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Integrating Web-Based Training into Communication Scholarship of Computer-Mediated Communication

Brian P. Johanpeter
Eastern Illinois University

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INTEGRATING WEB-BASED TRAINING INTO COMMUNICATION SCHOLARSHIP OF COMPUTER-MEDIATED COMMUNICATION

By

Brian P. Johanpeter

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[redacted]
Date

[redacted]
Advisor

[redacted]
Date

[redacted]
Department Chair

Eastern Illinois University

Abstract

INTEGRATING WEB-BASED TRAINING INTO COMMUNICATION SCHOLARSHIP OF COMPUTER-MEDIATED COMMUNICATION

by Brian P. Johanpeter

Chairperson of the Supervisory Committee: Professor Dr. Mark G. Borzi
Department of Speech Communication

As interest and use of the Internet through the World Wide Web increases, it becomes necessary for the Communication Discipline to reexamine its approach to studying computer-mediated communication. A meta-analysis of the discipline's research in this area provides insight into the scholarly history of this subject. Included in this analysis is an examination of the discipline's research in computer-based instruction, placed as a subcategory under computer-mediated communication. This study reveals a gaping hole in the communication scholarship of computer-mediated communication and offers suggestions as to how research of Web-based training might fill this gap. Additional discussion also reveals how research of Web-based training might provide a means for expanding the boundaries of the discipline's current approach to studying computer-mediated communication.

Table of Contents

Dedication

For my wife, Michelle, and my daughters Arielle, Victoria, and Mayla, who loved and supported me through my many hours of diligent work and study throughout a year of scholarly pursuit.

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The author would like to thank Dr. Mark G. Borzi for sharing his knowledge and for his guidance in the completion of this work. In addition, the author expresses his appreciation to the following members of the Graduate Faculty of the Department of Speech Communication whose teaching efforts and direction aided in the author's development and successful progression through the graduate program: Drs. Doug Bock, Ivy Glennon, Norman Greer, Floyd Merritt, Shane Miller, and Frank Parcells.

Chapter One

WEAVING OF THE WEB: AN INTRODUCTION

"The Internet is quite possibly the most important technical creation since the computer itself" (Santoro, 1994, p. 73).

Considering the phenomenal growth of the Internet due to the expanding popularity of the World Wide Web, it becomes difficult to disagree with Santoro's statement, made before the explosion of the Web. Everyone wants access to, a presence on, and a piece of the Web. Through a network connection to the Web, one can catch the score of a baseball game in progress, check on the current price of a stock, download a new game, purchase everything from diapers to cars to computer systems, listen to a new song, read a treatise by St. Augustine, look for a new job, update limbs on a family tree, watch a preview of the newest Star Wars movie, send an e-mail to a friend on the opposite end of the world, and conduct scholarly research for a literature review. As the Web continues to flourish, its potential escalates.

While the Internet provided access to information through different services prior to the emergence of the Web (e.g., Gopher, FTP, and Telnet; Santoro, 1994), the Web's ability to obtain formatted text, graphics, pictures, and multimedia in a single page format, far

surpassed the abilities of the previous services. However, the most important aspect of the Web lies in its utilization of the hypermedia concept of linking information that one accesses with the click of a button. Whereas previous services provided access to information, as well as the ability to obtain different forms of media, the Web became the first one capable of incorporating different forms of media for presentation on one page, with the assistance of a browser, through the use of HTML (hypertext markup language) and other scripting languages (Santoro, 1994).

With the new potentials provided by the Web come new problems, concerns, and challenges as one considers how this Internet service affects human communication. While the Communication discipline has shown interest over the years in the impact of the computer on communication behavior, most commonly referred to as computer-mediated communication (CMC), the Web provides a broad number of opportunities for the discipline to expand the boundaries of previous CMC research. The purpose of this work is to provide communication scholars with some suggestions of how to expand the boundaries of CMC research to include practical applications of the Web.

Through a review of the literature one will discover that, while communication research in CMC acknowledges the increased interest in and use of the Internet and the Web, much of the research focuses on the use of electronic mail and bulletin board systems as mediated forms of interpersonal and group communication. Although these areas of research have merit, some observe that what this research lacks are results identifying how CMC might be an effective means of communication (Walther, 1997). Previous research also fails to examine the effects of CMC on intrapersonal and organizational communication.

One form of organizational communication, training, might prove useful to the process of discovering effective CMC methods, and endeavor to provide a new means of examining intrapersonal communication. Training describes the process of an organization communicating to its members the cognitive, psychomotor, and attitudinal skills needed to be an effective and productive member of the organization. When distance separates the members of an organization, meeting individual and organizational training needs become costly, time consuming, often repetitive, and difficult to conduct. The Web has allowed companies previously successful in providing computer-based training (CBT), to offer organizations a new training solution in the form of Web-based training (WBT). This practical application of the Web will be the focus of the research in this work.

Conducting a review of the communication discipline's CMC research, constituting the first section of this work, will assist in determining how the discipline might integrate research of Web applications, such as WBT, into the current CMC research methodological framework. To achieve this, Chapter Two will explore several areas of interest in previous CMC scholarship. Chapter Three, while retaining the focus of reviewing previous CMC research, will review CMC scholarship in the area of computer-based instruction (CBI).

The second portion of this work begins in Chapter Four with an introduction to WBT. Chapter Five examines research pertaining to WBT from several discipline areas while also determining WBT's potential for integration into the Communication discipline's CMC research. To conclude, Chapter Five will summarize conclusions made in the previous chapters, as well as provide guidelines and suggestions for future research.

Chapter Two

COMMUNICATION CMC SCHOLARSHIP

Defining CMC

Defining CMC is not as straightforward an act as it would appear. Simply defining CMC as human communication with the computer performing as a transmission device is similar to a line drawing in a coloring book waiting for someone to add color with a crayon to complete the picture. To be more precise, the scope of CMC is similar to a multi-colored, multi-dimensional sculpture, rather than a picture in a coloring book. Thus, it becomes necessary to expand the definition of CMC to include its various dimensions and details.

To fill in these details, one might clarify the previous definition by stating that CMC occurs "when people use computer-networked systems to communicate to other people or to small groups of people" (Barnes & Greller, 1994, p.129). This addition provides a physical aspect of the concept and two levels of human communication: interpersonal and group. This is still just a beginning, however. Baym (1995b) provides more color and dimension by adding motivation when she observes that CMC "is often seen as a means of distributing information, of increasing organizational efficiency, of creating electronic democracy, or of challenging traditional hierarchies" (Introduction). December (1997) contributes contrast and depth by adding that CMC "is a process of human communication via computers, involving

people, situated in particular contexts, engaging in processes to shape media for a variety of purposes." Hiltz (1994) adds another dimension by defining CMC as using "a computer to facilitate communication among people who are dispersed in space or time" (p. 27).

To gain a clearer perspective, consider the different ways that one can use a computer, as presented through these categories suggested by Rice (1989):

> [The] uses of computers for the processing and exchange of information include (1) allocution (processing of transactional information for forms and record, management information systems, computer-generated music and art), (2) registration (online polling, computer-based patient diagnostic systems), (3) consultation (computer-assisted instruction, information retrieval from online databases, video games), and (4) conversation (communication between individuals via computer systems). (p. 437)

Implicit in Rice's classifications is the need for interconnectivity between a computer and other computers and computer systems. Also inherent in these classifications, as well as within the network concept, is that CMC "facilitate[s] the *processing* of the content of human communication" (Rice, p. 438).

Examining the different ways communication scholars have partitioned CMC can also assist in this definition process. Chesebro and Bonsall (1989) chose to categorize CMC applications by the level and type of computer-human communication. The first category, transmission, involves humans using computers for transmission purposes. As the categories develop, the human dominance diminishes until the final level, artificial intelligence, where the computer thinks, develops, and communicates on its own. Thus, they investigate CMC

first from the standpoint of humans communicating through the computer, with the enthymeme that communication occurs first between humans, and develops through their programming and technology until communication is taking place with and between artificially intelligent computers.

December (1996) categorized CMC by suggesting several units of analysis to guide research. These units of analyses also aid in our understanding of CMC. Each of these units fall within the framework of the "server-client-content triad", which describes the relationship existing between computer software, the computer system allowing access to a network, and exchanged content (December, p. 25-26). The individual units branch from the concept of media space, which recognizes that

> Internet communication is not a single medium sharing common time, distribution, and sensory characteristics, but a collection of media that differ in these variables. . . . A media space consists of the set of all servers of a particular type that may provide information in one or more protocols, the corresponding clients that are capable of accessing these servers, and the associated content available for access on these servers. . . . For example, we can consider one Internet media space to be Gopher space: the set of all information (content) provided by Gopher servers, accessible by people using Gopher clients. (December, p. 26)

The units of analysis within media space include media classes, media objects, media instances, and media experiences (December, p. 27-29). These units of analysis provide a framework that considers the various roles possible for the different media within CMC that

aid in the human use of the computer for communication, and essentially places CMC within the realm of mass communication.

