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Beyond mediation: thinking the computer otherwise

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Abstract

Whatever Media Studies 2.0 involves, one thing is certain, there is a need to confront and deal with new technologies, most notably computers and computer networks. Despite the fact that the discipline has largely marginalized these innovations, there has been some effort to incorporate the computer into both the theories and practices of media studies. This has been accomplished, at least in the United States, through the development of what is now called computer-mediated communication (CMC). CMC, which effectively understands the computer as a medium of human communication, does not necessarily institute a significant paradigm shift in media studies but accommodates the new technologies to existing structures, methodologies, and models. This essay contests and critiques this approach. It reviews the development of CMC, identifies its structural limitations, and provides an alternative understanding of the computer that has the potential to reorient the discipline in a much more radical fashion.

Keywords

communication
computer-mediated communication
media studies
technology

Let's begin at the end, with a statement about the end that will only be able to be properly understood at the end: the computer, despite everything we now read about new media, media convergence, and digital this and that, is neither a new form of mediated communication; an elaboration, continuation, and confluence of previous media technologies; nor a new tool in the arsenal of media production and distribution. Instead it constitutes the end of media as we have known it. In other word, the computer marks the end not just of a particular form of media, as has often been argued by scholars of both literacy and media studies (Bolter 2001; Bolter and Grusin 1999; McLuhan 1995; Ong 1995), but of a particular and paradigmatic concept of media such. I write this not to be controversial or fashionable, even though I recognize that such a statement is in fact not without considerable controversy and, from the perspective of a particular brand of theory that appends the prefix *post-* to virtually everything (i.e., post-modern, post-industrial, and even post-media), appears to be following what many would perceive to be a kind of intellectual *haut couture*. Instead I write this out of a deep and serious commitment to the study of media and the discipline of what has been called media studies.

Introduction

When employed for the purposes of communication, the computer has customarily been assigned one of two possible functions, both of which are dictated by a particular understanding of the process of communication. The computer has either been defined as a medium through which human interlocutors exchange information, or it has occupied, with varying degrees of success, the position of the other in communicative exchanges, becoming a participant with which human users interact. These two alternatives were initially formalized and distinguished in Robert Cathcart and Gary Gumpert's 1985 essay 'The Person-Computer Interaction.' In this text, the authors differentiate communicating *through* a computer from communicating *with* a computer. The former, they argue, names all those 'computer facilitated functions' where 'the computer is interposed between sender and receiver.' The latter designates 'person-computer interpersonal functions' where 'one party activates a computer which in turn responds appropriately in graphic, alphanumeric, or vocal modes establishing an ongoing sender/receiver relationship' (Cathcart and Gumpert 1985: 114). These two alternatives were corroborated and further refined in James Chesebro and Donald Bonsall's 1989 book, *Computer-Mediated Communication*. In this extended examination of the role and function of the computer, the authors detail a five-point scale that delimits the range of possibilities for 'computer-human communication.' The scale extends from the computer utilized as a mere medium of transmission between human interlocutors to the computer understood as an intelligent agent with whom human users interact. Although providing a more complex articulation of the intervening possibilities, Chesebro and Bonsall's formulation remains bounded by the two possibilities initially identified by Cathcart and Gumpert.

These two alternatives, which were originally associated with the prepositions *through* and *with*, effectively situate the computer in one of two positions. The computer either is a medium of communication *through* which human users exchange information, or it constitutes an Other *with* whom one communicates. Despite the early identification of these two alternatives, the field of media studies has, for better or worse, privileged one term over and against the other. With very few exceptions, media studies research has decided to address the computer as a medium through which human users interact with one another. This decision is immediately evident in and has been institutionalized by the relatively new field of computer-mediated communication, or CMC. CMC is routinely defined as any form of communication between human users that takes place through, or is facilitated by, some form of computer technology. With CMC, therefore, the computer is understood as a medium or instrument *through* which human users exchange messages and interact with each other. In this way, CMC does not necessarily institute anything new within the discipline of media studies but accommodates these new technologies to existing structures, methodologies, and models. Defining the computer in this manner is completely reasonable and possesses distinct theoretical advantages. At the same time, however, this approach limits our understanding of the computer, restricting it to only one of the two options initially identified by Cathcart and Gumpert.

