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The effect of computer mediated communication to communication patterns

Elena Methawut

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THE EFFECT OF COMPUTER MEDIATED COMMUNICATION TO COMMUNICATION PATTERNS

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Interdisciplinary Studies

by
Elena Methawut
June 2004
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ABSTRACT

Computers have become an integral part of every day life. Since the Internet, human beings have been able to communicate in a much broader sense. In the organization, virtual communities on the net have formed to establish communication through computers. Computer mediated communication (CMC), primarily in the form of e-mail, has become a dominant mode of communication both within and between organizations and the organizations have recognized that computer-mediated communication has had behavioral and operational effects, but has often failed to bring about necessary changes to ensure employee satisfaction with CMC.

There are also some uncertainties about what is the best format for communication. The variables can include the ability of the user to accept the technology available, the skill to integrate the technology, and the capability to integrate this technology when communicating interpersonally via a computer. If the people who working in the organization have limited experience of using electronic communication technologies e.g. telephone, fax, voice, and e-mail that would slow down the process of communication.
Consequently employees have to be trained to use something more technologically advanced than the telephone. If the workers are not experienced in email, fax and the Internet, they would find it impossible to communicate with other workers. New technology such CMC are very important in today’s business because it can save time and the communication technology has been promoted as a means for improving communication and collaboration because learners participate and interact more in those environments than in face-to-face environments. This study seeks to understand how email and the internet influence communication in the workplace, and address some potential issues and solution with CMC.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>viii</td>
</tr>
<tr>
<td>CHAPTER ONE: INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>3</td>
</tr>
<tr>
<td>CHAPTER TWO: LITERATURE REVIEW</td>
<td>7</td>
</tr>
<tr>
<td>A Comparison of Processes</td>
<td>12</td>
</tr>
<tr>
<td>The Channel</td>
<td>12</td>
</tr>
<tr>
<td>Feedback</td>
<td>13</td>
</tr>
<tr>
<td>Use of Time</td>
<td>13</td>
</tr>
<tr>
<td>Theories in Computer-Mediated Communication</td>
<td>16</td>
</tr>
<tr>
<td>Media Richness Model</td>
<td>18</td>
</tr>
<tr>
<td>Social Network Theory</td>
<td>20</td>
</tr>
<tr>
<td>Uses and Gratification</td>
<td>23</td>
</tr>
<tr>
<td>Effects on Communication Patterns</td>
<td>25</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>27</td>
</tr>
<tr>
<td>CHAPTER THREE: METHODOLOGY</td>
<td>30</td>
</tr>
<tr>
<td>Measures</td>
<td>33</td>
</tr>
<tr>
<td>CHAPTER FOUR: RESULTS</td>
<td>43</td>
</tr>
<tr>
<td>CHAPTER FIVE: DISCUSSION, LIMITATIONS AND IMPLICATIONS</td>
<td>61</td>
</tr>
<tr>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td>Research Limitations</td>
<td>64</td>
</tr>
<tr>
<td>Implications</td>
<td>66</td>
</tr>
</tbody>
</table>
APPENDIX: SPECIAL TERMS ................................................. 69
REFERENCES ............................................................... 72
LIST OF TABLES

Table 1. Statistics Generated from the CMC Survey .... 44
LIST OF FIGURES

Figure 1. I Know How to use Computer Mediated Communication Technologies Well .......... 45

Figure 2. I Feel That Computer Mediated Communication Technologies Improve the Speed at which I can Accomplish Workplace Tasks ................................. 46

Figure 3. I Feel Comfortable Using CMC to Ask for Assistance on Work I am Doing ............. 47

Figure 4. For Solving Work-related Problems, I Can Get Helpful Feedback by Suing CMC Technologies ..................................................... 48

Figure 5. CMC is Effective for Brain-storming About New Ideas .................................. 50

Figure 6. CMC is Useful During Team Project Stages ...................................................... 51

Figure 7. CMC is Good for Sharing Technical Information ............................................. 52