Santoro (1994) provides yet another method of classification by separating communication use of the computer into computer-mediated communication or informatics. The first classification, reserved for those computer activities designed to facilitate direct human-to-human communication, include functions such as e-mail, conferencing, and interactive messaging, which is the "synchronous form of CMC that sometimes is called 'chat'" (Santoro, p. 80). Informatics describes those "services in which a human user accesses a remote database of information for local use" (Santoro, p. 77). Examples of informatics such as telnet, FTP (file transfer protocol), gopher, and Wide-Area Information Servers (WAIS), receive detailed explanations by Santoro (p. 81-84).

Explanations that are more complex exist, such as the work of Chesebro and Bonsall (1989), which provides an exhaustive, comprehensive, albeit somewhat outdated, overview of the role of computers in human communication. December's (1996) detailed examination of the constituent parts of CMC, done solely in the context of Internet-based CMC, provides more detail in some of the technology developed since the work of Chesebro and Bonsall.

The previous definitions and classifications of CMC provide a way to create a more complete picture of CMC. Using fragments from each, the picture becomes a mosaic. CMC describes the human communication activity that takes place when computers, connected to one another as a part of telecommunication networks, facilitate the exchange of information and data in different media forms for various reasons and process communication content both synchronously and asynchronously between people of varying levels of communication.

This basic understanding of CMC will help guide the examination of research throughout the rest of this work.

Method

Scholars from a diverse range of disciplines have contributed to the CMC body of knowledge (see Appendix). However, this work focuses specifically on CMC scholarship conducted by the communication discipline. Doing so limits the examination of literature to that which considers the definition or nature of communication in the context of CMC, as a means to broaden the boundaries of previous communication CMC research. This approach naturally tends to limit the literature reviewed to communication discipline-based resources or communication scholars publishing outside of communication. One must understand that this approach does not intend to belittle the contributions toward the CMC body of knowledge by other disciplines.

This work examines CMC in a method similar to a meta-analysis. Traditionally, meta-analyses concentrate on quantitative studies reporting empirical findings, however, this research analyzed all of the communication literature with the intent to create an overall "analysis of analyses" (Kulik, Kulik, & Cohen, 1980, p. 527). While meta-analyses of CMC do exist (e.g., Walther, Anderson, & Park, 1994), the purpose here is to analyze the history of *communication* CMC research in an effort to provide possible directions the discipline might take toward developing a critical communication-based theory of CMC.

Developing a list of communication scholarship of CMC research required a detailed electronic and physical search of databases and indices to find research published by

communication scholars. The articles used in this study derive from commonly accepted communication journals, often sponsored by a communication association or a university's communication department, or from specific communication scholars.

The remainder of this chapter concentrates on the examination of the communication CMC research. This research includes CMC subjects such as e-mail, computer conferencing, electronic bulletin boards, and group decision systems. A review of communication scholarship pertaining to educational uses of CMC becomes the focal point of the next chapter.

Electronic Mail

With a computer, a modem, telephone access, often through an Internet Service Provider, and simple, frequently free, software, one can easily become one of several million people relying on e-mail to communicate with other people each day. Whether to send general correspondence, jokes, information delicacies, or insight into a particular problem, e-mail provides a simple and usually inexpensive way to expedite human communication across distances, whether around the world or two floors down.

Several scholars have reviewed the various communication aspects of e-mail (Chesebro & Bonsall, 1989; Rapaport, 1991; Santoro, 1994). Researchers have also addressed several communicative and social concerns, including problems with organizational adaptation of technology (Hunter & Allen, 1992), the effects of a crisis on organization e-mail (Danowski & Edison-Swift, 1985), its role in media selection and media richness (Fulk, Steinfield, Schmitz, & Power, 1987; Markus, 1987; Schmitz & Fulk, 1991; Trevino, Lengel, & Daft, 1987; Valacich, Paranka, George, & Nunamaker, 1993), and

interactive effects (Markus, 1987; Walther, 1992, 1993, 1994, 1996; Walther, Anderson, & Park, 1994; Walther & Burgoon, 1992). Much of the scholarship seeks to discover how face-to-face (FTF) communication and CMC differ as forms of communication (Althaus, 1997; Hiltz, Johnson, & Turoff, 1986; Olaniran, Savage, & Sorenson, 1996). This research often originates within a classroom setting or occurs within the context of computer conferencing or discussion groups (Althaus, 1997; Bordia, 1997; Olaniran, Savage, & Sorenson, 1996; Walther, 1992, 1993, 1994, 1996, 1997; Walther, Anderson, & Park, 1994; Walther & Burgoon, 1992).

Olaniran, Savage, and Sorenson (1996) grouped the differences between FTF communication and CMC under several focal concepts and provided a table outlining how the research to date fell within these categories. Participation describes the amount of communicative opportunities occurring during an FTF or CMC encounter, the amount of concurrency, or ability to communicate ideas at the same time without interfering others, and the level of anonymity, which can have both positive and negative effects in either situation. The second concept, criticism and embarrassment, is concerned with the level of severity of evaluation apprehension. The third concept, although it can appear in either communication setting, concerns how the amount of productivity loss between CMC and FTF communication varies. The fourth concept surrounds the asyncronicity of CMC and its ability to store and retrieve messages. The fifth concept, training, refers to the skills needed to participate in a CMC or FTF discussion. The final concept is timebinding, which describes not the synchronicity of the communication, but the distance involved and the amount of time required for completion of a decision-oriented task.

Many of the research projects pitting FTF and CMC that would fall into the various groups above, often produce mixed results. In an attempt to gain a better grasp of what these research projects were concluding, Bordia's (1997) review of FTF and CMC research led to 10 general conclusions that serve well to synthesize the research:

1. CMC groups take longer to complete the allotted task.
2. In a given time period CMC groups produce fewer remarks than FTF groups.
3. CMC groups perform better than FTF groups on idea generation tasks.
4. There is greater equality of participation in CMC groups.
5. When time is limited, CMC groups perform better than FTF groups on tasks involving less, and worse on tasks requiring more, social-emotional interaction. Given enough time CMC groups perform as well as FTF groups.
6. There is reduced normative social pressure in CMC groups.
7. Perception (understanding) of partner and task is poorer in CMC groups.
8. In CMC, evaluation of the communication partner is poorer under conditions of limited time. Evaluation of the medium is influenced by the type of task.

9a. There is higher incidence of uninhibited behavior in CMC groups.

9b. CMC induces a state of deindividuation, which in turn leads to uninhibited behavior.

10. CMC groups, as compared to FTF groups, exhibit less choice shift or attitude change. (p. 101-109)

Bordia convincingly argues that these studies suffer from several structural problems including external validity due to the subjects, most of whom are students, time limitations,

and basic research design (p. 110). Regardless of certain technical limitations, hope remains for CMC as a medium, although "it is alarming how little we know about the effects of CMC on interpersonal influence, persuasion, impression formation and management, power relations, and person perception" (Bordia, p. 114).

CMC and Group Communication

CMC applications on the group level of communication include conferencing, discussion groups, and chatting, although chatting can also transpire at the interpersonal level. Computer conferencing or discussion typically takes place when individuals participate with other individuals in discussion on either a subscription-based (usually free) e-mail list (LISTSERV), an electronic bulletin board system (BBS), or as part of an organization's specialized software, all of which are maintained by a computer serving as host (Berge, 1994; Phillips, 1983; Rapaport, 1991; Rice, 1984; Santoro, 1994). Communication in this manner usually occurs asynchronously, meaning participants do not typically participate at the same time. On the Internet or on subscription-based intranets, discussion groups often include individuals with common characteristics, careers, or interests, resulting in a wide range of available topical subjects. Within an organization, computer conferences often form out of a shared need to complete a task when distance separates individuals, or, as we will see later, conferencing using the computer takes place as a means to provide anonymity to users during decision-making tasks.

Chatting, however, occurs synchronously as participants engage in interpersonal and group discussions by exchanging electronic messages (Santoro, 1994). Chatting can occur on the Internet through the delivery of instant messages, or within "chat rooms" frequently

provided by on-line services such as America Online, although the programming for such rooms can be installed on any server. Synchronous communication of this form usually can form haphazardly with individuals joining and leaving at any time, causing a constant turnover in the chat room, or they can occur as planned meetings between individuals separated by distance (Berge, 1994).

The body of literature produced by communication scholars in this subject exceeds that of those focusing strictly on e-mail. Whether this stems from an overabundance of interest on the discipline's part in organizational and group communication activities, or because of the ease of studying groups (typically, of students), is unknown, although this is not to say that research has avoided the interpersonal level completely either. Much of the FTF and CMC research discussed in the previous section would also fall into this category. Additional areas of focus include various levels of communication effectiveness (Danowski, 1983; Johansen & DeGrasse, 1979; Phillips, 1983; Rice, 1984; Walther, 1997; Walther & Burgoon, 1992), electronic discussion language activities (Adkins & Brahers, 1995; Baym, 1996), individual impression and status development (Saunders, Robey, & Vaverek, 1994; Walther, 1993), the development of community through discussion groups (Baym, 1995a), the occurrence of humor (Baym, 1995b), university classroom applications (Althaus, 1997; Hacker & Wignall, 1997; Olaniran, Savage, & Sorenson, 1996; Phillips & Santoro, 1989), and group decision making (Hiltz, Johnson, & Turoff, 1986; Poole & DeSanctis, 1992; Poole & Holmes, 1995; Poole, Holmes, Watson, & DeSanctis, 1993).

