How Do Communication and Technology Researchers Study the Internet?

By Joseph B. Walther, Geri Gay, and Jeffrey T. Hancock

As a partial review of the field of communication and technology, this essay revisits Newhagen and Rafaeli's (1996) Journal of Communication *article that asked why communication researchers should study the Internet. Research directions, findings, and theories are discussed under the organization of the 5 important qualities of the Internet that Newhagen and Rafaeli identified: multimedia, hypertextuality, packet switching, synchronicity, and interactivity. The article concludes with an assessment of theory development in communication and technology research, issues facing theoretical growth, and an answer to the question of what this research might teach us.*

In 1996, a special joint issue of this journal and the *Journal of Computer-Mediated Communication* began by entertaining the question of why communication researchers should study the Internet (Newhagen & Rafaeli, 1996). Without offering an explicit answer to that question, the authors focused on five "defining qualities" of the Internet that, they implied, might offer the most fruitful study. These qualities included multimedia, hypertextuality, packet switching, synchronicity, and interactivity.

A lot has changed in less than a decade with respect to the Internet. Some of these five qualities have become hotbeds of research, while others have not. The World Wide Web, relatively new in 1996, did hold potential for multimedia in new ways, and with the coming of greater bandwidth, wirelessness, enhanced email, picture-taking cell phones, palm-sized computers displaying movies, and the Web, too, multimediation has exploded. Yet, even though video cameras for personal computers may often be acquired for less than $10 US, most people rely on email and text-based chat for their Internet exchanges. The absence of various communication codes from electronic text-based messaging, and the effects of this absence on a variety of outcomes, such as presence, persist as mainstream issues

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accompanying the rise of Internet use and research. Interactivity, as a loose term, is alive and well on the Internet and is a dynamic that begs for theoretical and practical attention from communication researchers. Yet, as a construct, interactivity has been undertheorized, and as a variable, poorly operationalized. These issues harken to the fields of interpersonal and nonverbal communication for such ideas as immediacy and cues, group communication for topics such as appropriation, and mass media traditions such as channel effects and uses and gratifications. Add to the mix visual communication and, from sister disciplines, usability and interface design, and the study of Internet communication is both familiar and strange. All is new and nothing is new.

The occasion of an article reviewing the area of communication and technology could focus on many things, the Internet and otherwise. Yet the Internet has had a great impact on almost every communication technology we can imagine, and a reexamination of the questions and answers Newhagen and Rafaeli put forward provides a useful starting point to review some of the recent research in the area of communication and technology. Indeed, largely due to the Internet, the field of communication and technology can be said to be as large and broad as the field of communication, as communication technology has touched in real ways phenomena in each of the discipline's subfields or professional association divisions. That said, any attempt at an article-length overview of this field could not do it justice, although some recent longer monographs have been admirable (e.g., Lievrouw et al., 2001; Lievrouw & Livingstone, 2002). This article will return to the ideas laid out by Rafaeli and Newhagen to see what developments have occurred, primarily in research but secondarily with the Internet, to take stock of our levels of understanding, the delivery on the promises of those arguments, and how new ideas and research trends are shaping future inquiry in this field.

Multimedia

Multimedia takes on several meanings. At one level, the Web was originally remarkable for its ability to display graphics alongside text, to run sound and video embedded in a document or linked through Internet connections. At another level, multimedia and the Internet pertain to the convergence of media—that is, the capacity of computing networks and devices to transmit and display television signals, movies, music, and other sound formats, and because of the digitization of these signals, to facilitate their storage and alteration. At a third level, multimedia pertains to efforts, and resistance, to imbue long-distance or text-based communication systems with greater capacity to transmit the physical elements of human speech, that is, voice and body messages in addition to text. These three dimensions have each occupied significant research attention.

The modern document is often a multimedia document. Numerous studies, often related to educational processes, have supported the utility of visual information in instructional media. The effects of pictures are generally superior to text alone in instructional messages that involve elements that have visual aspects to them (Quealy & Langan-Fox, 1998). Furthermore, for certain types of knowledge

learning, either audio-plus pictures or audio-video (motion) materials enhance recall more effectively than text-plus pictures. Multimedia can help users learn physical tasks more effectively, depending on the perspective that media show, that is, whether the media present views from the actor's or the observer's perspective (Krull, 2001). The delivery of multimedia tutorials and other computer-based instruction techniques via the Web is now a commonplace in distance education, course supplementation, and a trend in technical support generally.

Another issue in multimedia may be organized under the construct, presence, or social presence. Indeed, "social presence" was the term first used by Short, Williams, and Christie (1976) in their teleconferencing theory by the same name. Application of this theory to CMC began an ongoing and unresolved tension between theorists arguing that full bandwidth (i.e., all nonverbal cues) is needed for effective communication to occur and theorists who consider the possible accommodations or extra benefits that "leaner" communication renders. Although more thorough discussions of cues, bandwidth, and their effects on communication are available elsewhere (e.g., Walther & Parks, 2002), some cornerstones in this debate should be reviewed.

Echoing Culnan and Markus's (1987) characterization of some positions as a "cues-filtered-out" approach to the effects on cue reductions to the communication process, recent positions have argued quite similarly that there are certain communication functions that cannot in principle be accomplished without physical copresence and the communicative signals that accompany proximity. For example, Nardi and Whittaker (2002) argued that FtF interaction is requisite for communication partners (in their context, work colleagues) to be able to relate and work effectively. Some of the critical processes thwarted by CMC, they argued, include being able to monitor one another's attention and availability and the ability to form an interpersonal bond. The more established positions that these arguments reflect included social presence theory (Short, Williams, & Christie, 1976), a telecommunication theory imported to CMC by Hiltz, Johnson, and Agle (1978) and Rice and Case (1983), among others; the "lack of social context cues" hypothesis of Sproull, Kiesler, and colleagues (see, for review, Sproull & Kiesler, 1993); and information richness/media richness theory by Daft, Lengel, Trevino, and colleagues (Daft & Lengel, 1986; Daft, Lengel, & Trevino, 1987). Each of these theories featured as a principle construct a notion related to cue systems or bandwidth—the number of cue systems including language and nonverbal cues—as a causal property. As bandwidth becomes lower, aspects of communication are posited to differ. These changes may include less cognizance of others, less normative behavior, and corresponding declines in civility, coordination, empathy, and friendliness. In the case of media richness, the degree of bandwidth was said to have an optimal match to message equivocality or uncertainty such that efficiency and effectiveness were each possible at different levels. This was a theory more focused on prescribing optimal uses and media selection than one pertaining to group dynamics or interpersonal behavior.

