worlds in which people can converse through audio or text channels (Churchill, Snowdon and Munro, 2001). Virtual workspaces and meeting forums allow contact within persistent spaces (Bruckman and Resnick, 1995; Roseman and Greenberg, 1996; Erickson, et al., 1999), and media spaces provide video-based opportunities for chance encounters that can become focused conversations (Bly et al, 1993; Dourish and Bly, 1992; Dourish, et al, 1996; Finn et al, 1997).

When considering the nature of conversation that takes place in such mediated contexts, researchers have examined a variety of characteristics of mediated conversation, ranging from its structural properties (e.g. turn-taking in video-mediated conversation, Ruhleder and Jordan, 1999; to its organization (e.g. conversational threads in text-based conversations, McDaniel et al, 1996), to analyses of the effects of mediation on the affective content of conversations (e.g. flaming, Spertus, 1997; empathy, Preece, 1999).

In this special issue, we focus our attention on a different aspect of mediated conversations: conversations about “things”, that is, objects or artifacts that are the subject of the conversational focus. By “things”, we mean data models, simulations, models, prototypes, visual images, video images, sound files, spreadsheets, movies, and so on; anything one might want to share with others in the context of a conversation.

Everyday experience suggests that, within the realm of face-to-face conversation, talk about things is usually easy to achieve. Conversations about things at hand, or near to hand, proceed with gaze, gesture, manipulation, body comportment, and other forms of deixis to indicate specific referents in a shared context. People elaborate on their statements by picking things up or walking around them, by turning them around, by pointing to certain features, by inviting and indicating novel visual stances or perspectives to take, by glancing in the direction of objects as they become the focus of the conversation, and even by turning their backs on them.

When collaborators are separated and conversation is mediated, spanning distance or time, things often need to be represented so that they are visually, auditorally and/or kinaesthetically (e.g. Brave et al, 1998) available to the conversants. Once representations are created, conversations proceed with carefully constructed arrangements and procedures for establishing and maintaining joint views.

That said, some representations are easier to create, manipulate and share than others; a text file is easier to create and share than a graphical simulation of a complex weather pattern (e.g. Roe et al, 2001). Further, complex representations generally embody interactional affordances that differ from those of the original thing(s). Thus, a video image of a car is quite obviously not the car itself, and has quite different properties than

the car. It also has different properties than other representations of the car – for example, a physical model or a shared 3D representation.

However, we would argue that the crux of the problem is *not* the representation and transformation of things, *per se.* After all, face-to-face conversations often refer to distant things, and bring them into the conversation via representations such as names, phrases, sketches, illustrative gestures and pictures. Rather, the crux of the problem is that the participants in a mediated conversation no longer have *mutual access* to the representations. The participants are separated from one another, and situated in different contexts.

This loss of mutual access has two consequences, both of which lead to an increase in the "articulation work" needed to get the conversation back "on track" when unanticipated problems occur or when understandings seem to be diverging (Star and Strauss, 1999; Schmidt and Simone, 1996). First, depending on the nature of the conversation's mediation, the participants' representations of things may, in fact, *not* be the same: physical attributes of the representations – layouts, colors, resolution, and so on – may, and often do, have one set of values for one participant, and a different set for another. When such representational disjunctions occur, the effort required to notice, localize and repair them (identifying representational similarity and dissimilarity is seldom an easy task) can distract from the focus of the conversation. The second consequence is that the participants have lost the shared experience of watching one another as they are mutually engaged in the conversation. This reduces the ability to effect moment-to-moment task- and relationship- related adjustments; interpreting and referring to 'things' becomes, by and large, a solitary task in which it is more difficult to get a sense of the other conversants' interpretations, expertise, interests, opinions and viewpoints.

Contents of This Special Issue

We have both had a long standing interest in how systems can support the fluid shifts of focus that occur when collocated people can orient around things. And we have both worked on applications and systems that attempt to solve this problem through representations of digital artifacts and digital bodies, by re-presenting both the pointing finger and the pointed-to things, in the absence of their physical counterparts. Given this interest, we decided to invite papers to address how and when we manage such talk – and when we don't, why we don't. We were keen to offer readers (and ourselves) the treat of reviewing existing theories, methodologies, applications and systems that pertain to this area and offer some reflection on design directions for the future.

This special issue contains four papers that focus on mediated conversations about things – things that may be physically distal but which are rendered proximal through mediating technologies. One paper discusses the use of email as a medium for sharing things. The remaining three papers focus on systems that support focused or "tightly

coupled", synchronous collaborative work. In addition, three commentaries offer an overview of the area and position the papers within it, offering an entrée to alternative approaches and perspectives on mediated, object-centered communication and, we hope, inviting further critical reflection and debate.