Baym's (1996) discussion of Usenet, a network of discussion groups (Berge, 1994, p. 104), provides insight into the topics included in the above listing of group CMC research.

This work examines the interaction differences between writing, the form used in electronic discussion, and oral communication. While recognizing some of the differences between CMC and FTF, as mentioned in the review of Bordia's (1997) work, Baym suggests electronic discussions, having some of the attributes of written communication, are also

> like speech, [where] messages are contextualized and interactive in many ways. Though it is asynchronous, there is more of a shared temporal context than there is in print media because no sites carry messages indefinitely. There is thus no need for Usenet messages to be timeless. There is also a similar physical context. Although the locations of readers differ, writers know that their readers will be seated at computers. Often [messages] will refer to the computer, acknowledging and invoking this mutual context. Usenet groups also share referents, discourse histories, and normative conventions, which are possible because the groups are ongoing. (p. 317-318)

While recognizing that electronic discussion is more like conversation than writing, Baym also reviews important oral and electronic messaging distinctions, including the time differential between sender and receiver, a different perspective on turn taking, and the multiplicity of electronic bulletin boards, meaning sent messages exist as both interpersonal, and mass communication (p. 318-319).

An important concept in the electronic discussion literature is how computer communication filters out cues normally available in oral communication. Walther and Burgoon (1992) examine this concept in the CMC literature and recognize "that CMC produces much different affective and relational patterns than do other types of

communication, due to the reduction and types of cues available to participants" (p. 51). Contextual cues derive from social presence theory, and are used to explain the "task-oriented and impersonal tone of CMC" (Walther & Burgoon, p. 52), which provides much of the fuel for the FTF and CMC studies mentioned earlier. Social presence theory argues the lack of cues "affect users' interpersonal impression formation and their perception of the communication context, and to constrain users' selection and interpretation of messages" (Walther, 1996, p. 7). Adaptation of this theory places CMC in "a social vacuum" based on "the presumed lack of contextual cues and feedback [which] is seen as producing several interrelated communication outcomes" (Baym, 1995a, p. 140).

One of the most prominent of these outcomes is the anonymity of the participants in electronic discussions. Spears and Lea (1994) elaborate on this liberation aspect by stating "that CMC extends and equalizes information exchange, that it releases the individual from the proximal power of others and from the influence of the group, and that consequently it cultivates diversity and democracy in collective activities and decision making" (p. 428). Because of the temporal displacement and the lack of nonverbal feedback, senders can post messages without fear of repercussion due to position, physical characteristics (i.e., gender and race), or without fear of retaliation when disseminating inflammatory messages, a process known as "flaming" (Baym, 1995, p. 140; Lea, O'Shea, Fung, & Spears, 1992).

Identification of CMC as a liberating or "equalizing" (Spears & Lea, 1994, p. 428) form of communication due to anonymity of the user has led to the perception of CMC as an impersonal means of communication. However, Walther (1996) argues that CMC is "beneficial precisely because of its capability to render impersonal communication

outcomes" (p. 7), which assists in explaining why CMC research has shown it to be task-oriented (Bordia, 1997; Walther, p. 6-7).

Rather than continuing to focus on the differences researchers have uncovered regarding FTF and CMC, Walther (1996) encourages the acceptance of CMC as just a different form of communication with its own idiosyncrasies. He advocates a new model of viewing CMC that relies on its communication uniqueness by assuming

> communicators in CMC, like other communicators, are driven to develop social relationships. To do so, previously unfamiliar users become acquainted with others by forming simple impressions through textually conveyed information. Based on these impressions, they test their assumptions about others over time through knowledge-generating strategies, the results of which accumulate in refined interpersonal knowledge and stimulate changes in relational communication among CMC users. . . . This framework acknowledges that there is less social information per message in CMC because of the absence of nonverbal cues. It also recognizes the potential for users to adapt to the linguistic code as the sole channel for relational communication. (p. 10)

Thus, instead of research comparing CMC and FTF communication, Walther suggests examining CMC from a perspective recognizing its unique methods of achieving similar social and verbal goals.

CMC and Organizational Communication

The last section of this chapter will highlight some of the research in CMC applications within the perspective of organizational communication. Several articles discuss

CMC and communication or computer technology within the workplace (Allen & Hauptman, 1987; Barnes & Greller, 1994; Lewis, 1991; Papa & Papa, 1990; Steinfield & Fulk, 1987). Typically, scholarly research of CMC and organizational communication fall into one of two camps. The first encompasses the body of research pertaining to group decision support systems (GDSS). The second is computer conferencing. Although these are essentially applications of CMC at the group level, research frequently occurs at the organization level with the intent of determining the affects of CMC in organizations.

Computer conferencing is a favorite subject among those interested in CMC and organizational communication, as evident by the existence of several studies (Danowski, 1983; Hiltz, Johnson, & Turoff, 1986; Johansen & DeGrasse, 1979; Phillips, 1983; Rice, 1980; Saunders, Robey, & Vaverek, 1994). One of the interests within CMC conferencing in particular is the ability to allow one to shed their organizational status in a CMC conference (Saunders, Robey, & Vaverek, 1994), which is similar to the subject of anonymity mentioned previously. Other interests include how individuals apply CMC in both task and social-oriented instances (Phillips, 1983; Steinfield, 1986), and the context in which CMC conferencing takes place (Johansen & DeGrasse, 1979).

These studies provide evidence that individuals use CMC conferencing methods for both work-oriented tasks and to build the social community within an organization. Steinfield (1990) illustrates the social use of CMC within the organization in his study of the Xerox Corporation. The unfettered use of electronic mail within the Xerox corporation has led to the development of a larger sense of organizational community, as it allows

members of the organization the ability to engage in communicative acts with members they might not otherwise come in contact with during daily work.

As an organization's social community develops through CMC, the traditional opinions toward social presence theory begin to transform. Phillips (1983) suggests, "there *is* an emotional dimension in [computer conferences]" (p. 853). She presents this conclusion in contrast to the social presence theory, suggesting the exclusive sharing of emotion through visual an audio measures. This suggestion serves to support Walther's (1997, 1996) hyperpersonal CMC theory, which suggests that CMC users do exchange social cues, even to the point of achieving "more favorable impressions and greater levels of intimacy than those in parallel [FTF] activities" (Walther, 1997, p. 348).

Research on group decision support systems (GDSS) also provides some interesting insights into computer conferencing (Poole & DeSanctis, 1992; Poole & Holmes, 1995; Poole, Holmes, Watson, & DeSanctis, 1993). Based also status differential, the GDSS allows "participative, democratic decision making in 3- to 16-person groups" (Poole & Holmes, 1995, p. 91). A GDSS uses computers, a network, special decision support tools, and a public screen to facilitate the exchange of written, anonymous messages, thereby influencing open discussion of a topic in order to reach a consensus. While a GDSS may have special programming to permit additional functions, they generally "have been designed to support face-to-face or distributed meetings and to support both synchronous and asynchronous work" (Poole & Holmes, p. 91).

The design and layout of a GDSS is quite different from that of the CMC configurations discussed elsewhere in this study, and although none of the communication

produced results favorable of GDSS, certain aspects of these research projects can apply to other forms of CMC conferencing. First, the orderliness of ideas does not necessarily affect an outcome, but "orderliness correlated positively with perceived quality and decision scheme satisfaction" (Poole & Holmes, p. 122). Because most computer conferences may lack orderliness due to the nature of the medium, it helps to know that it does not necessarily affect the outcome.

One of the most important of these lessons is the need for participants to be competent in the their use of technology. Each of these studies mentioned difficulties in this realm. These results serve to illustrate the negative effects of users of CMC with lower skill competencies on decision-making, as well as conferencing, outcomes.

Conclusion

The purpose of this chapter was to provide an overview of CMC. Through this discussion, a definition of CMC was presented, as well as a review of several of the main foci within the communication CMC literature. The purpose of the following chapter is to examine CMC in the instructional setting.

Chapter Three

CMC AND LEARNING

Computers and Instruction

"Ten years ago the use of computers as instructional devices was only an idea that was being considered by a handful of scientists and educators. Today that idea has become a reality" (Atkinson & Wilson, 1969, p. 3). While somewhat dated, the concept of using computers in education is far from revolutionary, as Rigney (1962) poignantly observed:

> Apparently, [the computer] has proved to be such a powerful slave that we now wish to endow it with an attribute formerly peculiar to living organisms, the ability to learn. Anyone who has attended recent computer conferences has observed this anthropomorphic preoccupation, and some elder statesmen amongst the scientists have solemnly tried to foresee the implications of all this, one being that the slave may learn to turn on its master. . . . [Now we have gone] from trying to get computers to learn to trying to make teachers out of them. (p. 155)

Luckily, although technology has advanced far beyond Rigney's concept of the computer as both learner and teacher, computers have not yet advanced to the point of anarchy over its creators (although, from a behavioral perspective, this could be argued).