The Origins of CMC

Understanding and defining the computer as a medium of communication is a direct result of experiences with timeshared mainframe computers and early experiments with computer networking. First generation and early second generation mainframe computers like the UNIVAC and the IBM 650 and System/360 employed what computer scientists call 'batch processing.' Because these machines were designed to execute one job at a time, users were required to run their programs in batches, each particular job running from start to finish in its entirety (Kemeny 1971). Timesharing, a conglomeration of several conceptual and technological developments, dramatically altered this situation. In timesharing, the central computer is designed to be used by many simultaneous users, each accessing the machine remotely by using 'dumb terminals' comprised of a CRT display and keyboard (McCarthy 1962). Although timeshared systems were initially designed to permit concurrent access to and simultaneous use of a single computer, giving each individual the illusion that s/he was the sole user of the apparatus, operators and system administrators quickly discovered that this type of shared usage allowed for two kinds of communication between users.

One system, eventually called 'chat', provided users with a kind of synchronous interpersonal and even broadcast form of communication. In chat, users exchange information in text form by typing messages on their keyboard. Because each keyboard in a timeshared system is connected to and communicates with a common computer, the keystrokes entered by one user can be simultaneously displayed on any number of CRTs wired into the system. Additionally, because each user of the central computer is assigned a separate log-in identifier, one can employ the computer's own administrative system to discriminate between users, allowing the sender of a message to specify the destination or 'address' of the intended receiver(s). The earliest chat programs were designed to transmit messages between two users, creating a kind of interpersonal communication through the medium of the computer. Later enhancements supported the distribution of messages to more than one user, which allowed for the broadcasting of messages and information. The introduction and development of this form of computer-mediated communication illustrates William Gibson's (1993) insight that 'the street finds its own use for things' (1993: 23). Chat programs, at least initially, were not designed and developed by the manufacturers of mainframe computers. Instead they were invented and implemented by users and administrators of these timeshared systems.

The second form of computer-mediated communication fostered by timesharing was electronic messaging or what is now commonly called email. Like chat, electronic messaging capitalized on the fact that timeshared systems were supported and coordinated by a common, central computing machine. Unlike chat, however, electronic messaging provided for a form of asynchronous communication. Katie Hafner and Matthew Lyon provide a succinct description of the operation of such systems in their examination of the origins of email:

> Researchers on the same time-sharing system each had a designated file, like an in-box, in the central machine. Colleagues could address short electronic

> messages to someone else's in-box, where only the recipient could read them. Messages could be dropped and picked up at any time. It was convenient, given the odd hours people kept. People within a single lab sent parades of one-liners back and forth, as well as longer memoranda and drafts of papers.
>
> (Hafner and Lyon 1996: 190)

Employed in this fashion, the mainframe computer functioned as an automated message processing and distribution system, operating in ways that were similar to conventional forms of inter-office mail. The first electronic message program was called MAILBOX and was installed in the early 1960s on a timeshared mainframe at MIT. Like chat, this early email program was not developed by the manufacturers of the hardware and software; it too was hacked together *post hoc* by users and administrators of timeshared systems.

The use of the computer as a form of both synchronous and asynchronous communication expanded with experiments in computer networking and the development of ARPANET, the precursor to the Internet. In 1968, J.C.R. Licklider and Robert W. Taylor published an influential and prescient article in the April edition of *International Science and Technology*. This article, 'The Computer as a Communication Device,' not only espoused the advantages of communicating through timeshared mainframes but projected the benefits of expanding these various forms of 'computer-aided communication' to multi-machine computer networks. Although Licklider and Taylor had only experimented with a single machine coordinating communication across a room, they predicted that the same principles and results would apply to communication between individuals thousands of miles apart (Licklider and Taylor 1999: 97). Proof of their concept was provided three years later with the Emergency Management Information Systems And Reference Index (EMISARI). Murray Turoff, who oversaw the development and implementation of this computerized conferencing system for the US Office of Emergency Preparedness (OEP), described EMISARI as a 'computer-mediated communication system for dispersed human groups' (Hiltz and Turoff 1978: 43). The system provided three ways for users to communicate with each other: 'One, called "Party Line," was a simultaneous written conversation for up to 15 persons ... The other was "Discussion," which kept a permanent record in the computer of all entries made by participants, who were not on simultaneously. The third was messages among the contacts, which could also be attached to specific data items on tables as footnotes' (Hiltz and Turoff 1978: 55). With these three kinds of user interaction, EMISARI provided participants with synchronous and asynchronous communication over a dedicated computer network.