Slightly more moderate contemporary positions are also emerging. One such position argues that there are certain functions and benefits of FtF interaction that are not *yet* replaceable through mediated systems—that the cues and processes,

many of which happen in FtF communication without awareness, are not yet well enough understood to be replaceable with machine signals or routines that would allow them to function without proximity (Olson & Olson, 2002). The difference in these two positions is important. The former is an absolute argument. This theoretical position holds that communicative functions are intractably linked to certain communicative cues, and when the cues are absent, the functions do not transpire. The second view is more relative, offering the possibility that functions can potentially be choreographed as the interchange of certain signals, that the signals can be discerned and, potentially, analogued. In addition, the former position implies that the study of remote collaboration technology focuses on when to use it and when not to and that research might chart the consequences of good and poor choices. The latter position implicates further study of FtF communication as a complex but knowable process, the results of which become the fodder for further developments in human computer interaction (HCI), the field of study concerned with the development of interfaces and signals, not just between actors and devices, but also among actors through devices. For example, how we might signal availability is already apparent in the peer-to-peer system of Instant Messenger, which displays to one's "buddies" when one is logged on to one's networked computer (although not reliably), or through "away messages" that signal inaccessibility (or inattentiveness). The problems and solutions of human-robotic interaction, by which we will be able to communicate with semiautonomous devices, and they with us, will require more thorough understanding of natural interactions and how to synthesize them (see, e.g., Cappella & Pelachaud, 2002.)

Few theorists have defined the cues transmitted through CMC functionally. In one exception, Tanis (2003; Tanis & Postmes, 2003) suggested that media vary in their capacity to transmit cues to identity and cues to meaning. This bivariate scheme offers a useful distinction to begin to ask what cues people need and what cues systems offer in order for people to interact effectively using online media. Although this is a useful beginning, Tanis's elaboration of this scheme equated photographic information about participants with cues to identity and textual information with cues to meaning. This dichotomization, unfortunately, is somewhat illusory. For instance, we find interesting contrasts in the research between what people report that they need in order to detect identity—often visual, indeed—and the cues that they actual use to signal or infer identity among online partners, which are in many cases textual (see, e.g., Flanagin, Tiyaamornwong, O'Connor, & Seibold, 2002; Herring & Martinson, 2004; Thomson, Murachver, & Green, 2001). Conversely, much of the classic work on CMC privileges not language but visual cues as best suited to the disambiguation of complex messages (e.g., the media richness theory of Daft & Lengel, 1986; Daft et al., 1987). Nevertheless, consideration of the specific functional aspects of communication cues and their alteration via media is a useful step deserving elaboration. The inclusion of other functional signals might help to direct our inquiry. The specification of attention-detecting functions and cues suggested by Nardi and Whittaker (2002) would be one set that CMC/HCI development should explore. Relational functions and signals in CMC (e.g., Walther, Loh, & Granka, 2005) also offer further types leading to potentially well-defined and functional research that promises

ultimately to be more useful that either an undifferentiated bifurcation of cues as being only textual or physical, or tying specific cue systems exclusively to one or another function.

Yet other research points to distinct advantages in communication due to the absence of multimedia cues in conversation. Although very early CMC theorizing held the expectation that the replacement of multimodal language and physical cues in group discussions with mediated, text-based CMC might reduce distractions and conflict, subsequent early research on group CMC showed almost opposite, antagonistic effects (see, for review, Walther, 1996a).

Two lines of research have shown that the absence of cues can, in some cases, forge stronger group identities than FTF discussion and, in other cases, liberate users from the normal and sometimes deleterious effects of FtF interaction because of the physical cues FtF conveys. The social identification model of deindividuation (SIDE model; Spears & Lea, 1992, 1994) highlights the role of cues to social identity under the conditions of visual anonymity common to most types of Internet communication. In particular, SIDE draws on theories of social identity and self-categorization (e.g., Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) to conceptualize individuals as having multiple layers of self that can be accessed depending on which social identity is salient. When personal identities are salient, self-categorization corresponds with one's unique, individual identity and leads to behavior that expresses the beliefs, norms, and standards associated with our personal identity. When social identities are salient, self-categorization corresponds with valued groups of which one is a member and leads to behavior that expresses the norms of the group with which one is identified.

This identification process is assumed by SIDE to be affected in important ways by the visual anonymity CMC imparts. Internet communication that lacks multimedia cues and renders participants visually anonymous tends to make cues to identity much more salient because of the dearth of other identity cues. As such, people with salient social identities may forge stronger bonds with groups in the absence of multimedia cues than when such cues (e.g., a picture) are available (Spears & Lea, 1992). Indeed, a number of studies have shown that under conditions of visual anonymity, people tend to act in more group-normative ways (Lea & Spears, 1991; Postmes, Spears, & Lea, 1998; Postmes, Spears, Sakhel, & de Groot, 1998; Spears & Lea, 1992). Moreover, a salient social identity enhanced by invisible online conditions stimulates greater denigration of equally invisible outgroup members. When pictures or videoconferencing are added to CMC, these effects diminish. That is, when the individuating cues of personal physical appearance remind users that there are individuals and not just group members online, these individuals are evaluated independently and with less bias (Lea & Spears, 1995; Lea, Spears, & de Groot, 2001).

The hyperpersonal perspective on CMC (Walther, 1996a) also examined the potential for online communicators to exceed in relational states and collective output that which occurs in parallel FtF contexts. The hyperpersonal model describes four factors—senders, receivers, the channel, and feedback—that may interact with the affordances or features of online communication and that are as-

sumed to underlie the exaggerated relational processes frequently observed online, such as increased levels of affinity and intimacy. In the context of multimedia, the reduction of visual cues plays an important role in each of the four factors. First, when no visual information is available, senders can manage impressions through selective self-presentation by highlighting positive personal characteristics (e.g., a large vocabulary) while avoiding less desirable ones (e.g., a large waistline). Similarly, text-only communication channels allow senders greater control over message construction by providing more time to craft messages and the ability to edit. In nonmultimedia communication, receivers are also more likely to engage in idealized attributions of their online partners, especially when senders are selectively presenting themselves, and the similarity or complementarity described in SIDE theory stimulates overattribution of attraction. Finally, the lack of multimediation may promulgate a feedback loop between senders and receivers. In particular, the receiver's idealized perceptions of the sender may in turn lead the sender to behave in a manner consistent with this idealized view, a process referred to as behavioral confirmation (Snyder, Tanke, & Berscheid, 1977), which then leads to more idealized views of the sender, and so forth. Considered together, these factors suggest that when multimedia cues are unavailable, relational processes between participants should be enhanced or exaggerated.