The motivation behind the development of computer-assisted instruction according to Atkinson and Wilson (1969) was to meet "today's most pressing need in education--the

individualization of instruction" (p. 3). Although now referred to as "self-directed learning," the need, concept, and motivation behind involving the computer in learning remain the same. As technology advances and the computer's ability to guide a student through the self-directed learning process increases, it becomes increasingly important to research this new relationship, heretofore reserved between human student and human teacher. One of the most important connections in the relationship between the student and the computer during the learning process is the communication that transpires. This communication may occur between fellow students (via CMC discussion groups), between the student and the computer teacher (the instructional design team who created the software), or between the student and the human instructor (via e-mail or face-to-face contact).

The communication occurring in CBI is best described as instructional communication. Sprague (1992) identifies instructional communication as the communication taking place "in the teaching of all subjects at all levels" (p. 1). The importance of the role of communication in CBI is as important as its role in the classroom. CBI facilitates the passage of knowledge from human to human using CMC. However, the role of communication in learning is more than just passive, for "from the Platonic dialogues to the recent discussions of rhetoric as epistemic it has been acknowledged that communication does much more than just transmit knowledge. Communication plays a central role in the *creation* of knowledge" (Sprague, p. 9). It also must be noted that while CBI falls under the instructional communication category, it does lack the cues detection available in the traditional FTF classroom. When CBI program developers keep this deficit in mind, they can account for the lack of cues by programming the interactivity of CBI to

respond to the various permutations of individual users. Of course, this requires an intuitive team to plan, design, and develop a CBI program capable of responding to the various possibilities, in addition to the advanced technology required to facilitate such advanced programming.

Despite the importance of communication in instruction, some communication scholars still have difficulty categorizing CBI, or CMC for that matter, both of which involve human-computer communication (Chesebro & Bonsall, 1989), as human communication. The communication transpiring in CMC frequently occurs asynchronously, meaning that a human sends a message at one point in time, which the intended receiver receives as a later point in time. This describes the same process occurring in CBI. A CBI designer or programmer develops a CBI program with the intent of communicating information to others who receive the information asynchronously as they execute and proceed through the program.

For example, when an organizations training manager develops an organization program, he or she does so for the purpose of communicating the organization's history, ideals, and expectations to new employees. Whether that manager presents this training program before a group on their first day of work, or develops it into a CBI program distributed as HTML pages on the company's intranet, the distribution of the orientation information still occurs. In either scenario, the manager communicates the orientation material to new employees.

Pearce's (1989) examination of human communication further aids in placing this issue into perspective. Pierce begins by situating communication in a traditional definition:

> The traditional concept of communication holds that 'we' exist in a material world, and we use communication to express our 'inner' purposes, attitudes, or feelings, and to describe the events and objects of the external world. Communication works well to the extent that it accurately expresses . . . inner feelings or external reality, and when it produces understanding (or deliberate misunderstanding) between the speaker and the audience(s) addressed. (p. 11)

In CBI, the programmer or design team meets fulfills the role of the speaker, while the learner(s) who proceeds through the CBI program comprise the audience. In their creation of a CBI program, the design team describes "events and objects of the external world," while, with good design, creating an interactive environment that aids in the development of understanding a concept or task.

While, the previous situates CBI in a traditional communication context, Pearce (1989) also proposes a new communication perspective:

> The alternative view is that "we" consist of a cluster of social conversations, and that these patterns of communication constitute the world as we know it. In this view, communication is a *primary* social process, the material substance of those things whose reality we often take for granted, such as our "selves," motives, relationships, what we would otherwise describe as "facts," and so forth. The forms of communication in which we participate either liberate or enslave us; they facilitate or subvert human values. The characteristics of the material universe and the properties of the mind are

> sufficiently different that any number of stories may be told that "adequately" account for the facts. (p. 11)

In this alternative, CBI may also be placed into the realm of human communication. CBI exists as part of the continuing human conversation by transmitting facts as stories set into a CBI program. Communication occurs through the natural conversation between a human learner and the human instructor, with a computer in between the two to facilitate the conversation.

Before continuing, it first becomes necessary to provide some contextual definitions. Over the years, the name used to identify the concept of using a computer to facilitate learning has fallen under many rubrics. One of the first, "programmed instruction," stemming from Burrhus F. Skinner's work[1] in the 1950's and 1960's, referred to an early teaching machine based on Skinner's concepts, which required students to complete "programmed" sentences (Maddux, Johnson, & Willis, 1997, p. 74-76). Skinner's concepts appeared again in the 1970's as programmers incorporated these concepts into educational software. Other terms in the literature describing the use of computers in education include computer-based instruction, web-based instruction, computer-based education, computer-assisted instruction, computer-based learning, computer-assisted learning, computer-managed instruction, and Internet-based training, all of which help to create what some call the "virtual classroom" (Hiltz, 1994; Porter, 1997).

For the purposes of this work, two models are used to describe the use of the computer in learning. The word *based*, as used above, describes the computer-learner-only model, where the learner operates the software or hardware on their own, with little, if any,

supervision from a human facilitator, or contact with fellow students. In this context, computer-based instruction (CBI), will describe this type of learning situation, even though its use may refer to both traditional educational purposes as well as training. The second model, based on those terms containing the word *assisted*, describes the use of computer hardware and software as an educational tool to help in a learning process, which may also include an instructor and multiple learners. Here, the term computer-assisted instruction (CAI) will describe applications of this model, including applications within a training context.

A distinction will also be made to identify where the computer learning takes place. The word *instruction* will refer to the conceptual learning occurring in a formal educational environment. *Training* describes the process either of learning a specific skill that can transpire in a formal educational setting or as part of workplace learning, occurring within the confines of an organization. As mentioned previously, however, CAI and CBI will refer to the computer use in both instruction and training.

CAI and CBI can appear at every level, or environment, of the learning process from primary and secondary education, to post-secondary education and workplace training. CAI can supplement education by providing programs designed to reinforce concepts taught in a traditional classroom environment, or the entire learning process can be programmed into the software, including lessons, practice exercises, and testing, which describes CBI. Learning takes place using a computer in a classroom, computer laboratory, training room, or, in the case of distance learning, anywhere a person has access to a computer. CAI/CBI

software programs operate directly from saved files on a computer's hard drive, from a CD-ROM, or from the Web as HTML formatted pages.

Regardless of its type or platform, CAI/CBI involves an individual using a guided, interactive learning program. This description encompasses and unites the previous concepts, which is further explained by Kuehn's (1994) review of Steinberg's (1991) definition of CBI:

> In this context "individualized" is focused on tutoring or serving students as individuals, "interactive" means there is a "two-way communication between a learner and a computer system," and "guided" describes the function of the computer to reflect stored or interactive expertise to a learner, such as to connect a student to an instructor by electronic mail, or to provide feedback in a tutoring session (Steinberg, 1991, p. 2-3). (Kuehn, 1994, p. 172)

From this perspective then, one can identify the differing levels to evaluate CAI/CBI. When examining the effectiveness of a CAI/CBI program, one would gauge a program's ability to provide individualization, the amount of interaction or communication between the user and the computer, and the extent to which the program provides guidance or allows interaction between the user and a human facilitator.

As demonstrated in this definition of CAI/CBI, no matter the environment, the purpose, or the delivery method, CAI/CBI is a communication process. The computer acts as a mediator between the providers (the senders; i.e., the instructional design team) of information or learning concepts (the message), and the student or learner (the receiver). Programming written by the design team determines the amount of assessment and feedback the software can impart. As a means of communicating ideas in an instructional environment,

CAI/CBI fits within this discussion of CMC and deserves similar attention from communication scholars. The remainder of this chapter examines such research.

CMC and CAI

Many of the studies reviewed in the previous chapter aptly apply to the current review of literature regarding CMC and learning. Much of the scholarship examined previously involved the research of student communication behavior in an educational environment. Studies comparing CMC and FTF communication in the classroom (e.g., Althaus, 1997; Hacker & Wignall, 1997; Hiltz, Johnson, & Turoff, 1986; Olaniran, Savage, & Sorenson, 1996; Phillips & Santoro, 1989) provide insight into the practical application of computers in an educational context. In many of these studies, CMC provided a means of enhancing or enriching traditional classroom learning, which describes the CAI model of computer instruction.

Several studies examine CMC and CAI within the framework of a network run by software designed specifically for CMC. An example of one such computer-mediated communication system (CMCS) is New Jersey Institute of Technology's Virtual Classroom™ software (Hiltz, 1994), and while most of the CMCS research lies outside the communication discipline, Hiltz and her colleagues have provided much direction for communication CMC scholarship, as is evident by the frequency with which her work is cited in the communication CMC research. While several articles published in the communication literature address CMCS (Heeter, 1989; Hiltz, 1986; Johnston, 1989; Rice 1987, 1989), actual research of CMCS occurs outside of the discipline.

Despite occasional disappointments, which often result from system difficulties, user skill level, and methodologies (Althaus, 1997; Olaniran, Savage, & Sorenson, 1996; Phillips & Santoro, 1989), the cumulative results of these studies reveal the addition of CMC in the classroom in a positive manner. According to Phillips and Santoro, "CMC provides for continuous communication between students, instructors, and consultants [teaching assistants] by allowing for convenient transfer of centrally-stored information and permitting participants to exchange information or disseminate it to all or selected lists of participants" (p. 155-156).