Figure 8. For Me, CMC is The Primary Form of Communication for Most Subjects ............ 54

Figure 9. CMC Helps me Maintain Relationships with My Colleagues ............................ 55

Figure 10. I am More Likely to Set Up an appointment to Talk by Face-to-face Communication than Contact Collages by Using CMC ......................................... 56

Figure 11. CMC Can Replace Face-to-face Communication in the Organization ............. 57

Figure 12. CMC is Complicated Technologies in Organization ......................................... 58

Figure 13. Inexperience Using CMC Limits How my Colleagues and I Communicate ............ 60
CHAPTER ONE

INTRODUCTION

Computers have become an integral part of every day life. Each and every day, individuals use personal computers and surf the internet to gain a multitude of information. The internet has facilitated communication in a much broader sense. Virtual communities on the internet have formed within organizations to further their forms of communication. Moreover people now communicate globally through computers like never before (Birnie & Horvath, 2002). Computer mediated communication (CMC), primarily in the form of electronic messages (e-mail), has become a dominant mode of communication for organizations. Networking and e-mail software support communication of messages, sending of attached files and working in groups. Organizations continually strive to enhance interaction, productivity, quality and learning by introducing new and innovative communication media (Carey & Kacmer, 2000). Communication is generally recognized to be central to the management and development of organizations, and indeed, the style of communication can influence interpersonal relationships, and in turn, factors such as commitment and motivation (Rower, 1999). The technology of CMC is
recognized to be a feature of knowledge-based organizations (Sproull & Kiesler, 1986). Yet if relationships between individuals and groups have deteriorated as result of CMC, there seems little prospect of achieving a climate in which the explicit and implicit knowledge base of an organization can be shared (Rowley, 1999). Therefore it is imperative to research the impact that CMC has on organizational functions.

Fundamentally, as organizations change their modes of communication, CMC may have a profound democratizing effect on organizational structures (Chesbro, 1990). Such media forms not only supersede many routine face-to-face interactions, but also replace a range of communication tools, such as postal services, facsimile (fax) and voice telephone. In the organization of the network, CMC would be the norm for alternative offices or future organizations. Sometimes CMC has failed to bring about necessary changes to ensure employee satisfaction. It is also important to recognize the impact that CMC has on the way in which an organization functions.

Computer mediated communication technologies are important in today's business world because they save time and they provide a means for improving communication and collaborations because learners tend to participate and
interact more in these environments than in face-to-face interactions (Mason & Kays, 1990). However, there are some uncertainties about what is the best format for communication. The variables include the ability of the user to accept the available technology, the skill to integrate the technology, and the capability to integrate this technology when communicating interpersonally via a computer. People who work within an organization and who have limited experience of using electronic communication technologies such as telephone, fax, voice, and e-mail slow down the processes of communication, which may impede their work in the organization. Consequently, employees have to be trained to use more technologically advanced CMC. If inexperienced in these technologies, they would find it impractical to communicate with other colleagues.

Purpose of the Study

Computer mediated communication fundamentally influences the function of communication. It influences the organization’s management and administration, but it most affects the dynamics of middle and lower level employees. The most simplistic model is that of an electronic office in which its employees need to know and understand the role of CMC. The purpose of this study is
to investigate the performance and satisfaction of co-workers who use CMC to communicate within their organization, and to check employees' performance when using CMC. Also, this investigation attempts to address how e-mail and the internet influence communication within the workplace, and identifies potential issues and solutions when using CMC. Moreover this study observes how teamwork is affected by CMC rather than face-to-face communication, because working within an alternative office relies to a large extent on electronic communication technologies enabling work processes to occur with little to no interruptions despite the geographic separation of its workers.

Often organizations require their employees with little technological experience to respond to significant changes without having a clear understanding of the nature of that change. For example, this target employee group already performs a set of computer-based tasks using word processing, spreadsheets, presentations, and database software. Each new version of these software packages requires these employees to update their skills. Typing has not merely changed keyboards, but now requires actual document creation and formatting. As management, in many cases, enter directly their correspondence, the secretary
is now responsible for formatting that document for wider circulation. These tasks increasingly require a better appreciation of the objectives and modes of communication. These employees are now often expected to complete a broad array of additional tasks, ranging from photocopying to other basic administrative tasks.