In support of these predictions, Hancock and Dunham (2001a) found that initial impressions among unacquainted online dyads working a collaborative task were more extreme, yet less detailed in terms of the number of attributes participants selected for rating their impressions of partners, as opposed to when visual information was present in FtF dyads. In a study on relationship development with and without visual information about participants, Walther, Slovacek, and Tidwell (2001) found that providing pictures to long-term trans-Atlantic work groups reduced their levels of affection and social attraction, relative to long-term groups that worked together virtually a semester long but who never saw one another's likeness. Additionally, users who remained invisible earned higher ratings in physical attractiveness the longer they knew their partners and the more they exercised self-presentation efforts, despite exchanging no direct information about their physical appearance. This counterintuitive finding is consistent with the hyperpersonal model.

Research exploring online social support—Internet-enabled venues in which users offer support for psychological, medical, societal, and other problems—offers further insights into SIDE and hyperpersonal dynamics that can be easily identified. These online venues host from handfuls to hundreds of individuals in specified Internet-accessible groups, where typically messages are exchanged asynchronously using text-based messaging. The behavior of many in these groups is uncanny in intimacy and disclosure. One can see a "sign on the door" effect (Wallace, 1999), by which to say that users enter these labeled asynchronous conversation spaces (e.g., alt.support.cancer on Usenet News) knowing little about one another than their common concern, as a patient, family member, or survivor of the common cause of discussion. SIDE dynamics seem very clear here, in that the social context is well defined immediately, and the norms of these groups

become clear either through immersion, the reading of FAQS, or observing (or experiencing) reproaches to norm violations (McLaughlin, Osborne, & Smith, 1995). Hyperpersonal dynamics may be detected in the relatively greater intimacy and trust that are apparent in some of these groups relative to the FtF human resources one may be able to muster offline (Turner, Grube, & Myers, 2001). Moreover, research by Walther and Boyd (2002) found that the hyperpersonal characteristics of interaction management is among the attractions to these invisible forums, along with anonymity, access, expertise, and stigma management.

Although the absence of multimedia cues on the Internet may enhance some communication and relational properties, there is nevertheless a strong draw to using the Internet for voice and visuals through videoconferencing. The effectiveness of videoconferencing, at least in task-oriented settings, has met with very mixed results for some time (e.g., Chapanis, Ochsman, Parrish, & Weeks, 1972). When videoconferencing focuses on the participants and their faces rather than on the task materials or objects, it appears to offer no advantage. For conversations that involve collaboration on physical tasks, however, video cues about objects rather than people have a much more demonstrable impact.

Clark and his colleagues (Clark, 1996; Clark & Brennan, 1991; Clark & Wilkes-Gibbes, 1986) have developed a theoretical model in which successful communication relies upon common ground, which refers to the beliefs, presuppositions, and knowledge that are mutually shared by a speaker and listener. Common ground is gained when participants coordinate their activities to reach the mutual assumption that each utterance has been sufficiently comprehended by everyone for current purposes (Clark & Wilkes-Gibbes, 1986). Visual information can facilitate grounding by providing evidence about each participant's current state of activity and understanding. In particular, visually shared information provides timely and precise evidence of whether or not the listener has understood the speaker; the "instructor" can tell from the "trainee's" visible manipulation of objects whether or not the trainee has understood the instructor's last utterance. If visual information was not shared, the instructor would have to rely upon the trainee's spoken (or written) feedback about his actions, which is more effortful and less timely. Also, shared visual object cues allow the speaker and listener to rely more on linguistic shortcuts, such as the use of deictic pronouns ("it") and spatial deixis ("there"), for referential statements.

From this perspective, video focused on each communicator's face does not provide useful information for grounding communication, compared to providing visual information about the workspace. Recent research by Kraut and Fussell and their colleagues (Fussell, Kraut, & Siegel, 2000; Gergle, Kraut, & Fussell, 2004; Kraut, Fussell, & Siegel, 2003) has examined shared visual information focusing on the workspace and objects, rather than the face. Findings from these studies suggest that visual information about objects improves the grounding process. In particular, participants perform better at aligning puzzle pieces, repairing bicycles, and other visually oriented tasks, faster and more accurately when shared visual information of the workspace is available than when it is not (Gergle et al., 2004).

Hypertextuality

With some exceptions, hypertextuality has not become as great a focus of research in human communication and technology as have other foci. In composition and rhetoric, the subject has been more celebrated. For instance, Bolter (1991) predicted that the interlinking of information through hypertext would have a dramatic effect on individuals' cognitive structures and perceptual processing of information. Specific aspects of cognitive structures, attention, and learning suggest more systematic and reasonable expectations for this potential (see, for review, Eveland & Dunwoody, 2001). Studies of technical communication have focused on the new ability to lead users to context-sensitive help, and user manuals are commonly appearing on CD ROMs or via the Web in hypertext fashion.

The interlinking of information has had a dramatic impact on activities less often considered communication but nevertheless involving information processing, such as e-commerce, in ways predicted by Malone, Yates, and Benjamin (1987). Malone et al. predicted that the effect of networked information technologies on organizations and interorganizational communication would lead to several outcomes. First, large multidivisional organizations would be able to experience vertical disintegration because the cost of coordination with outsources would be reduced as information systems became ubiquitous. Second, this would be due, in part, to the enhanced ability to engage in "spot contracting" by scanning production capabilities and prices among a variety of prospective suppliers and contracting for only the limited quantity of supplies a company might need in the short term, opportunistically and temporarily. This is more productive than the alternatives of long-term contracts or integrating supply functions in the organization itself. This would also lead, third, to the emergence of "electronic brokers," who would take a share of transactions by providing electronic information to potential buyers and potential sellers, in one common interface. Whether or not these predicted dynamics have transformed organizations, it is remarkable to see how the Internet has pushed this effect down to the level of the consumer. Consumer-level brokerage tools have become commonplace, from services that facilitate airfare sales among multiple airlines, to those featuring comparative prices for the same books, videos, or electronics using broker and recommender systems, that line up prices and connections to vendors with hyperlink displays.