An advantage missing in this description is the immediacy provided by CMC. Not only are all of the participants capable of disseminating information to others, they are able to do so more immediately than what would be available to them if they were to have to wait until a meeting time with an instructor, an aid, or the entire class. In addition, the message dissemination is immediate to all members of a bulletin board or list, so that, although members may not actually read and respond to the message immediately, the message arrives immediately after sending. This communication immediacy and its corresponding latency describe the asynchronous nature of CMC.

Another positive attribute to CMC is its ability to provide immediacy. Althaus (1997) arrived at the conclusion "that supplementing face-to-face discussions with on-line interaction can provide students with a learning environment superior to that of the traditional classroom" (p. 173). These studies comparing the roles of FTF and CMC in the classroom point to the continued need for analysis of effects, including how student

perception effects the implementation of CMC as a form of CAI, and how CMC/CAI effects learning outcomes.

Not all of the communication literature focusing on CAI focuses on CMC directly. Several provide insight and suggestions of how the discipline might incorporate CAI and computer technology into the communication curriculum (Behnke & King, 1984; Behnke & O'Hair; 1984; Behnke & Sawyer, 1987; Harms, 1970; Hemphill & Standerfer, 1987; O'Malley & Kloker, 1972; Pace, 1987; Seibold et al., 1992; Sheckels, 1983). Because of the age of most of these articles, some of the ideas presented are outdated because due to the technological advancements of the computer. Despite this, several practical suggestions still hold true today.

For example, Hemphill and Standerfer (1987) offer ways CAI might be effective. The first, dynamic lesson design, involves designing CAI to allow students to study a succession of topics in their own order without risk of lesson deprivation. This self-directed learning approach puts the student in control of the learning process. The authors advise that "speech instructors looking to provide students with a sense of dynamism will have to ensure that the computerized lesson has at least some ability to adapt to individual student needs and demonstrated competencies" (p. 273). Essentially, CAI should be able to provide remedial lessons for students who, in the course of CAI testing, demonstrate a lack of understanding of the material.

Additional methods of ensuring CAI effectiveness include designing the program to provide feedback, which can "make the learning experience more immediate for students" (Hemphill & Standerfer, 1987, p. 274), and the inclusion of graphics, which, even now, has

yet to exhibit any proof of influencing student performance. Hemphill and Standerfer also suggest artificial intelligence as another method of the application of CAI in the discipline. An artificial intelligence system would "converse" with a student on an interactive basis while providing the student with the learning material. However, the application of an effective artificial intelligence form of CAI may still appear to lie in the not so distant future. In conclusion, Hemphill and Standerfer's parting advise still holds true today: "a key issue for speech communication educators must be to what extent a student's interaction with a computerized lesson brings about changes in the student's actual communication behavior" (Hemphill & Standerfer, p. 275). This concern with the effectiveness of CAI parallels and reinforces a similar necessity in CMC research as discussed previously.

CMC and CBI

Shifting emphasis from CAI to CBI, as defined in this analysis, results in a significant drop in the availability of research in the communication literature Hemphill and Standerfer (1987) do allude to the concept of CBI in their discussion of an artificial intelligence system. However, a thorough review of the communication literature resulted in a deficiency of systematic research of stand-alone CBI programs by communication scholars. These results are disturbing considering the plethora of organizations involved in the creation, distribution, and selling of CBI materials.

Although it may seem puzzling as to why such a gap exists, there are several possible explanations. First, the void might exist simply because of the environment of scholarly research, which often occurs in a university setting. University professors conduct such research, often using university students, and most universities are in the *business* of

providing students with classes set in a traditional classroom environment rather than in front of a computer with a stack of CD-ROMs. Thus, the lack of existing CBI in the university setting may contribute to a similar lack in the research of the subject.

Other possible explanations for this void in the communication literature include price and accessibility. The hours spent in instructional design and the technologically advance equipment used to create CBI, makes purchasing sets for research cost prohibitive. Custom designed CBI is even more so. Thus, it would take a grant or a donation from CBI developers, to provide the materials necessary to conduct research. However, researching the use of CBI in an actual organization setting would bypass this problem, but organizations, or training and consulting firms, using custom designed CBI are not often willing to grant accessibility to such training due to a desire to protect corporate secrets and copyrighted material.

Even within the problems mentioned above, solutions exist. Scholars could approach software manufacturers of CBI regarding the possibility of conducting research using their products. Organizations, including consulting firms, could also open their doors to allow research of their CBI materials. In both instances, the developers of CBI or the users would benefit from research that would gauge the effectiveness of their materials. Finally, even universities could invest in CBI materials, place them in a computer lab, and advertise the availability to the surrounding communities as a method of continuing education. This last scenario would provide a very convenient laboratory setting for qualitative or quantitative studies designed to gauge the effectiveness of CBI materials.

Although some plausibility may exist within the reasons mentioned above, the philosophical positioning of communication scholars, may best explain the absence of research of CBI from a communication perspective. As mentioned previously (p. 23), many scholars have difficulty placing human-computer communication within the realm of human communication, and, consequently, within the boundaries of subjects the communication discipline should pursue in scholarship. However, as by placing CBI within the confines of instructional communication and within the realm of human communication itself (p. 22-25), it becomes quite an appropriate subject for consideration by scholars in the discipline.

Upon accepting CBI as worthy of attention by communication scholars, it becomes necessary to consider possible research possibilities. Recognizing the plausibility of some of the problems mentioned above, scholars might consider researching a more easily accessible form of CBI. Web-based training (WBT) is a form of CBI accessible through the Internet. This new, popular form of training has become popular in business and industry. In the following chapter, an examination will help provide insight as to how WBT might fill the void of CBI research in communication CMC scholarship.

Chapter Four

WEB-BASED TRAINING

An Introduction to the Web

> In 1957, at Syracuse University, a professor teaching a basic instructional technology course in which I was a student speculated that, 'One day, we will have an instructional technology that will permit the display of information in any medium, on any subject, in any order, at any time.' Most of us chuckled. After all, he was almost as young as we were, and was, no doubt, overwhelmed by his own enthusiasm. Surely this would not happen in my lifetime. I was underwhelmed. . . . [In 40 years] no technology has emerged as rapidly as the World Wide Web. Not only is it on the lips of every educator and business person, but also the web is common knowledge in virtually every walk of life. We are rushing to put up home pages, and to share our lives, whether prudently or not, with the rest of the world. Many feel that the Web is the most important technology of our time. (Crossman, 1997, p. 19).

Crossman's narrative provides a pertinent illustration of the phenomenal impact of the Web. The results of a recent study reveal the power of the Web, as the researchers examined the length of time it took for 50 million people to begin using certain communication technologies. For the radio, this took 38 years; the television took 13 years; cable television

took 10 years; and the Web took 5 years (Margherio, Henry, Cooke, Montes, Hughes, 1999) This impact is no less felt within academia, which is just now beginning to explore the wonders of the Web and the potential of WBT. To understand the capabilities of WBT, one must first understand the basics behind the Web. Although several articles referring to the Web exist in communication scholarship (Collins, M., 1994; Jackson, 1997; LaRose, Gregg, & Eastin, 1998; Santoro, 1994; Smith, 1994), several appear in the same volume (Phillips, 1994), and only one reports the results of research (LaRose, Gregg, & Eastin, 1998).

As a beginning, the Web is the newest addition to the Internet, which is a telecommunications network that allows for the transfer of data using various methods. The Internet can be portrayed literally as a superhighway with the different lanes corresponding to the various services that travel within the network. Each lane is devoted to either e-mail, Gopher, Telnet, FTP, or, the newest addition, the Web.

The Web is a "second-generation Internet application . . . [that works as] a hypermedia information retrieval system" (Santoro, p. 84). "Second-generation" refers to the Web's ability to search the other services of the Internet. The term *hypermedia* refers to the concept of hyperlinks, which are text, graphics, or any other embedded objects on a page, programmed to open another document upon activation, thereby creating a link between the two pages.

Thus, when a reader uses a pointing device to highlight hyperlink and clicks, the hyperlink activates the link to the corresponding page and the second page opens either in the same browser window, replacing the previous page, or in a new browser window. A Web page can refer to any other page accessible through the Internet, as long as the page exists

in the correct format (i.e., HTML, PDF, etc.), and these pages, put all together, create the Web. The Web has several distinct advantages including its ability to display formatted text and pictures, in addition to carrying sound and video files that can be played if the receiver has the necessary programming installed. However, the Web's greatest capability is the retrieving of any document stored on any computer system, despite differences in platform, as long as the document is accessible from the Internet, meaning that it is stored on a computer server containing a continuous (usually) connection to the Internet.

Jackson (1997), author of one of the few communication articles devoted to the Web provides a more in-depth review of the history of the hyperlink concept and its eventual technological development. In her article, Jackson suggests that:

> The basic structural element of WBC [web-based communication] is the hypertext link. These links do more than define the means for moving from one location or document to another. They offer a new strategy for structuring communication. It is possible that such structuring may carry unique implications for the nature and consequences of human communication.

Jackson advises that the first step, however, is determining how to study the Web as a unique form of communication. The Web is as unique a communication method as CMC. While CMC describes the use of the computer in interactive communication occurring on the interpersonal, group, organizational, and sometimes mass level, the Web allows for communication on every level, including intrapersonal and societal.