In the same year that EMISARI came online, Ray Tomlinson, an engineer in the employ of Bolt Baranek and Newman, created the first inter-machine email program, successfully passing an electronic message between two PDP-10 minicomputers. Electronic messaging in a timeshared system was possible because different users shared the same machine and its operating system. Tomlinson's innovation was to devise a method for transferring an electronic message from the file system of one machine to that of another, permitting users of different systems to

exchange messages. This basic email system was synthesized by combining an extant electronic message program (SNDMSG) with a file transfer program (CYPNET). In the process of experimenting with this, Tomlinson selected the now ubiquitous @ symbol to distinguish the name of an individual user from that of the host computer s/he utilizes. Eventually Tomlinson used this email program to inform other researchers on ARPANET of the existence of the nascent email system and its mode of operation. Consequently, the first use of network email announced the system's own existence (Campbell 1998: 3); the medium was, quite literally, the message. The application immediately caught on, and by 1974 it was estimated that 75 per cent of all traffic on ARPANET was email.

Communication through the instrumentality of the computer, whether in the form of synchronous or asynchronous exchange, has been designated by a number of different names. In 'The Computer as Communication Device', Licklider and Taylor (1999) advocated use of the term 'computer-aided communication' (CAC), which they fashioned following the precedent established in the engineering community with computer-aided design (CAD) and computer-aided engineering (CAE). Other theorists and practitioners have employed the compound 'compunications' (Oettinger 1971), 'computer-based communication' (Vallee and Wilson 1976), and 'computerized communication' (Rogers and Rafaeli 1985). Other candidates include Zbigniew Brzezinski's neologism 'technotronic', which designates 'the impact of technology and electronics – especially in the area of computers and communication' (Brzezinski 1970: 9), and 'telematique', which was introduced by Alain Minc and Simon Nora in a 1978 report commissioned by French President Giscard d'Estaing to identify the 'increasing interconnection between computers and telecommunications' (Nora and Minc 1980: 4).

But the most popular and accepted appellation, especially in the United States, has been and continues to be 'computer-mediated communication'. Despite its popularity, the exact origin and etymology of this phrase is not certain. What is known is that it begins to make an appearance in the mid- to late 1970s. In 1978, for example, Starr Roxanne Hiltz and Murray Turoff employed the term in their extended examination of computerized conferencing, *The Networked Nation: Human Communication via Computer*. Although Hiltz and Turroff used the term 'computer conferencing system' (CCS) to name 'any system that uses the computer to mediate communication among human beings' (Hiltz and Turroff 1978: xix), they had also employed 'computer-mediated communication' as a generic designation for various forms of human communication via the computer, including, 'computerized conferencing, computer assisted instruction, and home terminals from which white collar work can be done' (Hiltz and Turroff 1978: 167).

The phrase 'computer-mediated communication' was elevated to the status of a technical term in Hiltz's subsequent collaboration with Elaine Kerr, which was undertaken for the US government's National Science Foundation. This 1981 study was expanded and published in 1982 under the title *Computer-Mediated Communication Systems: Status and Evaluation*. In this text, 'computer-mediated communication' was defined as 'a new form of enhanced human communication' (Hiltz and Kerr 1982: 3).

> Essentially, computer-mediated communication means that large numbers of people in business, government, education, or at home can use the computer to maintain continuous communication and information exchanges. More than a replacement for the telephone, mails, or face-to-face meetings, computer communication is a new medium for building and maintaining human relationships.
>
> (Hiltz and Kerr 1982: ix)

For Hiltz and Kerr, the specific technologies that make up this new medium of human interaction includes: 'conferencing systems, electronic message systems, and general information-communication systems designed to support "knowledge workers"' (Hiltz and Kerr 1982: 1). Consequently, Hiltz and Kerr's 'computer-mediated communication' functions as a comprehensive term, designating both synchronous and asynchronous forms of human communication *through* the instrumentality of the computer. Recent employments and characterizations of CMC have reiterated and solidified this general and instrumentalist definition. For Susan Herring, editor of one of the first published collection of essays addressing CMC, 'computer-mediated communication is communication that takes place between human beings via the instrumentality of computers' (Herring 1996: 1). And John December, editor of the now defunct *Computer-Mediated Communication Magazine*, answers the self-reflective question 'What is CMC?' with a similar definition: 'Computer-mediated communication is a process of human communication via computers ...' (December 1997: 1).