Within more familiar settings, some work has been done on levels of hypertextuality and the level of information chunking and scrolling in a political information context. Sundar, Kalyanaraman, and Brown (2003) used the interactivity construct to examine Web layout and its effect on perceptions of political candidates. Different versions of websites alternatively called on users to scroll through a site to find all the information posted, or used a moderate degree of linking and chunking—that is, a home page featured links to topical subsections where additional information was displayed—in order to find additional information. Finally, some called for a high degree of linking and chunking, by which users chose links from a home page, and links within second-level subsections in order to see information posted three levels down. Curvilinear effects of the degree of chunking

were produced on perceptions of the candidate himself—his character, competence, and likeability—such that the greatest outcomes were obtained with a moderate level of linking. Although the connection to interactivity, as we will discuss below, may be tenuous from some perspectives, it is remarkable to note that hypertext differences in the interface alone, not the content of the website, led to differences in perceptions that transcended judgments of the website and projected onto judgments of the candidate himself.

Interactivity

The construct of interactivity is not new to new technology. Simpler notions of things being interactive versus noninteractive go back to debates about the efficacy of television versus classroom learning. Interactivity in new media has been referred to, not too radically, as the extent to which source and receiver are interchangeable roles, exhibiting reciprocal influence (Pavlick, 1996; Stromer-Galley & Foot, 2002). The term is also used loosely, and somewhat inconsistently, when comparing new media to old, such as email to face-to-face (as if interactivity amounts to mutual interruptibility).

It is interesting to consider that the interactive quality of Internet communications implicitly connotes drastically different comparisons among different types of communication scholars who have different kinds of training, although they may not be aware of these biases. For instance, interactivity, or quick interaction between a source and a receiver, is a very new dynamic from a mass communication perspective on information transmission. It differs dramatically from other electronic media in the ability to influence the presentation of content and feedback quickly to sources. For a receiver to select the parts, or the order of presentation of content within a message package by clicking on hyperlinks, as in the Sundar et al. (2003) study noted above, is substantially different from television, movies, or radio in which the content is invariably linearly presented and ordered by the sender alone. Thus, Internet communication is more interactive than traditional forms to mass media observers.

In contrast, among interpersonal communication researchers of face-to-face communication, interactivity is a native state. "Interacts" and "double-interacts" also have a history in dyadic, small-group, and organizational communication research (e.g., Rogers & Farace, 1975; Weick, 1979), where interactivity connotes the functional relationship of one utterance to another. Mediation, a foreign state from this perspective, brings with it delays. Thus sending and receiving messages by email, for example, constitute substantially different processes than those that constitute these researchers' baselines, to say nothing of the relatively static and broadcast-like nature of webpages. Even Instant Messenger conversations evolving in real time do not achieve the mutual interruptibility and backchanneling among senders/receivers of the unmediated mode. In this sense the Internet offers less interactivity than the traditional standard to observers of face-to-face communication. Thus, among mass communication and face-to-face communication researchers ostensibly connected by an interest in the Internet, people may

find themselves locking horns about the interactivity of the Internet, using the same term but referring to different qualities based on the implicit biases with which they apprehend traditional communication.

One of the most exciting conceptual definitions of interactivity holding promise to cut across different baselines appeared in a volume attempting to bridge mass and interpersonal communication perspectives (Hawkins, Wiemann, & Pingree, 1988): Rafaeli's (1988) treatise on the subject. Rafaeli's conceptualization was not radical in its attention to the interrelationships among message utterances. Rather, it was unique in its schematic focus on cumulative exchanges that derived meaning despite differences in the media that transported such messages. In the Rafaeli scheme, an act is an utterance or message by Actor A. A response to that message by Actor B is necessary but insufficient to achieve interactivity; it is reactive but not interactive. A third or subsequent message must be offered such that the subsequent message refers (explicitly or implicitly) to prior messages and is interpretable and meaningful only by that referencing. Thus the exchange below does not achieve interactivity, as it does not feature three messages:

A: How are you?
B: Fine.

Neither does this exchange because the third message relates to the second but not necessarily the first:

A: How are you?
B: Fine. How are you?
C: Fine.

However, the following exchange meets the criteria of three or more messages and the referential nature of the third to distant priors:

A: How are you?
B: Not too bad. Yourself?
C: Fine.

Although this somewhat phatic and trivial exchange belies the potential complexity of extended interactions and exchanges, it sets the stage for conceptualizing serial communications as intertwined and cumulative, as opposed to action-reaction pairs.

The most promising aspect of Rafaeli's framework is that it is entirely medium independent. That is, it is not only possible within this conceptualization to have noninteractive face-to-face exchanges (as may be reflected in the second dialogue above). It is also possible to achieve interactivity without synchronicity or copresence; one can imagine that email is capable of conveying the third dialogue above. This construct, then, offered the potential to examine how media are used, and the capability of new technological forms supporting natural and traditional characteristics of communication, by focusing on the exchange and interplay of

messages rather than the superficial characteristics of the media themselves, provided that the media did or did not affect the tendency for interactivity to occur.

The utility of this definition and its media independence has been echoed elsewhere. Indeed, in a major counterargument to the then widely accepted and seldom-challenged media richness theory (Daft & Lengel, 1985), Lee (1994) argued forcefully in *MIS Quarterly* that lean media were in principle capable of rich levels of meaning. While Lee drew on a somewhat loose hermeneutics approach to support his point, his arguments and illustrations were very similar to the conceptual framework laid out by Rafaeli: An accumulation of messages, no matter how long apart, if they refer back and forth among one another, can convey complex ideas and interpersonal nuances. The issue for Lee as well as for Rafaeli was to look beyond the one message with no feedback instance and look for the unfolding meaning in the sequence.

Given such a potentially potent perspective, it may be surprising that relatively little has been done in research using this construct in the years since its introduction. However, the lack of attention to this definition may have something to do with its lack of connection to theoretical antecedents or outcomes. Although Rafaeli (1988; see Rafaeli & Sudweeks, 1998, p. 176) posited that that interactivity may be linked to "attitudinal dimensions of acceptance and satisfaction . . . performance quality, motivation, sense of fun, cognition, learning, openness, frankness, and sociability," he offered no theoretical explanation for this linkage, nor what direction the relationship of interactivity to any of these other constructs might be. Whereas theoretical underspecification often does not, for better or worse, thwart research, almost no such research has emerged, with only a few works providing exceptions.