Jackson's (1997) article also assists in the understanding of how the Web might be a form of intrapersonal communication: "in hypertextual expression, ideas may branch in

several directions, and paths through these ideas are followed *and* created by the reader who also becomes author. A hypertext document, therefore, cannot be recreated on a conventional page of linear text." A text linked to another document on the Web through a hyperlink, allows the reader to move between texts, which means that the reader creates, or authors their own text. In this sense then, hyperlinks allow one to take pieces, or fragments (McGee, 1990), from linked documents to create what Becker (1971) calls a mosaic picture.

The previous discussion serves to demonstrate the communication research potential of the Web. Communication study of the Web will require new theoretical foundations and research methodologies to account for not only its CMC attributes (e.g., anonymity), but its own unique characteristics as evidenced by the discussion above and through the works of Jackson (1997) and LaRose, Gregg, and Eastin (1998), whose research will be reviewed shortly. At this point, however, it is necessary to postpone such a discussion.

The Possibilities of WBT

In its most basic form, Web-based training (WBT) describes a computer-based instruction delivery method. It involves the transfer of training materials through the Internet or an intranet, programmed for presentation using HTML and add-in scripting, to appear in a browser program designed to view such pages. The intent of this chapter is to provide background information on this relatively new method of CMC and CBI. As was the case for CBI, the communication literature was devoid of articles discussing WBT, with one exception (Jackson, 1997). In fact, the rarity of WBT discussion within *any* scholarly journal requires turning to trade journals, books, and the popular press to help explain WBT.

Before continuing, one must have a clear understanding as to what "web-based training" really means. If referring to the placement of training materials and information on the Internet via the Web, one refers then to *Web*-based training. If, however, one refers to placing training materials formatted using HTML for presentation on an *intranet*, the subject then becomes *web*-based training. Although this may appear to represent a hairline difference, the actual effectiveness of any WBT program depends upon the delivery method. If relying upon the Internet, it becomes necessary to consider how WBT content might effect download time, whereas an intranet, which often restricts access to those within an organization, thereby reducing the amount of traffic on the server and available line, allows for faster downloading of information. For the purposes of this study, WBT will refer to the placement of training *or* instructional materials on either an intranet or the Internet through the Web.

The existing literature regarding WBT falls into one of two camps, academic or non-academic. The academic camp includes scholarly literature and books focusing on implementing WBT in education. This includes every level of education from primary through post-secondary. The non-academic category refers to books, articles from training journals, and literature from the popular computing/information technology magazines regarding the use of WBT for training, often within the context of the organization. A review of this category will help set the stage for the review of the previous.

The enormity of the non-academic body of knowledge over the academic indicates both the popularity of the Web and the willingness of organizations to adopt WBT as a training tool. The first form of non-academic literature comes from two categories of trade

journals, computing or information technology, and training. Computer trade magazines such as *Datamation*, *Online, PC Week, Computerworld*, and *InfoWorld*, cover the subject of WBT quite well (Callaway, 1996; Cole-Gomolski, 1998; Crenshaw, 1997; Hawkins, 1997, 1998; Paul, 1997; Sullivan, 1998). Often these articles on WBT are brief and do little more than report corporate adoption of or experience with WBT, or the activity of WBT content providers. While there may be some value in the reported information, it rarely provides any information to further the body of knowledge.

The training literature provides richer, more meaningful information in the area of WBT. While still lacking the refereed aspect of scholarly journals, the training journals, primarily *Training & Development*, often provide reliable information through reports of research and often rely heavily on the case study approach of reporting implementation of WBT in organizations. WBT training articles cover topics such as its interactivity potential (Black, 1998; Hall, 1997a), WBT's ability to conform to various learning styles (Goldstein, 1998), implementation and introduction (Driscoll, 1998a), and program testing (Kursh, 1998).

Those classed within the final type of non-academic literature are books. This is not to say that the authors of these books were not scholars. On the contrary, scholars wrote each of the four books below. What is distinctly different about these books is their self-help nature. Each of the books approached the subject of WBT from a "computer book" perspective. Early books on computers required a degree in computer science to comprehend, mostly because they used a language or lingo familiar to computer scientists, but unfamiliar to most other people, which occurs frequently when someone unfamiliar with an area of

study attempts to read academic literature. As time went on and more and more people were using personal computers, the computer literature "dummied" down as is evident from the *For Dummies* series by IDG Books Worldwide, Inc. Characteristics of these books include plenty of white space, which is appealing to the vision, graphics and screen shots, and step-by-step task instructions, categorizing these books more as guides than solid scholarship. Although the reading level for these books is uncertain, it is probably lower than the typical scholarly work. Thus, because of the reasons outlined, and with apologies to Hall (1997b), Driscoll (1998b), McCormack and Jones (1998), Porter (1997), and Brooks (1997), these books fall under the non-academic literature category.

Analyzing each of the citations in the materials above would be a daunting task and beyond the scope of this work. Instead, these citations serve to provide the pieces to the WBT puzzle, which, when combined, help one to see the overall picture of WBT. To this end, the following reviews and condenses the positive and negative concepts of WBT presented by these articles, which serves to provide one with an overall picture of WBT.

By far the largest advantage of WBT in the workplace revolves around cost savings. Reduced travel costs alone can account for an organization's initial investment in WBT. Another WBT financial plus is that an organization can have their WBT materials updated and uploaded at one location, which costs much less than paying for and distributing CD-ROMS. In addition, "the web is also a much cheaper way to leverage expertise. By writing Web pages, an expert can train hundreds quickly and less expensively than in a classroom" (Sullivan, 1998, p. 36).

WBT provides students with the chance to study in a self-directed manner, which allows for control over the course's pace and progression. The use of WBT is also less disruptive to the workday than traditional training. Based on the hypermedia concept, WBT allows for linking both within a program and to sites outside of the program where a student can easily obtain further information on a topic. A final advantage is its flexibility. One can participate in WBT anywhere, at anytime, for any reason. For example, a middle manager can access WBT "whether they want to spend an hour refreshing particular skills or must track down an immediate answer to a question that arises during business hours" (Callaway, 1996).

With these advantages come certain disadvantages and concerns. The main problems with WBT were bandwidth constraints, the lack of FTF interaction, the amount of technical and instructional preparation required, and the tendency to focus on information passing. Bandwidth refers to the amount of data processed over telecommunication lines at a given point in time. The greater the number of pictures, sounds, video, and animation on a page, the longer it will take to download and display. Thus, bandwidth constrains the use of multimedia in WBT. As discovered in the previous discussions of CMC and CAI, the lack of interaction with a human instructor can inhibit the perceived effectiveness of WBT. One of the major hurdles to implementing WBT is the technical and instructional preparation required for WBT to succeed. The use of WBT requires possession of a personal computer, preferably equipped with Windows 95 or later, telephone connections allowing access to the Web, and knowledge and skill in the operation of the computer programs. A final concern with WBT is its frequent use as a means to disseminate information rather than to build

practical skills. This often occurs as a result of poor planning and poor design on the part of the instructional design team. A good WBT program becomes more than an electronic page turner when the design team incorporates interactivity and multimedia into the program, which many WBT programs lack simply because of bandwidth problems.

The second category of WBT literature is academic. While examples of WBT scholarship may be difficult to find, some do exist. This analysis includes an edited book (Khan, 1997) containing scholarly commentary on issues pertinent to WBT such as the emergence of the Web as an interactive learning and instruction tool (Crossman, 1997; Reeves & Reeves, 1997; Romiszowski, 1997). Scholarly articles cover topics such as course development (Jonassen et al., 1997; King, 1998), adult learning and pedagogical concerns (Eastmond, 1998; Firdyiwek, 1999; Schrum, 1998), interactivity (Berge, 1999; Gilbert & Moore, 1998; Hedberg, Brown, & Arrighi, 1997), and instructional media effects (LaRose, Gregg, & Eastin, 1998), which is the lone example of communication scholarship in a sea of educational perspectives.

What is most unfortunate is the lack of scholarly research among these articles. Most of the writings in Khan's (1997) book, as well as most of the articles, with the exception of LaRose, Gregg, and Eastin (1998), are commentaries discussing different aspects of WBT. This is not to say that these commentaries lack value, rather, they actually work as guideposts indicating the possible directions for WBT research. The difficulty is in the large number of existing guideposts, along with the continued posting of new guideposts (including this one) without any indication of any tracks in the directed research paths. It becomes necessary then to take a moment to see the direction these guideposts are pointing.

The first guidepost is interactivity. As with CMC, the lack of FTF interaction in WBT poses as a concern to scholars, and as a major hurdle to education providers. Berge (1999) identifies traditional interaction in education as student-teacher, students-teacher, or student-student(s) (p. 5). While the actual amount of these types of interaction in the traditional classroom is instructional design-dependent, implementing this traditional model becomes difficult, and some argue not possible, in WBT. Thus, Berge and other authors urge redefining educational interaction as

> two-way communication among two or more people within a learning context, with the purposes either task/instructional completion or social relationship-building . . . that includes a means for teacher and learner to receive feedback and for adaptation to occur based upon information and activities with which the participants are engaged . . . (p. 6).