Standard Operating Presumptions

In CMC the computer is defined and functions as a medium or instrument through which human users exchange messages and interact with one another. Situating the computer in this fashion is completely reasonable and has distinct theoretical and practical advantages. First, this approach locates the computer at an identifiable position within the process model of communication, which was initially formalized by Claude Shannon and Warren Weaver in *The Mathematical Theory of Communication*. According to Shannon and Weaver, communication is a dyadic process bounded, on the one side, by an information source or sender and, on the other side, by a receiver. These two participants are connected by a communication channel or medium through which messages selected by the sender are conveyed to the receiver (Shannon and Weaver 1963: 7–8). This rudimentary model is not only 'accepted as one of the main seeds out of which Communication Studies has grown' (Fiske 1994: 6) but establishes the basic elements and parameters for future elaborations and developments. Although subsequent models, like those devised by George Gerbner (1956), B. H. Wesley and M. S. MacLean (1957), and Roman Jakobson (1960), extend and complicate Shannon and Weaver's initial concept, they retain the basic elements of senders and receivers connected by a medium that facilitates the transmission of messages. In accordance with this model, CMC locates the computer in the intermediate position of channel or medium. As such, it occupies the position granted to other forms of communication technology and is comprehended as something through which human messages pass.

Second, this intermediate position is substantiated and justified by the traditional understanding of the proper role and function of the technological apparatus. This can be seen, for example, in the work of Marshall McLuhan, the media theorist whose influence extends beyond traditional forms of media studies and into the new fields of CMC and cyberculture. For McLuhan, media – and the word 'media' encompasses a wide range of different technological devices, applying not just to the mechanisms of communication, like newspaper and radio, but all kinds of tools and instruments – are defined as 'extensions of man.' This is, of course, immediately evident from the title of what is considered to be one of his most influential books, *Understanding Media: The Extensions of Man*. And the examples employed throughout this text are by now familiar: the wheel is an extension of the foot, the telephone is an extension of the ear, and the television is an extension of the eye (McLuhan 1995). Understood in this way, technical mechanisms are defined as *prostheses* through which various human faculties come to be extended beyond their original capacity or ability. In making this argument, McLuhan does not so much introduce a new understanding of media technology but provides explicit articulation of a decision that is itself firmly rooted in the soil of the Western tradition. The concept of technology, especially the technology of information and communication, as an extension of human capabilities is evident in and deployed by Plato's *Phaedrus*, where writing had been addressed and debated as an artificial supplement for speech and memory (Plato 1982: 274b–276c).

This particular understanding is also evident in Martin Heidegger's *The Question Concerning Technology:*

> We ask the question concerning technology when we ask what it is. Everyone knows the two statements that answer our question. One says: Technology is a means to an end. The other says: Technology is a human activity. The two definitions of technology belong together. For to posit ends and procure and utilize the means to them is a human activity. The manufacture and utilization of equipment, tools, and machines, the manufactured and used things themselves, and the needs and ends that they serve, all belong to what technology is.
>
> (Heidegger 1977: 4–5)

According to Heidegger's analysis, the assumed understanding of any kind of technology, whether it be the product of handicraft or industrialized manufacture, is that it is a means employed by human users for specific ends. Heidegger terms this particular characterization 'the instrumental definition' and indicates that it forms what is considered to be the 'correct' understanding of any kind of technological innovation. As Andrew Feenberg summarizes it in the introduction to his *Critical Theory of Technology*, 'the instrumentalist theory offers the most widely accepted view of technology. It is based on the common sense idea that technologies are "tools" standing ready to serve the purposes of users' (Feenberg 1991: 5). And because a tool 'is deemed "neutral," without valuative content of its own' (Feenberg 1991: 5) a technological instrument is evaluated not in and for itself, but on the basis of the particular employments that have

been decided by a human user. This verdict is succinctly articulated by Jean-François Lyotard in *The Postmodern Condition*:

> Technical devices originated as prosthetic aids for the human organs or as physiological systems whose function it is to receive data or condition the context. They follow a principle, and it is the principle of optimal performance: maximizing output (the information or modification obtained) and minimizing input (the energy expended in the process). Technology is therefore a game pertaining not to the true, the just, or the beautiful, etc., but to efficiency: a technical 'move' is 'good' when it does better and/or expends less energy than another.
>
> (Lyotard 1984: 44)

Lyotard's evaluation begins by affirming the traditional understanding of technology as an instrument, prosthesis, or extension of human faculties. Given this 'fact,' which is stated as if it were something that is beyond question, he proceeds to provide an explanation of the proper place of the technological apparatus in epistemology, ethics, and aesthetics. According to his analysis, a technological device, whether it be a cork screw, a clock, or a computer, does not in and of itself participate in the big questions of truth, justice, or beauty. Technology, on this account, is simply and indisputably about efficiency. A particular technological innovation is considered 'good,' if, and only if, it proves to be a more effective means to accomplishing a desired end.

Third, this instrumentalist understanding has been and remains largely unquestioned, because it constitutes what epistemologists routinely call 'normal science.' The term 'normal science' was introduced by Thomas Kuhn in *The Structure of Scientific Revolutions* to describe those undertakings that are guided by an established and accepted *paradigm*. Paradigms, according to Kuhn, are 'universally recognized scientific achievements that, for a time, provide model problems and solutions to a community of practitioners' (Kuhn 1996: x). Normal sciences, Kuhn demonstrates, have distinct theoretical and practical advantages. Operating within the framework of an established paradigm provides scholars with a common foundation and accepted set of basic assumptions. This effectively puts an end to debates about fundamentals and allows researchers to concentrate their attention on problems defined by the discipline, instead of quibbling about competing methodological procedures or metaphysical substructures. For this reason, a paradigm provides coherent structure to a particular area of scientific research. It defines what constitutes a problem for the area of study, delimits the kind of questions that are considered to be appropriate and significant, and describes what research procedures and resulting evidence will qualify as acceptable. When the computer is understood and examined as an instrument or medium facilitating human communication, research generally concentrates on either the quantity and quality of the messages that can be distributed by the system, or the kinds of relationships established between the senders and receivers through its particular form of mediation.

In the first instance, investigators consider the messages that are and can be conveyed by the technologies of CMC. Such examinations include,

for example, linguistic studies of the evolving conventions of language, comparing use, style, and genera of online discourse to norms and protocols described and predicted by various linguistic models and/or empirical studies of language. These investigations consider issues like the effect of CMC on language use and evolution (Baron 1984; Crystal 2006; Pemberton and Shurville 2000), the development of distinct forms of 'electric language' (Herring 1996: 13–28), and the invention, use, and acceptance of new linguistic components like emoticons :-), cyber-slang (flamming, lurking, spamming), and abbreviations and acronyms (BTW, LOL, etc.) (Jones 1995; Herring 1996: 47–64). Other forms of research address the perceived limitations and projected opportunities of online communication by comparing the information capacity of messages in CMC to that established by other forms of communication, most notably face-to-face interaction. These studies, which often rely on the theories of media richness (Daft and Lengel 1984; 1986) and social presence (Short et al. 1976), have produced interesting but varying results. Some conclude that CMC is less expressive than face-to-face interaction, arguing that computer generated messages lack both non-verbal cues and clear indication of social context (Sproull and Kiesler 1986). The majority, however, have demonstrated that the same 'deficiencies' can often be a distinct advantage, because they foster forms of interaction that are significantly less inhibited, hierarchical, or constrained (Hiltz and Turoff 1978; Hiltz and Kerr 1981; Kiesler et al. 1984; Herring 1996: 65–80, 109–128, and 243–264). Finally, there are number of research projects that have looked at the actual composition of messages exchanged via network email, on IRC channels, in USENET discussions, or through bulletin board systems (BBS). These analyses consider the content of messages in synchronous and asynchronous CMC, and have discovered both interesting innovations (Wittig 1989; Dery 1994) and disturbing patterns of prejudice, and even forms of hate speech (Herring 1999; Nakamura 1999).