One study by Rafaeli and Sudweeks (1998) examined postings in 32 online groups (from Bitnet, Compuserve, and Usenet news) and analyzed the "threads" (series of topically related postings with follow-up messages posted as replies to the original or other subsequents). They found that interactivity levels ranged from 0 to 40%. Most messages (52.5%) referred to one message prior but not several prior. The subset of interactive messages contained relatively more frequent opinions and agreements. The study offered no conclusions about the relationship of interactivity levels to other characteristics of communication (and given the observational and noninvasive nature of the study, none were possible). Indeed, the researchers indicated that "we are still far from a theory of interactivity . . . . The findings reported here do not prove the proposed definition of interactivity, or its role in group CMC, namely that interactivity leads to engagement" (p. 187).

The interactivity construct has been subsumed in a recent higher order model of human communication, including but not limited to CMC, in a framework that can be used to classify and potentially analyze any type of communication episode. Burgoon et al. (2000) include in this model (a) *interactivity*, or contingency, which includes the degree to which the meaning of one participant's messages depend on the prior ones of the coparticipant, (b) *participation*, implying active rather than passive observer behavior or lurking, (c) *mediation*, versus face-to-face interaction, (d) *synchronicity*, or real-time rather than delayed message exchange, (e) *proximity* in space and geographical distribution, (f) *richness* of cue

system availability, (g) *identification,* with participants anonymous, pseudonymous, or identified, (h) *parallelism*, whether the format allows concurrent versus serial messaging, and (i) *anthropomorphism*, or the degree to which the communication interface resembles a human appearance. As these elements vary, the theorists expect differences in individual involvement (in cognitive, sensoral, and visceral levels), mutuality (interdependence and shared understanding), and individuation among participants. The extraordinary value of this approach is its avoidance of a monotonic grouping of all qualities as increasing or decreasing as a set when comparing and testing media. This would-be fault has been identified in the set of media characteristics described by media richness theory (see Walther & Parks, 2002). For research to identify what the causal properties are that distinguish one medium from another, or applications of alternative media across situations, these elements must be able to vary independently, in principle. Although some of these characteristics will be hard to separate empirically, the conceptual value of orthogonal characteristics will help focus researchers as well as developers on critical elements that effectively support communication across different Internet and traditional communication platforms, as research has already begun to do (e.g., Burgoon et al., 2002).

The dynamic of interactivity, at least implicitly, also helps to contrast some of the dominant theories pertaining to Internet communication and CMC more generally. For instance, the consequences of interactive communication show stark contrasts between the tenets of media richness theory (Daft & Lengel, 1986) and those of social influence theory (Fulk, Schmitz, & Steinfield, 1990) when it comes to predicting the utility and selection of various communication media. Media richness, discussed previously, holds that media have fixed characteristics, and the differences between people and their uses of technology have to do with their individual intelligence in recognizing and deploying those characteristics for various tasks. In contrast, Fulk and colleagues (Fulk, Schmitz, & Ryu, 1995) took a social constructionist view of media perception and choice in which they argued that the characteristics and utility of media, and ultimately those media's use by individuals, are determined not in isolation and recognition but through social interaction with others. One's perception of media richness, therefore, is in large part a product of the overt and covert evaluations of media held by those in one's close social network and are conveyed through interaction within and about those media. To their credit, Fulk et al. (1995) provided very compelling and exacting evidence for the social shaping of media evaluations. They argued that, for the social influence effect to be true but not to be magic (i.e., to reflect an individual's reaction to the network of influential partners), one's perceptions of media should reflect one's perceptions of others' perceptions. The researchers measured the perceptions of media among several social networks. They found, indeed, stronger correlations between an individual's evaluations of various technologies and his or her perceptions of the evaluations by his or her closest colleagues than between the individual's perceptions and the actual perceptions reported by those colleagues. It is unusual to see such robust evidence for the effect of interactivity on the shaping of perception when individual assessments, alone, have been accepted so strongly in other stations.

The potential of interactive communication also helps to contrast the hyperpersonal (Walther, 1996a) and SIDE models (Spears & Lea, 1992) in certain ways. Although both theories lead to the prediction of social attraction among comparable conditions of CMC use, the hyperpersonal model stakes its claims, like social information processing theory (Walther, 1992), on evolving attraction through message exchange processes. Beyond the receiver/idealization component of the model, in a sense it is a rational model of biased effects. That is, as one user engages in selective self-presentation, even if the receiver processes this information rationally and veridically, there should still be the selective (often positively skewed) impression that the sender had intended there to be. SIDE, on the other hand, is a cognitive biasing model in which interactivity is not central or even necessary to the theoretical biasing process. That is, once social identities are made salient and visual anonymity is in place, subsequent messages have little theoretical bearing on the ultimate evaluations users should be expected to generate. In fairness, several SIDE studies have plotted convergence to group norms over time, or the evaluations of normative messages, suggesting that SIDE is strong enough a theory to predict effects despite the inconsistencies within spontaneous conversations. At the same time, some SIDE studies have employed settings in which prior conversations were presented and in which subjects' behavior had no potential to impact the targets' behavior (e.g., Douglas & McCarty, 2001). Others have involved prescripted messages presented to subjects obviating the possibility of true interactivity (in the sense of mutual influence) no matter what the subjects wrote (Tanis, 2003). That SIDE predictions prove true is testimony to its strength as a psychological theory, yet one in which interaction may not necessarily be a mechanism leading to hypothesized effects.

Another theory that assumes and relies on interactivity to occur is adaptive structuration theory (AST; Poole & DeSanctis, 1990): "Communication processes occupy a central position in any theory of structuration because interaction is the locus of structuring processes" (Poole & DeSanctis, 1992, p. 6). AST is a very complex theory, with numerous defined terms and recursive relationships specified. AST suggests that group technologies have a reinforcement effect on group dynamics rather than a deterministic one. It has had a major impact in the study of group communication technology, especially among constructivist and, in many cases, interpretive researchers. For other kinds of researchers, it can be difficult to derive specific testable predictions from the theory, although efforts to do so have proved valiant and interesting.

A primary assumption in AST is that the introduction and use of any communication technology is socially co-constructed and mediated by human communication and interaction drawing on, and reinforcing, structures that are available in large sociological groups (Poole & DeSanctis, 1990). AST emphasizes that adaptation takes place as group communication comprises a complex interplay between the properties of information technology, rules of interaction, social structures, and human interactions (DeSanctis & Poole, 1994).