Berge further identifies interaction as occurring either interpersonally or intrapersonally. Interpersonal interaction takes place in WBT when a student communicates with other students or an instructor (assuming they exist) using CMC or telecommunications methods, or through FTF interaction. This type of interaction gives students "the opportunity to build within themselves, and to communicate, a shared meaning, to 'make sense' of what they are learning" (Berge, p. 8). Intrapersonal interaction occurs in WBT as the student works through the learning material, during reflection over what they have learned, and when the student actually applies learning in the application of a skill.

As an alternative, Gilbert and Moore (1998) suggest that interactivity occurs either socially or instructionally. Instructional interactivity describes the interaction between the

learner and the instructional content. This model allows for easier integration of the interactivity of multimedia WBT as part of the instructional content (Hedberg, Brown, & Arrighi, 1997). Interactive multimedia describes the combination of text with any mixture of graphics, pictures, sound, and video that enables the user to interact interpersonally and instructionally during a CBI/WBT program. This environment allows learners to manipulate graphical objects in real time as part of a realistic simulation to a complex situation (Hall, 1997b, p. 8). While training using interactive multimedia has traditionally only been delivered by CD-ROMs, WBT has the potential to deliver multimedia as well, although bandwidth considerations, as mentioned previously, restrict the amount of multimedia used.

Reeves and Reeves (1997) outlined a model including 10 interactive, dichotomous dimensions intended to provide a description of the possible mix of "pedagogical dimensions that [WBT] can be designed to deliver" (p. 59). While their intent is to demonstrate the ability WBT has to meet any mix of these dimensions, their model will receive detailed attention because it incorporates all of the scholarly guideposts. The first dimension, "pedagogical philosophy" (Reeves & Reeves, p. 60), includes the bipolar instructivist or hierarchical view with a constructivist, learner-oriented view. The corresponding guidepost is marked *pedagogical concerns* and is similarly addressed by Eastmond (1998), who explores the types of WBT available to the adult learner in distance education, Firdyiwek (1999), who examined the pedagogical orientation and capabilities of several WBT development programs, and Schrum (1998), who reviewed the pedagogy of WBT along with its on-line counterparts.

The second dichotomous dimension involves learning theories, with behavioral psychology and cognitive psychology occupying opposite poles. WBT can be designed from a behavioral perspective, which focuses on "observable behavior, and instruction involves shaping desirable behaviors through the arrangement of stimuli, responses, feedback, and reinforcement (Reeves & Reeves, 1997, p. 60). The cognitive point of view places more emphasis on internal knowledge development. This second step in the model refers to another guidepost, course development, the components of which receive attention from several scholars (e.g., Jonassen, 1997; King, 1998; Ritchie & Hoffman, 1997).

Discussion of this guidepost leads to the concept of active learning, a topic appearing regularly in the literature (both academic and non-academic). Generated from a self-directed learning perspective, Brooks (1997) describes active learning as occurring when a "learner speaks, writes, performs experiments, plans, etc., as opposed to reads, listens to lecture, etc" (p. 185). Brooks expands this concept by stating implicitly:

> Teachers can design creative instructional materials for WWW-based instruction of two types. One type requires active learning; the other presents the materials in a way that an excellent lecturer might present them. *Teachers who demand active learning are likely to bring about substantially greater learning success than those who do not*. My advise is to keep the learners' brains running in high gear whenever possible; make learners work; keep learners active" (Brooks, p. 12).

Active learning fits well into the learning theory step in the model by Reeves and Reeves, as it encourages more of a cognitive approach rather than a behavioral.

Goal orientation refers to either focused or general studies, which, in the training field, describes the difference between "soft skills" and direct-application skills. Task orientation illustrate the dichotomy between self-directed learning, meaning the learner chooses the learning environment, and academics, which describes involuntary participation such as what occurs in primary and secondary education. Task orientation is closely related to the motivation source, which is either intrinsic, that is, motivation coming from within, and extrinsic, which is motivation from without.

Although the role of the teacher changes in WBT, it can still vary from didactic to facilitative, with most WBT proponents actively supporting the facilitative role of the teacher. Metacognitive skills refer to "the skills one has in learning to learn" (Reeves & Reeves p. 62). Metacognitive support within WBT can vary from none at all, meaning the student comes equipped with what they need to learn, to integrated, which describes WBT designed with the ability to support the student by providing, as an example, "learners with recapitulations of their troubleshooting strategies at any point in the problem-solving process" (Reeves & Reeves, p. 62-63).

Collaborative learning describes the extent to which interaction takes place among other learners. Cultural sensitivity involves designing WBT to be respectful of possible cultural implications within the content. Finally, structural flexibility refers to the time and environment in which a student can engage in WBT.

This model of WBT instructional design provides scholars with many possible avenues of research. It is important to discover the relationship between each of these components and the effectiveness of WBT. Research of WBT should consider each of these

levels, or variations thereof, during the process of research design, in an effort to discover the level of importance of each.

To conclude this introduction of WBT and its literature, a brief examination of the single research project is in order. In their research, LaRose, Gregg, and Eastin (1998) examined an audiographic telecourse, which is a hybrid between a telecourse and WBT. A telecourse could best be described as tape-based teaching, as it involves teaching through the use of audio cassette tapes containing recordings of lectures. The researchers intent "was to create an audiographic telecourse which used audio captured in a live classroom to augment text-based lecture outlines and graphics published on the Web" (LaRose, Gregg, & Eastin, 1998). In this audiographic telecourse, the recorded audio from lectures was incorporated into and distributed through the Web, thereby reducing reproduction costs.

One purpose of this research was to test the teacher immediacy of WBT. The authors began with the shared assumption that a WBT would offer less teacher immediacy than what would be received in a traditional classroom. They defined teacher immediacy operationally as the presence of both verbal and non-verbal behaviors between the student and the teacher, which " was positively correlated to student satisfaction with both the course and the instructor (Hackman & Walker, 1990)" (LaRose, Gregg, & Eastin, 1998).

While this study suffered from some internal validity and generalization problems, it provided some interesting insight into how WBT could be researched. The results of the study showed that "a relatively modest audiographic approach to Web courses based on the familiar telecourse model proved to be as educationally effective, immediate and enjoyable to learners as live instruction" (LaRose, Gregg, & Eastin, 1998).

Although its limitations cause concern, this research provides a perfect example of the type of scholarship missing in the WBT literature. More communication scholars need to follow this example by providing more detailed research based on paradigms like that of Reeves and Reeves (1997) presented earlier.

Chapter Five

THE WEAVING OF A NEW WEB

Although the journey to this point might relate to the metaphor of a long and winding road, the traverse was necessary in order to reach this point of completion. The unraveling of this experience necessitates a brief review of the road traveled, and why it took its various routes. First, the previous chapter provided an overview of WBT and its accompanying literature in order to show how it would be an appropriate subject to fill the void of communication scholarship in the CBI arena, which was shown to be a form of CMC.

The lack of communication CBI/WBT scholarship is possibly the result of the philosophical positioning of many scholars in the discipline, who essentially believe that human-computer communication is not equal to human communication, and therefore not worthy of research from a communication perspective. In an effort to position CBI/WBT communication under the heading of human communication, arguments were provided to show its placement under both a traditional model of communication and Pearce's (1989) model of communication. In addition, it was shown how CBI/WBT falls within the subject of instructional communication according to Sprague's (1992) guidelines. The instructional aspects of WBT allow it to correspond with both CBI and CAI because a student can use it as the sole means of instruction (CBI), or with the guidance of a facilitator (CAI). In

addition, the model by Reeves and Reeves (1997) demonstrate the ability of WBT to deliver programs using combinations of various pedagogical dimensions.

Second, the review of the communication CMC scholarship illustrated the need for a new paradigm and application for future study of CMC. Early on, it was suggested that WBT might provide an appropriate application that could facilitate the creation of a new research paradigm. The model presented by Reeves and Reeves (1997), provides a method by which scholars could research WBT. By examining WBT based on the Reeves' model, scholars could seek to determine which combination(s) of bipolar dimensions lead to the most effective instructional communication model for WBT.

An additional model to guide researchers was the interpersonal/intrapersonal model of interactivity suggested by Berge (1999). Combined with Walther's (1996) hyperpersonal model of interpersonal interactivity, communication CMC scholarship could easily incorporate the practical application of WBT. In addition, WBT offers a superior method of instruction over CAI/CBI, in relation to CMC, because of its abilities to incorporate every aspect of CMC. This understanding, combined with its capabilities, provides the communication discipline with an opportunity to graft this new instructional approach into the instructional communication literature and to use it to create a new research paradigm for CMC.

In the third point, it becomes necessary to return to the concept that research of WBT could facilitate the improvement and expansion of CMC research on the intrapersonal and organizational levels. While it was shown that some CMC research could apply to the organizational setting, the literature revealed that most research of organizational

communication surrounds group discussion and decision-making. The organizational adoption of WBT could provide researchers with another approach to studying organizational communication.

To illustrate this point, one of the easiest forms of WBT used at the organizational level would be the presentation of orientation materials. While not replacing an actual tour and the interpersonal and group interaction that an orientation provides, an organization could provide new members with a WBT orientation package, thereby reducing the time spent on orientation. Such a change could facilitate scholarship as a researcher could examine how the organization uses CMC, in the form of WBT, as a communication method to integrate new members into the organization.