In the second instance, research is concerned not with the composition, limitations, benefits, or content of messages in CMC but with the effects such communication have on participants. This particular approach characterizes early forms of CMC research, which was organized around task-oriented examinations within specific organizational settings and questioned the effectiveness of synchronous and asynchronous computer-based interaction for accomplishing specific objectives (Hiltz and Kerr 1981; Hiltz and Turoff 1978; Lea and Spears 1991; Rice and Case 1983; Rubinyi 1989; Sproull and Kiesler 1986; Steinfield 1986). Such studies often compare the experiences and outcomes of computer-based discussion and decision-making to other forms of communication in order to determine the relative effectiveness of the technology within the context of a specific occupation, work-group, or organization. Although such task-oriented examinations continue to be popular in organizational communication research, recent work has concentrated on the social aspects of CMC, investigating the relationships, communities, and cultures that have been and may be fostered through the mediation of the computer. In this area, researchers have employed many of the traditional theoretical approaches developed in the sociology of communication and media studies. Scholars like, Furlong (1989), Koreman and Wyatt

(Herring 1996: 225–242), and Shaw (Jones 1997: 133–145), for example, have pursued uses and gratification studies, examining how different users (i.e. senior citizens, women, immigrants, gay men, etc.) employ the technology of CMC and what they perceive the benefits and shortcomings of computer-mediated interaction to be. Others investigate the formation, development, and struggles of online or virtual communities (Gumpert and Drucker 1992; Herring 1996: 265–278; Jones 1995: 138–163; Rheingold 1993; Wood and Smith 2001) and the various forms of social behavior and modes of conflict resolution deployed within these cyber-societies (Holt 2004; Jones 1997: 206–235 and 146–168). There have also been ethnographic examinations of specific virtual cultures (Herring 1996: 173–186; Jones 1997: 55–79); investigations of the limits of trust, the construction of identity, and the complications of self-disclosure (Bruckman 1999; Gratz and Salm 1984; Stone 1995; Turkle 1995); and theoretical and practical considerations of what is perhaps the most extreme form of computer-mediated, human interaction – virtual sex, tel-edildonics, and tiny sex (Branwyn 1993; Gumpert 1990; Herring 1996: 129–146; Rheingold 1993; Stone 1995; Van Gelder 1990).

Beyond Mediation

In CMC, the computer is determined to be, in both name and function, an instrument or medium through which human interlocutors exchange information and interact. Understanding the computer in this fashion is technically justified and possesses distinct theoretical and practical advantages for students and scholars. And in being situated in this fashion, the computer is easily accommodated to and made to function in accordance with the dominant paradigm of media studies as it has been practiced throughout the second half of the twentieth century. This approach, however, also entails a set of unacknowledged presuppositions that necessarily complicate this highly specific formulation and ultimately enervate its procedures and significance. In CMC research the computer is effectively immaterial. In fact, CMC is not about computer technology at all. Understood as an instrument through which human users interact, the computer recedes from view and becomes a more or less transparent medium of message exchange. According to Cathcart and Gumpert, studies of communication have always and necessarily:

> minimized the role of media and channel in the communication process. The focus has been on the number of participants, source and receiver relationships, and forms and functions of messages. The media of communication have been accepted, more or less, as fixed or neutral channels for the transmission of messages among participants.
>
> (Cathcart and Gumpert 1981: 27)

This form of instrumental transparency, however useful and convenient, is necessarily interrupted and even resisted by the mechanisms and machinery of computing. Technically speaking, the computer, whether a timeshared mainframe, a networked PC, or something else (i.e., cellphone, handheld device, etc.), has never been a fixed or neutral channel through

which human interaction takes place. Frederick Williams pointed this out as early as 1982:

> The computer is the first communications technology to interact intellectually with its users. Most technologies only transform light, sound, or data into electronic impulses for transmission, then reverse the process at the receiving end. Computers, by contrast, can accept or reject our messages, reduce or expand them, file them, index them, or answer back with their own messages.
>
> (Williams 1982: 30)

A similar remark was recorded by Ithiel de Sola Pool in the foreword to Wilson Dizard's *The Coming Information Age:*

> Prior to the computer, every communication device took a message that had been composed by a human being and (with some occasional loss) delivered it unchanged to another human being. The computer for the first time provides a communication device by which a person may receive a message quite different from what any human sent.
>
> (Pool 1985: xi–xii)

And Cathcart and Gumpert drew a similar conclusion:

> For the first time, a technology can not only speed and expand message exchange, but it can also respond with its own message to a human partner. The computer in this mode becomes a proxy for a sender-receiver in the communication dyad.
>
> (Cathcart and Gumpert 1985: 116)