Essentially, the theory argues that groups conceptualize technology through their use of it in potentially different ways. People intentionally adapt rules and resources to achieve their goals. These appropriations may be "faithful" to the

design or intent of the technology (i.e., used in line with the designer's intention, such as using anonymous voting to gather an interim measure of agreement) or they may be "ironic" to the designers' purpose (e.g., impersonating another participant when anonymity could allow the taking of false names). The way groups utilize technology is expected to impact the quality of their decision-making outcomes, yet the factors that may lead to a group's timing and appropriations of technology in their work is the subject of ongoing investigations.

A central expectation of AST is that different groups will use technology and communicate in different ways. Furthermore, different ways in which a technology is used can mediate its impact on group outcomes. DeSanctis and Poole (1994) suggested that the impact of technology on groups can be assessed by analyzing how groups tend to structure themselves around social routines that are closely linked to the taskas they undertake as well as to their surroundings or context. "Micro-level structuration is characterized by two distinct interaction dynamics . . . continuous production and reproduction of structures as they are employed in activities . . . [and] junctures at which major shifts in structure occur" according to Poole & DeSanctis (1992, p. 15). Such potentially observable shifts may take place in response to differences in technology characteristics, technology use, and users' various schemata about group processes. One empirical investigation of AST used a local (rather than Internet-based) computerized group decision support system with different levels of procedural rules and restrictiveness imposed by the system's menu of tools (Poole & DeSanctis). Researchers coded the conversational behaviors of participants into categories consistent with the definitions of different types of technology appropriation: at one level, as structuring moves (questioning or suggesting group discussion procedures) at another level, and at a microlevel, as rhetorical tropes and schemes of each participant. Data were transformed into sequences over times. The analyses of these sequences showed that a good deal of discussion (79% of speech acts) was about the technology and how to use it with regard to group processes, with proportions within referring to computer system structures or externally suggested procedural rules. Among the many other findings, the results showed that when procedural restrictiveness was lower, groups spent more conversational effort resolving ambiguity about how to use the computer system.

This finding in and of itself alerts us to reciprocal relationships between the structures and rules imposed by any given communication tool, the social rules imposed by administrators, and the need for users to accommodate through their own innovative effort when there is uncertainty over how to coordinate and exploit a social technology. No wonder, then, that ad hoc discussions in Internet groups are filled with FAQs about acceptable conduct, and that the first stages of computer-supported cooperative work show higher proportions of technology questions and answers than do later stages (Hollingshead, McGrath, & O'Connor, 1993). Elsewhere, in a complex yet compelling study, Contractor and Seibold (1993) showed that AST is amenable to specific hypothesis derivation and provided evidence through computer simulation supporting some of its tenets.

AST has received much attention but fairly limited criticism. Yet the multiply contingent nature of AST might be so emergent in nature that specific outcomes

defy predictability, or that predictions are not open to falsification. Propositional statements, such as "different groups are different," provide useful alerts to the kinds of variance that might be expected, but challenge the researcher to imagine a null hypothesis. At the same time, the bounded constructionism of technology through group interaction and technology appropriation, the heart of this theory, places it as one of the few theories in which both social interaction and aspects of technology play central roles. The theory holds promise for more applications to the characteristics of various Internet tools and settings, the norms of use within user communities, and their dynamic interaction (see, e.g., McLaughlin et al., 1995; Postmes, Spears, & Lea, 2000; Sassenberg, 2002).

Finally, interactivity (or its proxy, personalization of content delivery) is merging with multimedia in original and effective ways, as sound, video, and text are stored in and retrieved from databases based on the ad hoc responses of Web users. New health communication campaigns have employed these techniques with great promise (see Rimal & Flora, 1997). For instance, Buller et al. (2004) have studied and created interactive online health information services that tailor delivery of specific information for users whose input indicates differences in demographic, attitudinal, or experiential characteristics. In a smoking prevention and cessation system for teens, user characteristics triggered the appearance and animation of different characters, the physical appearances of which resembled the age of the user, to lead the user through specifically matched dialogues, information modules, and decision-making routines. Positive results were achieved by the use of this system through its enhancement of learning and social influence.

Packet Switching

Of all the qualities of the Internet enumerated by Newhagen and Rafaeli (1996), the packet-switching structure of the Internet has probably received the least attention in conventional human communication research. Packet switching is the mechanism by which digital bits, sent encoded with metainformation about the "file" to which they belong, where they are going, and where they fit in the final assembly, are routed across the Internet in a potential variety of paths, transparently to the user. It is often reported that one of the motivations to build a packet-switching network was for military emergency purposes. In case of a nuclear attack taking down one node from the network, packets would reroute across other nodes, thereby preserving lines of communication (Rheingold, 1993). It is ironic in that context that on the day the U.S. actually was attacked—September 11, 2001—the Internet was clogged and unresponsive to many of us beyond any utility (Pew Internet & American Life Project, 2001). So many users tried to get information about the terrorist attacks and to see the multimedia views of the World Trade Center that the Internet system built to withstand attack turned out to be a victim of its own success.

The packet-switching basis of the Internet does portend for policy issues be-

cause packet switching means there is no central pipeline to control or cut off. Policies intended to arrest certain behavior conducted through the Internet, such as the regulation of pornography, face the challenge that bits travel transparently from geopolitical areas with one set of local regulations to other areas with different laws and standards with no physical checkpoints and no physical way to keep bits from reaching their destination (Lane, 2000). For offshore bits it is the same.

Packet switching also contributes to the rise of peer-to-peer (P2P) networking and the sharing of multimedia files. The legal, corporate, and cultural issues associated with these developments are occupying a good deal of communication policy research. P2P systems facilitate file sharing, giving rise to the sharing of copyrighted as well as personal material. Controversies about Napster's facilitation of P2P music exchange are the outgrowth of the Internet's structural makeup: Once bits of content are freed from storage media, they are readily transmitted as packets. What constitutes ownership of a movie or song, for instance, is a heated political and corporate copyright debate, with potential answers drawing on issues such as what the user intends to do with the material (copy for personal use or to share, resell, or alter it), and for how long. According to Gillespie's (2004) analysis of current policy issues in the U.S., major turning points in the culture industry's control over its goods have been achieved with the passage of the Digital Millenium Copyright Act (DMCA) in 1998 and in the record industry's lawsuit against the Napster P2P song-trading system, which was settled in 2001. The DMCA not only extended copyright protection to digital artifacts, it included an "anticircumvention statute":