This study seeks to understand the role that CMC plays in assisting employees who work off-site to get remote access in order to share work-related information easily, efficiently, and in a timely manner. Specifically, the study looks at how workers use CMC in their work; how it influences the nature of work-related face-to-face communications; how CMC improves time efficiency with their work; and how it makes organizational activities more effective. The survey questions used in this thesis intended to investigate whether CMC technologies have an effect on employees' performances. This study posed four main questions along with several sub-questions to examine the function of CMC in maintaining work-related communication:

1. How helpful is CMC helpful in work efficiency?
2. In what ways does CMC limit workplace communication?
3. How sophisticated are CMC users?
4. How do people use CMC to communicate with colleagues within their organization?

In addition, this study addressed how CMC can enhance employees' working performance to reach the maximum benefit of the organization. Employees have different CMC capabilities. Some workers may not be aware nor comprehend the concept or function that CMC has within their organization. Consequently, the results of this study can assist organizations to improve development skills and capabilities of users within their organization.
CHAPTER TWO

LITERATURE REVIEW

Nearly every employee who works in an office setting uses some type of information technology, such as personal computers, to do their job. Most business, education, and service organizations are engaged to reconcile new technologies with the skills of their workforces in ways that will increase strategic effectiveness. Computer based tools such as computer mediated communication (CMC) are often the communication mode that most organizations use to improve their work abilities. Computer supported collaborative work and groupware have the potential to improve organization effectiveness through improving the effectiveness of the individual and groups within organizations who are enabled by these technologies (Kirkpatrick, 1996).

Computer mediated communication systems are designed to help people work together more effectively. These systems enable voice mail to deflect unanswered phone calls to devices such as voice response units, car phones, and hand held personal communication devices. Other examples include video conferencing, groupware, electronic messages (e-mail), and a group decision-support system.
GDSS (GDSS), an interactive computer-based system that helps groups of people solve unstructured problems (Gallupe & Desanctis, 1987). GDSS also facilitates disseminating, evaluating, recording and implementing ideas (e.g., in Gallupe & Cooper, 1993). These systems allow individuals throughout the world to work on a single project, participate in brainstorming sessions, and attend classes without leaving their offices. It is important that CMC systems be considered as alternatives to traditional communication methods because they provide a variety of tools that allow users to communicate. These new communication alternatives help resolve time and space constraint issues imposed on employees (Raciti, 1996).

Technology software offers some advantages over traditional communication in collaborative CMC (Benbasat, & Lim, 1993; Boiney, 1998; Lam & Schaubroeck, 2000; Weisband, 1992). Since computers are present in almost every business, CMC gives employees the advantage of communicating with fellow colleagues independent of their physical location, even from the most remote areas. Discussion lists, e-mails, and bulletin boards are not necessarily dependent on a time frame. Once information is sent by e-mails, for example, the receiver can take as much time as needed to respond. The easy access of e-mails
and chat rooms provides employees with the opportunity to communicate, discuss, and agree on mutual norms and symbols. Different formats in communication allow users who may be underdeveloped in traditional social interaction to communicate through alternative modes.

The ability to communicate through CMC is because of the network of computers, in which CMC users share a mutual exchange and understanding of textual data. The CMC environment is an inexpensive way for group members to collaborate regardless of location (Dietrich, Grear, & Ruth, 2002; Crawford, 1998; Allbritton, 1996). The ability to collaborate with colleagues in exchanges of ideas, opinions, and information has revolutionized the way interpersonal communication occurs through CMC (Strickland, 1998; Allbritton, 1996).