The first paper, by **Duchenaut and Bellotti**, focuses on email, noting that it is often the preferred medium for carrying on work-related conversations. Drawing on field studies of 28 email users in three organizations, Ducheneaut and Bellotti investigate the ways in which users employ email to talk about things. While the text-only nature of email would seem to render it poorly suited to talking about things, in fact, Ducheneaut and Bellotti's users report few difficulties. Instead, in the conversations that Ducheneaut and Bellotti analyze (often between colleagues in the same organization), message recipients prove quite adept at using a variety of forms of contextual information to resolve seemingly imprecise references. Drawing on these observations, Ducheneaut and Bellotti explore the ways in which email users refer to things—ranging from textual references to embedded URLs to attachments—and the ways in which message recipients resolve those references. They note people are active producers and recipients of email texts, with shared meanings being mutually constituted through discourse in prior encounters over time within common institutional settings. They conclude that "email has many powerful and unique properties for managing communication about work objects that are much more than just a poor simulation of what is possible in face-to-face communication", and observe that in a number of instances, sharing digital things through email is easier than sharing them face-to-face: the digital contents are already in a format that is suitable for computer mediated communication; no printing or screen sharing is required.

Martin and Rouncefield also examine mediated conversations carried out in the context of everyday work. They examine two cases of remote banking, one in which the banking is done by telephone, and the other in which it is carried out over an experimental video system. The telephone banking study provides an ethnomethodologically informed view of the practices through which operators and customers carry on their interaction, their talk referring both to mediating technologies such as the computer being used by the operator, and banking objects such as accounts, records and letters that are the primary subject of the interaction. As a mature technology, telephone banking provides an interesting contrast to more experimental video-banking system studied. As Martin and Rouncefield note, while some of the interactive practices are the same, the video mediated banking system places new demands upon the operators. For instance, since the video system makes records visible to the customer, this creates a pressure for the operator to discuss the record as soon as it becomes visible, regardless of whether that is the best point in the interaction to do so. Thus, rather paradoxically, increased access to things (in the absence of the embodied techniques through which collocated conversants may jointly manage such access) may make the interaction more difficult rather than less difficult.

Moving from "the wild" to the lab, we come to the experimental comparison of performance between audio and video mediated communication by **Kraut, Fussel, and Siegel**. They examine communication in a task in which an expert advises a novice who

is trying to repair a bicycle. The condition of interest is where the expert is remote and the novice is wearing a head-mounted video camera; this condition is compared with solo (non-expert) and audio-only conditions in a between-subjects design (experiment 1), and with audio-only and collocated conditions in a within-subject design (experiment 2). In general, the results are that having an assistant improves performance, and that the condition in which the expert is collocated with the novice produces the best performance. Rather surprisingly, when the expert is remote, there is no significant difference in performance between the audio-only and the video connection conditions. Drawing on Clark's notion of "conversational grounding" (Clark, 1996), Kraut et al. present quantitative and qualitative analyses of their findings, presenting both task performance data and analyses of the characteristics of the conversation produced during the task. Drawing on these results, they consider the role of visual information in conversation and its implications for the design of video-mediated communication systems. A number of design suggestions are offered, including provision of a wide field of view so objects can be seen within the wider environment in which they are located, and provision of carefully tailored support for gesture and for tracking others' focus of attention. The authors suggest provision of such information will lead to a better sense of *shared* visual space. These suggestions resonate with innovations designed to support collaborative, object manipulation tasks within virtual environments (e.g. Hindmarsh et al, 2000).

In the final paper, **Luff, Heath, Kuzuoka, Hindmarsh, Yamazaki, and Oyama** build on a number of previous projects concerned with synchronous remote collaboration, again focusing on video mediated communication. Their paper reports a study of GestureMan, a novel video based environment that employs a mobile robot equipped with a laser pointer to allow remote participants to "point" to things in the proximal room. In a quasi-experimental, "naturalistic" setting, they evaluate GestureMan, conducting a fine-grained analysis of how it is used by distributed collaborators to complete a furniture arrangement task. Although one might expect that providing a remote participant with a robotic surrogate would ease the task of talking about things, in fact a variety of difficulties ensue. Pointing, it turns out, is not quite as straightforward as one would expect. Indeed, Luff et al. argue – buttressing their study of the GestureMan system with observations of people in face to face settings – that the problem is not simply one of pointing to particular things, but that making sense of reference involves understanding the "connection" or ongoing relationship between an actor and the environment within which the to-be-referenced thing is located. Thus, through detailed examples they illustrate the highly situated nature of people's actions, and the "fractures" that occur when collaborators do not have equal access to the environment in which the actions are unfolding. They argue that "the problem …is not simply how people can detect and identify particular objects, but rather how they can establish and maintain a relevant 'connection', [a] 'relationship' between the co-participant (even an avatar) and the environment in which that person (or representation) is located". The authors offer a number of design guidelines related to technologies for remote collaborative action, including methods by which participants can better determine others' frames of reference and remote object manipulations.

In addition to the four papers that comprise the heart of this special issue, we have three commentaries that approach the papers from three distinct perspectives.

Firstly, **Bly** compares and contrasts the four journal papers along three dimensions. To begin, she raises the issue of approach, asking about the methods, settings and technologies that authors have employed, noting the considerable differences between them. Next, she notes that each paper, in its own way, addresses the issue of common ground. She observes how the sorts of common ground available vary across papers, due, in part, to constraints inherent in their approaches. Finally, she foregrounds a crucial question that this set of papers raises: "Why do the more complex CMC environments not support the interactions with objects any better than phone calls and email…?"