> If a copyright owner were to distribute a digital work with some kind of technological barrier built in (i.e., password security, watermarking, encryption, anticopying codes, etc.), it should be illegal for a user to gain unauthorized access by breaking that barrier. Furthermore, it should be illegal to make or distribute a tool that facilitates such a breach. (Gillespie, 2004, p. 240)

Yet such encryption schemes, especially for the prevention of DVD file sharing, have been cracked as frequently as they have been adopted, despite the American courts' subsequent judgments against distributors of cracking tools. One of the clearest conclusions of these policy debates is that predigital conceptualizations of ownership and copyright are not capable of defining or guiding the permutations of consumption and distribution in the new networked, digital society. As we are now beginning to see, these issues are being resolved in part through policy but to a great extent through new business models by which the culture industry is co-opting the distribution of audio-video content, at much lower prices per unit, in such services as the new Napster and Itunes. We should expect that business models will continue to evolve more quickly than slower moving regulatory models and that they will capitalize on the packet-switching nature of the Internet more and more, rather than compete with it.

Synchronicity

The degree to which Internet communication is synchronous or asynchronous is a challenging topic. Although simple understandings of the differences in these mechanisms are common, very little empirical research has compared the effects of one versus another of these platforms. Moreover, many experiments in which the rationale discusses modern organizations using CMC systems such as email and computer conferencing (asynchronous media) have collected their data using synchronous meeting systems. One cannot help but wonder if this is due to the relatively greater ease of running subjects through real-time CMC lab sessions in order to complete data collection quickly, compared to the much more onerous, dropout-ridden, anxiety-producing process of assessing asynchronous partnerships over some period of time. Without additional research on the similarities and differences between these settings, the generalizability of research across these platforms is questionable. Nevertheless, some research has compared the two forms, and more work has focused on forms of synchronous Internet communication for study.

Two studies made direct comparisons between synchronous and asynchronous operations on the same activity. Honeycutt (2001) observed students engaged in peer evaluation of paper writing online. Whereas the students expressed a strong preference for the chat-type system, their economy of language and quality of work suggested that the synchronous was inferior to the asynchronous mode. In another experiment, Walther (1996b) compared decision-making groups who alternately used several synchronous communication systems: CMC chat, FtF meetings, or quickly distributed paper, compared to several asynchronous systems, such as asynchronous computer conferencing and a paper-based drop box and a (physical) bulletin board, in conditions including the expectation of long-term projects or short-term work. An ordinal interaction effect revealed that both anticipated ongoing interaction and synchronous communication (all forms) predicted greater satisfaction and affectionate communication. Paralleling Honeycutt's finding, however, the asynchronous CMC, as well as the slower paper-based groups, reached better decisions. It appears that fast communication is often gratifying but less often as effective in the written environment.

Synchronous CMC has a more infamous history as a recreational tool than a common business application. Indeed, the Internet relay chats of the early Internet, "chat rooms" on proprietary networks such as AOL, and the MUDS and MOOS that provide for role playing and socializing have been studied for their interesting implications on the nature and fluidity of identity (Bruckman, 1992; Turkle, 1995), impression formation and revision (Jacobson, 1999, 2001), relationship development (Parks & Roberts, 1998; Utz, 2000), and gendered language and gender switching (Herring & Martinson, in press; Roberts & Parks, 1999). In addition to their attraction to many people of many predilections, Caplan (2003) argued that when individuals with social skill deficits employ these spaces as alternatives to FtF interaction, their offline skills ironically may decline.

As Instant Messenger grows in popularity (and/or as former college-age IMers join the workforce), more uses of synchronous chat are finding their way into organizations. Nardi, Whittaker, and Bradner (2000) described the use of open IM screens as a way to maintain a sense of presence among distributed colleagues. Their analysis also presented the implicit rules of IM use; it's okay to be IMing someone while on the phone with someone else, but not while talking FtF to someone else. It's okay not to answer an IM right away (even if your friend's "buddy list" says you're at your computer) because everyone knows you might be having to, you know, talk to someone "in real life." IMing or web surfing in real time takes place in classrooms, too, where one might expect that such activities reduce attention and learning. That depends, however, on the destination or topic the tools are being used to access. When students chat about the course they are in, or examine topically related websites, this "split attention" actually leads to better work as seen in their course grades (Hembrooke & Gay, 2003). For those whose activities shift to course-irrelevant Internet matter, course grades are inversely correlated with in-class computer use. Other analyses of IM and synchronous chat have focused on conversational coherence mechanisms, turns, closings, abbreviations, and other linguistic markers that illustrate how this system works among its users (Baron, in press).

Why Should Communication Researchers Study the Internet?

The conventional answer would be, to develop theory, which is after all the aim of research. It is fair to say that the short history of Internet communication research so far has yielded surprisingly little theoretical novelty. That is, despite the alleged newness of new technology, there are few authentically new theories (that have survived scrutiny at least) that can be said truly to represent the phenomena of the field. One set of possible exceptions was formerly to be found in the theories comprising the "cues filtered out" perspective (Culnan & Markus, 1987). The evolution of these theories, however, has done much to dissipate their impact by subsumption of their principles into higher order theories, accounting for the variance in the older studies, but using theoretical terms that are less specifically media related. Social presence and the lack of social context cues, for instance, and the research findings supporting them, have been shown to be subject to confound or subsumption. Both social identification-deindividuation theory (Spears & Lea, 1992) and Walther's (1992) social information processing theory have been able to account for these theories' findings by reference to otherwise extrinsic variables such as salient identity, time, and anticipation of future interaction—variables imported from other psychological and communication works with traditional origins in nonmediated interaction. The final assault on these theories as theories of media selection and use may be the work of Fulk et al. (1995) discussed above, as it recast media perception and selection as socially situated network effects, a more parsimonious and higher order approach than any number of media attributes and goal states. Thus these theories that had

properties of technology as central, main-effect constructs have been supplanted by less media-centric views. It is good that our thinking evolves, yet curious that few new theories define this field.

Perhaps the paucity of new theories is as it should be. It may be argued that theory should grow conservatively, and new theories should arise only when old theories will no longer do. Perhaps communication dynamics change little when they take place via technology, and computerized surface appearances belie traditional communication mechanisms. For a variety of possible reasons, new technology research is still in its infancy, and it is unclear whether it will or should reach maturity as a bona fide field.