The lack of intrapersonal research of CMC could be addressed through WBT research as well. Historically, researchers have had difficulty studying intrapersonal communication, due to an inability to observe how a person communicates messages internally (Frey, Friedman, & Kreps, 1991, p. 33). Based on Berge's (1999) model, WBT allows for intrapersonal interaction with the course content. While not a perfect solution to the measurement problem, could research intrapersonal communication by measuring the individual's interaction with course content. With the right programs, a server could keep track of an individual's use with WBT, which might provide a method to correlate course interaction with a person's perceived intrapersonal communication.

Another approach to intrapersonal communication alluded to earlier during Jackson's (1997) review of hyperlinks, surrounds the notion that a reader is also an author (p. 37). As a person reads a text on the Web, the option to activate hyperlinks appears in the form of

text, graphics, and other embedded objects. When the reader uses these hyperlinks to move between texts, they become authors of their own text using the fragments garnered from each of the locations reached by activating various hyperlinks. From this perspective, a research study designed around a *rhetorical* investigation of an intrapersonal hyperlink creation of a text could provide insight into one's intrapersonal communication experience on the Web. A possible research design could include the direct observation of an individual's browsing of the Web, indirect observation of an individual by using a computer server to track visited sites, through questioning, or through ethnography. The purpose of each of these approaches and any combination thereof, is to determine the text an individual creates through identification of the hyperlinks used.

Another area requiring attention surrounds the concept of WBT as a form of mass media. Earlier literature discussions regarding the Web and CMC (Baym, 1996; December, 1996; Jackson, 1997) touched upon the concept of the Web as a form of mass communication. However, most of the literature reviewed in this work focused on scholarship from an interpersonal and organizational communication perspective. Therefore, mass communication research paradigms may provide further directions for CMC research.

An example of a mass communication approach is found in the work of James, Woltring, and Forrest (1995) who examined the characteristics of electronic bulletin board users, that is adopters, and the social impacts of electronic bulletin boards including the "benefits of use, usage patterns, and how bulletin board use affects the use of other communication media" (p. 30). In their conclusions, these authors suggest future CMC research could utilize "the uses and gratifications approach, which is functional in looking

to which needs are sought and gratified by a medium, [which] could provide an explanation and course of research for explaining the results of the typology of uses" (James, Woltring, & Forrest, p. 47). They also suggest examining CMC using media displacement theories and "an integrated dependency theory that makes the socio-cultural context a contributing factor on the nature of the messages and the effects on the audiences" (James, Woltring, & Forrest, p. 47).

Another consideration from a mass media perspective is the tendency for individuals to construct realities as they interact with media. Previously, this work alluded to the roles of the rhetorical fragmentation (McGee, 1990) and mosaic (Becker, 1971) paradigms in explaining the CMC. These concepts help to solidify the suggestion that the Web is a mass medium that allows for individual construction of reality. The difference lies in the use of a computer, as opposed to a radio, newspaper, or television, as the tool used for that construction. As people interact with technology constructed by others, as in the case of WBT, it leads to a shared understanding.

Pearce's (1989) model of communication aids in developing the communicative logic of this discussion. This "communication perspective" involves expressing resources, in this case provided by CMC/WBT, to create practices, which, in turn, construct and reconstruct resources. Within this outer paradigm, one finds the people involved in the communication. Resources are appropriated from people, who engage in the practices created through the expressed resources. In return, the practices respond to the involvement of people who continue to generate resources on the (re)construction side of the model (Pearce, p. 24). Applying this model to the current context, the computer becomes a practice and the

programming becomes a resource. As resources are constantly (re)constructed from their use in practices, does the entire issue of CMC become disputable? What is meant by this question is, as technology continues to advance, providing improvements to bandwidth, programming, and the advent of artificial intelligence becomes a reality, the computer will become less of a factor, or hindrance as some might say, as technology allows for more "real" communication between individuals. This may result in the fading of the concept of CMC as the difference between human-computer-human communications becomes less distinctive when compared to traditional human communication.

To put this in another way, as technology advances and the communication capabilities of the computer increases, will those people in the middle of Pearce's communication paradigm know of what some now see as a difference between human-computer communication and human communication? Pearce (1989) illustrates this concept further when he discusses the differences in housing architecture in the American and Korean cultures:

> In the United States, most houses have a semipublic lawn between the street and the doorway; in Korea, most houses have a wall adjacent to the street enclosing a very private lawn or courtyard between the street and the house. Whatever their historical or functional reasons, these design characteristics may be looked at from a communication perspective as *expressing* a particular concept of the relationship between the private and the public, and *(re)constructing* patterns of thought and action. Those who have lived all of their lives in one of these architectural patterns

> are likely to have internalized these concepts, finding them "natural" and those expressed in the other culture as "strange." (Pearce, 1989, p. 25)

If communication between humans occurs as CMC "naturally" due to the advancements of technology, will it still be necessary to classify it as CMC when it is fulfilling the "natural" role of human communication?

Furthermore

While the above discussion serves to answer questions posited at the beginning of this endeavor, one reaches the end of the journey and discovers even more questions waiting. Thus, it is obligatory to review some of the interesting research possibilities resulting from this work.

As content communicated in WBT changes in response to training needs, improved presentation techniques, and improved communications technology, how does one evaluate the effectiveness of WBT? Although there may not be an easy answer to this question, certain possible directions do exist. For example, one might concentrate research on one group of individuals over a period of time to gauge the effectiveness of WBT on their communication habits and performance. This type of research would require pre- and post-testing prior to the implementation of a new WBT program. A study of this type could possibly fill the "need to identify the essential elements that are common, as well as distinct, across different implementations of media systems" (Heeter, 1989, p. 480-481). By designing a study incorporating WBT with other forms of CMC instruction, one can discover the differences and similarities existing between the methods of instruction.

While there yet may be value in examining the effects of WBT on an individual's communication behavior, consideration of its effects on an organization's culture might provide greater insight into the effectiveness of WBT on performance. Such studies would evaluate over a period of time the use and effectiveness of WBT as part of an organization's overall training program. (Rice, 1989, 462).

Future research of WBT should incorporate qualitative methodologies. By utilizing a case study approach, for example, one could evaluate over time a subject's or subject group's exposure to WBT, in an effort to determine relationships between exposure to WBT, performance, competence, and communicative effects. Johnston (1989) made a similar suggestion on the basis that

> the CMCS [computer-mediated communication systems] is an evolving technology. New technological capabilities constantly change the very character of the CMCS and, therefore, its meaning for users. Even with stable systems, CMCS provide new ways of communicating for users, and increasing use has the potential to alter users' entire conception of what communication is all about in the full range of media he or she uses. (p. 494)

While advocating a qualitative approach, Johnston does not ignore its limitations. However, although quantitative analysis might provide generalizable data, "there is a greater need for deep understanding of complex, diverse, and shifting perceptions of the CMCS user communities" (p. 496).

In his discussion of communication technologies, Biocca (1993) suggests the existence of an

> opportunity for [communication] researchers to positively shape the channels of mediated human communication . . . [although] I fear that many research paradigms may inadvertently condemn communication research to the role of spectator in the long march of communication technology. . . .If we really believe that communication environments are socially constructed, then can communication research aggressively engage in their construction? (p. 60)

Biocca's suggestion does require those within the discipline to question why, in the area of technology, research is reactive rather than contributory. These comments correspond well with this discussion.

The entire purpose of this work encompasses the concept that research of WBT can be grafted into current communication CMC research. However, if the discipline were to follow Biocca's (1995) implication, instead of designing research reacting to WBT, communication scholars should focus research in such a manner that such research will aid in the development of WBT based on a communication paradigm.

To illustrate this concept further, return to the model by Reeves and Reeves (1997). One of the steps in the model involved WBT development and course design. If communication scholars were to adopt and adapt this model to incorporate basic communication theories, the discipline could come to lead the way in developing new theories of WBT course design and development. Although not necessarily intended to encourage inter-disciplinary competition, this might spark some motivation in the redesigning of the communication discipline's approach to CMC scholarship.

This last statement is the crux of this undertaking. Communication CMC scholarship needs to stop comparing CMC with FTF as if comparing apples and oranges, and come to accept the concept that CMC is just a new and somewhat different fruit. CMC does something no other medium prior to its existence has been able to do: provide asynchronous or synchronous communication at every communication level. Thus, in a sense, CMC sits on its own at the pinnacle of the communication level hierarchy. However, this will last only so long as the technology continues to provide a distinction between CMC and human communication. As technology improves and this dichotomy dwindles, the communication discipline needs to be prepared to reconsider its approaches to studying the communicative role of computers. Communication scholarship of WBT provides an alternative approach for the discipline to prepare for the upcoming computer revolution of human communication.

Footnotes

1. A large body of research exists based on the work of B. F. Skinner. Interested parties could begin by examining Skinner's own work (Skinner, 1958, 1961a, 1961b), or by examining various articles within Couleon's (1962) volume on programmed learning. To learn more about Skinner himself, try visiting the B. F. Skinner Foundation at http://www.lafayette.edu /allanr/skinner.html

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Appendix

The focus of this work was on communication CMC research. However, many scholars from many disciplines have contributed to this body of knowledge. For those who wish to pursue the study of CMC further, the following list of references, while not in the least exhaustive, will assist in such an endeavor.

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