The commentary by **Zuiderent, Winthereick, and Berg** takes an ethnomethodological perspective, and is positioned with examples drawn from medical sociology. They use their own work on the sociotechnical practices in medical informatics as a foil against which to reflect on the contributions of this issue's papers. They focus on the ways in which conversation is entwined with its context, with many communication technologies providing little context for conversations. They characterize such communications as being of "low context density", and observe that communication difficulties that occur with mediated conversations are often "splinted in work practices". Thus, "low context density" technologies often require new skills and new forms of often-invisible work to produce a coherent engagement. An example of such extra work is Martin and Rouncefield's report of the need for video-banking operators to make contact with customers through exaggerated smiling, nodding and facial gestures even as they operate the system. Finally, Zuiderant et al urge us to consider the broader organizational issues underlying the determination of *whose* responsibility it is to perform the hidden work of creating, and who is therefore accountable for ensuring the effective "splinting" of fractures in communication.

Finally, **Whittaker** offers readers a summary of experimental research on synchronous and asynchronous mediated communication, and introduces readers to a number of technologies that have been designed for conversing about things. He notes the central role of visual information in support of talking about things in mediated contexts, and offers three general conclusions that are discussed in detail in his text. First, in many instances and for many collaborative settings, speech or text communications are often sufficient for maintaining ongoing work. Second, visual information about the things themselves tends to be of more value than visual information about work participants. Thirdly, disjoint visual perspectives tend to undermine the communication process. Overarching these conclusions is the point that, as designers, we need to design with careful consideration of the relationship between the technology employed and the task at hand – he urges us to consider carefully *what* visual information is shown and *how* it is shown *in the context of* what is to be achieved. Such an analysis should include a clear understanding of when physical things are needed and when digital artifacts are more suitable. In addition to consideration of the nature of the task, we need to go beyond consideration of technological asymmetries that participants may be experiencing, to address asymmetries between participants' expertise, experience and roles in the

collaboration. Whittaker's commentary concludes with reflections for theory, empirical research and design work in this area.

Some Closing Reflections

In closing, it is worth noting that the papers in this special issue, as well as our remarks in this introduction, tend to use face-to-face conversation as a benchmark or foil against which to contrast mediated conversation. Indeed, most of the methodologies for studying mediated conversation, whether rooted in psychology or sociology, were initially developed for investigating face-to-face, oral interaction (Sacks was an exception, looking at phone conversations; Jefferson, 1995). Thus, there is a tendency to frame analyses in terms of the "shifts" that occur once conversation is mediated, or in terms of the "costs" of maintaining coherence and developing shared understandings when cues are diminished or skewed, relative to face-to-face contexts (Daft and Lengel, 1984; Short et al, 1993).

This slant is not surprising, given that we framed the special issue in terms of "talk," "conversation," and mediation. However we wish to note, in closing, that other perspectives and approaches are possible. Rather than approaching mediated conversation as a variant of "talk," it might equally well be approached as a variant of written discourse. Email, still the best-established form of mediated "conversation," was explicitly modeled on the business memo of the twentieth century, which in turn grew out of the business letter of the nineteenth century (Yates and Orlikowski, 1992). Before that, we have centuries of precedent for communicating via various forms of persistent media, ranging from the correspondence networks of the Royal Society (Rusnock, 1999) to the communication networks needed to sustain the extended governments of early empires such as Rome, Persia and China.

Taking a tack that focuses more on written discourse brings a variety of different methodologies to the fore. For example, work in the area of social studies of science — which notes that much of the effort of scientists is devoted to producing representations of things (in our terms) — offers a very different way of approaching mediated communication (Latour, 1990; Latour and Woolgar, 1979/1986). Similarly, Joanne Yates' germinal book *Control Through Communication* (1989), provides a perspective on mediated communication strongly grounded in historical and material culture. Work in literature and rhetoric, such as that focused on genre (Berkenkotter and Huckins, 1995; Bahktin, 1986; Swales, 1990) offers yet another perspective. We encourage our readers, having digested this work, to cast their eyes farther afield and to take note of the varieties of other perspectives on mediated communication.

Finally, it is interesting to reflect that, in assembling this special issue, we have been immersed in its subject. Most of our work has proceeded through the exchange of email and associated attachments, bearing out Duchenaut and Bellotti's observations. We also made use of web pages, a web-based chat system, the telephone, and a few face-to-face meetings. When we also consider the flows of email and other forms of mediated conversation that have occurred amongst the editors and the reviewers, amongst the editors and the commentators, and amongst the co-authors of submissions, the amount of

time spent and the number of technologies utilized in carrying on the vast conversational web that generated this special issue is astonishing. It is interesting to reflect on how (or even whether) an endeavor like this might proceed in the absence of mediated (or at least digitally mediated) communication: certainly the slower pace of postal mail and the substantially different affordances of telephonic communication greatly change the nature and the amount of required work. Likewise, it is interesting to consider what new kinds of endeavors and forms of collaborative engagement might become possible should we vastly improve our ways of talking about things.

NOTES

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