For Williams, de Sola Pool, and Cathcart and Gumpert, the computer cannot simply be reduced to the customary instrument of communication. Although other devices may function appropriately as a kind of technical intermediary through which human beings exchange messages, the computer deviates from this expectation and interrupts its procedure. Instead of functioning as a virtually immaterial and transparent channel through which human agents exchange messages, the computer participates in and contaminates the process. It acts on the messages, significantly alters them, and delivers information that was not necessarily selected, composed, or even controlled by human participants. These various involvements cannot be reduced to a form of unintentional noise introduced by the exigencies of the channel, which is precisely how the process models have dispensed with and accounted for this kind of machinic contribution. As Chesebro and Bonsall point out, 'other communication technologies may affect the substantive meaning of a human message, but the alteration is typically an unintended by-product of the medium. The computer, on the other hand, is employed because it will reformat the ideas contained in a human message' (Chesebro and Bonsall 1989: 31). With the other media of communication (i.e., print, telegraph, telephone, radio, television, etc.), changes in the human-generated message are explained as unintentional noise imparted by the instrument of transmission. With the

computer, such alterations cannot be reduced to mere noise. They are necessary and integral elements of its function.

The computer, therefore, substantively resists being exclusively defined as a medium and instrument through which human users exchange messages. Instead, it actively participates in communicative exchanges as a kind of additional agent and/or (inter)active co-conspirator. Defined in this fashion, the computer may not be reduced to an instrument or medium of communication but occupies, to varying degrees of success, the position of an other within a communicative exchange. Already in 1966, for instance, Joseph Weizenbaum exhibited ELIZA, a rather simple computer program that was arguably capable of passing the Turing Test for machine intelligence (Turing 1999) by entering into what appeared to be intelligent conversation with a human user (Weizenbaum 1976). A more recent, if not somewhat ironic, example can be found in the circulation of unwanted email or spam. Spam messages, which inform Internet users of everything from herbal supplements, which enhance the size and operation of various parts of the body, to bogus stock and investment opportunities, are generated by and originate with a computer. As a result of the seemingly unrestrained proliferation of this kind of machinic generated messages, users and network administrators now employ spam filters, which effectively decide which messages to deliver to the human user and which ones to filter out. In the era of spam, email is no longer an exclusive instrument of human communication but shows signs of increasing involvement by machines in the communicative process.

Conclusions and Consequences

So what does this all mean? First, it marks the end of media studies as we have known and practiced it. We need, however, to be cautious with how we understand and employ the word 'end' in this particular context. In the field of media studies, the operative paradigm, as we have seen, situates technology as a tool or instrument of message exchange between human users. This particular understanding has been codified by the dominant forms of communication theory, has guided the customary practices of media studies research, and has been considered normal and virtually beyond question by a particular community of scholars. Because this conceptualization is accepted as normative, the computer and other forms of information technology have, with some notable success, been accommodated to fit the dominant paradigm. And this success is clearly evident by the phenomenal growth of CMC as a recognized area of investigation, and the institutionalization of CMC within professional organizations, university curricula, and scholarly journals. At the same time, however, it is increasingly clear that the computer does not behave according to this paradigmatic structure and effectively challenges long standing assumptions about the role and function of technology. The computer, therefore, constitutes what Kuhn would call an 'anomaly' (Kuhn 1996: 52) – something that does not quite fit with the dominant paradigm and that calls into question its assumptions and structure. For this reason, the computer is not necessarily a new technology to be accommodated to the theories and practices of media studies as it is currently defined but introduces significant challenges to the standard operating procedures of media

studies research, initiating what Kuhn calls a 'paradigm shift.' What is at an end, therefore, is not media studies per se but the dominant paradigm that has, until now, structured and guided both the theories and practices of media studies. And it is this shift in paradigm that is announced and marked by the moniker Media Studies 2.0.