Just as problematic as a lack of technologically centered theory, however, is research drawing on traditional theories that compare medium to medium, ostensibly examining the impact of the Internet, in which Internet characteristics are insufficiently explicated. For instance, in studies by several media researchers examining the Internet's impact on public opinion and political engagement, we find Internet conceptually undifferentiated. Whereas the Internet may be, from the perspective of public opinion theories, just another medium, research that has conceptualized and operationalized Internet use monolithically should not be expected to find much impact, as the research very probably has squelched differences of substantial magnitude. Internet use is too broad a category to assess systematically or sensitively the potential impacts of the various communication channels for which the Internet is a conduit, even limiting these channels to those most likely to concern political information: government websites, campaign websites, news websites, personal websites, blogs, political newsgroups, and politically oriented chats, to say nothing of the ad hoc free-wheeling discussions in many nooks and crannies where political opinions are shared, compared, and fought over. While this scattershot list of Internet channels offers no more of a theoretical inroad to understanding the roles of the Internet in political involvement than a monolithic approach, it reinforces that there may be qualities that rigorous research needs to address rather than ignore. As Bimber (2000, p. 330) argued:

> "The Internet" can entail very different activities with divergent or even conflicting effects on human phenomena under investigation. Time spent in a political discussion in a so-called 'chat room' is different from time spent sending e-mail to a group of neighbors about a weekend community project, and these are different from time spent viewing pornography. To speak in simple terms about "the Internet" can conceal important functional differences with distinct implications for civic engagement.

Although a traditional bifurcation of mediated versus interpersonal channels of communication may have some sensibility in traditional media research, classifying the Internet as another noninterpersonal medium defies experience as well as research on the largely interpersonal and relationship-oriented gratifications that at least many Americans seek through their Internet use (Stafford & Gonier, 2004). When research allows for aspects of Internet use to be interpersonal-like as well as media-like, and unpacks various functional activities, richer findings emerge than the "dead ends" predicted by more narrow approaches. For example, Moy,

Manosevitch, Stamm, and Dunsmore (in press) examined a variety of Internet activities and channels, including email, chats and discussions, and Web usage, which factored into several kinds of functional uses (political participation, community activism, social networking, information, and financial/consumer activities). Using these more specific dimensions, Moy et al. found greater impacts of various Internet activities on dimensions of civic engagement than have generally been reported in previous work:

> using the Internet specifically for searching for information, email with interpersonal sources, and political activity . . . was related positively to all dimensions of civic engagement . . . [and] specific dimensions of Internet use emerged as equally, if not more, powerful predictors of civic engagement than either demographics, use of traditional media, or older measures of Internet use. (p. 14)

Although findings such as these do much to refocus research on the Internet as media rather than medium, more can be done to define uses of the Internet if for no other purpose than to further partial those uses out in the analysis of theoretically interesting empirical relationships!

There are also contrary voices, arguing that our relative lack of theories for new communication technology arises because the impacts of technology are so revolutionary that we need totally new ideas with which to comprehend recent and impending changes. The enthusiasm accompanying new media and novel interaction venues has led to a rush to describe and speculate, with an unfortunate tendency to ignore previous research, to mystify, and to dramatize any given discovery. For a time, as students encountered chat spaces and identity-morphing multiuser discussions, and we were treated to a bevy of self-published postmodern awakenings, the future of scholarship in new technology promised to look more like a series of French coming-of-age films, rather than efforts at the identification of generalizable principles and the technological, social, individual, or sociotechnical factors that may cause or result from them. Even among quantitatively oriented researchers, failed hypothesis tests have been offered by their very testers as proof that determinism was a fatality of the networked era (not just technological determinism, but determinism per se), and that technology effects are so deeply embedded, site-specific, and emergent, that they defy rational and generalizable prediction. This point, if true, is one that really needed to be made only once, but which has been shown to be untrue on numerous occasions. More sophisticated work seems to be gaining ground, allowing us to take some steps back from the brink of a headlong plunge into postmodern unreality.

Back from the brink, in some domains, older theories and perspectives have been stretched, reboundaried, and expanded to see where they fit and fail to fit behaviors that are newly situated and yet are the stuff of human nature (see, for review, Walther & Parks, 2002). The number of quasi-theoretical findings about the modification or transformation of common communicative practices affected or enabled by technology has been growing at a rapid pace. Typologies have emerged in addition to those presented above (e.g., Eveland, 2003; Finn, 2000;

Nass & Mason, 1990). Like the multilevel elements identified in activity theory for the study and evaluation of HCI systems (see Gay & Hembrooke, 2004), each may guide our attention and help us to compare and identify causal and confounding properties among existing and forthcoming new media. For design and implementation purposes, a broad view of attributes is necessary because the design of technical systems requires careful consideration of the interactions among the various groups that are working to define and develop them. To design an effective system that meets the needs of various users requires attention to a variety of social, organizational, administrative, and technical concerns (Kilker & Gay, 1998). However, for the higher order principles connecting these typological constructs, for the most part, we await.

Multimediation, interactivity, hypertextuality, packet switching, and synchronicity are interesting phenomena and, as one can see, are interesting organizing topics with which to relate some, but surely not all, communication research on technology. Yet these are not good enough reasons alone for communication researchers to study the Internet. Rather, the Internet and related technologies have the potential to have as great an impact on the social, organizational, political, and relational interactions of our daily lives as other media such as the television and the telephone have had in the past. Communication technology research helps us explore these impacts. It helps us understand how technology affects us at cognitive and social levels. It helps us design and redesign in order to make interfaces and systems more capable of supporting human needs even as we discover with greater precision what humans' information-processing needs really are. These are good reasons for communication researchers to study the Internet and other communication technologies.

Moreover, and grander, communication technology research has the potential to unlock and refresh our views and understandings of the basic ways people interact with each other, offering new lenses with which to view normal, traditionally focused processes in intrapersonal and interpersonal dynamics, group functioning, the development and impacts of social networks, organizational behavior, commerce, and global information sharing. The study of the Internet has reinforced some ultimately simple truths and expanded their impact, in ways that everyone can understand: People sometimes relate as groups rather than as individuals; people relate to one another even in the dark of no FtF contact; people help each other with their problems, and sometimes it's better to ask a stranger than a friend; a picture is worth a thousand words; like a backscratcher or a hammer, a tool is what people make of it. Rather than to help us understand our new technology-enabled behaviors, research using the Internet helps us understand the human condition the way we were and always will be, as message-exchanging and meaning-creating creatures, and that alone warrants our attention.

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