Second, a new paradigm, especially during the time of its initial appearance and formulation, does not simply replace, reject, or invalidate the preceding one. For this reason, the previous paradigm, although clearly in something of a state of crisis, can still be useful, albeit in a highly restricted capacity and circumscribed situation. Within Newtonian physics, for example, what is true and what is false, is determined by the entities, rules, and conditions that come to be exhibited within the Newtonian system. As long as one operates inside the framework or 'paradigm' of this system, it is possible to define what is and what is not valid for the Newtonian characterization of physical reality. All this changes, of course, when the normal functioning of Newtonian science is confronted with an alternative, like that formulated by Albert Einstein. Einstein's innovations, however, do not invalidate or foreclose Newtonian physics. They simply reinscribe Newton's laws within a different context that reveals other entities, rules, and conditions that could not be conceptualized as such within the horizon of Newton's theorizing. In an analogous way, the change in paradigm that is announced by Media Studies 2.0 does not disprove or simply put an end to CMC research as such. Instead it redefines CMC as a highly specific and restricted case of what needs to be a much more comprehensive understanding of the role and function of technology within communication. This should come as no surprise to media studies scholars. In fact, we already know this and currently operate within this Kuhnian perspective, even if we do not acknowledge it as such. From the innovative work of Marshall McLuhan (1995) to Nicholas Negroponte's *Being Digital* (1995), and Jay David Bolter and Richard Grusin's *Remediation* (1999), media scholars have affirmed time and again the apparently indisputable fact that new media do not so much eradicate previous media technology but relegate these existing forms to new positions and functions within the newly defined system. We just have not applied this particular insight about the historical development of media to the development of the field of media studies itself.

Finally, although the computer challenges the current paradigm, placing its normal functioning in something of a crisis, what comes next, that is the new paradigm, is only now beginning to make an appearance. And if the history of science is any indication, it may be quite some time before these innovations come to be formulated and codified into the next iteration of what will be 'normal science.' At this preliminary stage, however, we can begin to identify some aspects of what the next generation in media studies might look like in the wake of this paradigmatic shift. For now, the shape of this new paradigm is, for better or worse, influenced (or clouded) by the current paradigm, which provides the only conceptual apparatus and vocabulary we have at our disposal. We are, therefore, in the somewhat cumbersome situation of trying to articulate what will exceed the current paradigm by employing the words and concepts that it

already defines and regulates. This will, of course, affect what can be said about the new paradigm, but we have no other way by which to proceed. From what we already know, it is clear that it is no longer accurate to define computer technology exclusively as an instrument that is to be animated and used, more or less responsibly, by a human being. The computer is beginning to be understood as an Other – another kind of communicative Other – who confronts human users, calls to them, and requires an appropriate response. This other aspect of the computer, as we have seen, was predicted by Cathcart and Gumpert back in 1985. Media studies scholars, however, had (for reasons that are both understandable and justifiable) ignored it, because it did not fit the established paradigm of media studies scholarship – what can, in retrospect, be called 'Media Studies 1.0.' In reframing the machine according to the stipulations of this other and virtually forgotten alternative, all kinds of things change, not the least of which is our understanding of who, or what, qualifies as a legitimate social actor. For Norbert Wiener, the progenitor of the science of cybernetics, these developments fundamentally alter the social landscape:

> It is the thesis of this book [*The Human Use of Human Beings*] that society can only be understood through a study of the messages and the communication facilities which belong to it; and that in the future development of these messages and communication facilities, messages between man and machines, between machines and man, and between machine and machine, are destined to play an ever-increasing part.
>
> (Wiener 1988: 16)

In the social relationships of the not-too-distant future (we need to recall that Wiener wrote this in 1950), the computer will no longer comprise an instrument or medium through which human users communicate with each other. Instead it will occupy the position of another social actor with whom one communicates and interacts. In coming to occupy this other position, one inevitably runs up against and encounters fundamental questions of social responsibility and ethics – questions that not only could not be articulated within the context of the previous paradigm, but if they had been articulated, would have been, from that perspective, considered inappropriate and even nonsense. What, for example, is our responsibility in the face of this Other – an Other who is otherwise than another human entity? How do or should we respond to this other form of Otherness, and how will or should this machinic Other respond to us? Although these questions appear to open onto what many would consider to be the realm of science fiction, they are already part of our social reality. The vast majority of information currently exchanged on the Internet is not human-to-human communication via the instrumentality of the computer network. It is not what we commonly understand and study as CMC. The majority of traffic is otherwise; it is human-to-machine and machine-to-machine communication. Consequently, we already live and operate in a 2.0 world. It is only our theorizing that lags behind and remains committed to outdated models and methodologies.

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