Nevertheless, Allbritton, and Parks and Floyd identified a negative aspect of group communication via CMC is the lack of responses from members of the group. In today's society, people have jobs, school, and other activities and responsibilities, and may not have time to answer their e-mail. Others may be unable to answer due to illness, disinterest in e-mail, or network connection difficulties (Allbritton, 1996; Parks & Floyd, 1996).
Even though employees may access chat rooms, they may not necessarily participate in the discussion. These individuals who lurk or act invisible while observing chat rooms may decide to not contribute to the discussion (Allbritton, 1996) or decide to exercise anonymity when expressing their opinions and defending their rights to express that freedom. This latter approach provides employees with a forum to express themselves without pressures associated with face-to-face interactions (Dietrich, Grear, & Ruth, 1998). Informal controls in CMC consist of collective controls, management, and enforcement of rules without the explicit explanation from the employees' coordinator (Allbritton, 2002). The employees accept the norms and behavior during the exchange of messages and information. The ability of the group and the concern of the members during CMC are considered imperative for the flow of information and the advance of interpersonal communication (Allbritton, 2002).

Parks indicates that face-to-face communication is the most important form of interpersonal communication. Face-to-face interactions are advantageous in that they enhance messages with use of facial expressions, hand and arm gestures, context cues, and other available physical means. Telephones are a secondary access to communication
but only as an audio medium. Employees who communicate by telephone can only communicate and respond to tones and inflections of the voice. Therefore, with the loss of face-to-face interactions and audio cues, CMC enhances or detracts from effective interpersonal communication (Parks, 2002). The degree of interpersonal communication through CMC depends upon the ability of the user to accept the available technology, the skill to integrate the technology, and the capability to integrate this technology when communicating interpersonally via a computer (Allbritton, 2002). The accessibility of e-mail and chat rooms, for example, provide employees different modes to communicate.

According to (Allbritton, 2002), traditional social communication and internet social communication, according to research may differ quite a bit. Computer mediated communication reduces the effects of communication to its lowest level (Allbritton, 2002), while CMC is typed as an extension of face-to-face communication. As social creatures, humans have rapidly developed their ability to socialize on the internet. Social network theory, social motives theory, use and gratification theory are an integral part of CMC and are also considered to be
extensions of face-to-face communication (Birnie & Horvath, 1998).

A Comparison of Processes

Face-to-face communication and CMC differ dramatically. The differences highlighted at this point are in terms of the modes involved in each system, modes so radically different that significant contrasts between the two systems can be noted even before their contents are investigated (Haynes, 1995). Five of the variables used to differentiate face-to-face interactions and CMC are the channels used; the type of discursive modes used in each system; the unique feedback systems built into each system; the different kinds of social roles involved in each system; and the use of time embedded in each system (Haynes, 1995).

The Channel

Mehrabian (1981) claims that nonverbal communication accounts for 93 percent of the social meanings conveyed in face-to-face communications. The nonverbal is eliminated in computer mediated exchanges; whereas in face-to-face exchanges, verbal communication is typically oral. In a computer mediated exchange, verbal communication is mostly in written form. This means that responses typically
conveyed in an oral form now must be translated into a written form. As such, those who are more literate in the written mode of communication will be more satisfied and confident with a computer mediated system (Friedman & Philips, 1983).

Feedback
In face-to-face interactions, feedback is synchronistic. David Berlo presumed the existence of face-to-face interactions as “dynamic, on going ever changing continuous” (1960, p. 124). In a computer mediated relationship, the physical structure and physical requirements of the technologies require that all feedback be a synchronistic because non-verbal variables are completely eliminated in such exchanges (Haynes, 1995). Only these one-way verbal transmissions define the feedback system. The successive transmissions of small units of data also simulate the more rapid information exchanges characteristic of face-to-face interactions (Haynes, 1995).

Use of Time
In computer mediated interactions, time can be more directly controlled and manipulated. Preparation time can be employed during message construction. Virtually all
computer bulletin board systems allow users to access a system and to read messages at their own pace. The receiver is unaware of the time or effort given to any message he or she contact even if they work at different times of the day. Time thus becomes a variable that can be controlled and manipulated toward personal ends. Kiesler, Siegel, and McGuire (1984) noted that with few exceptions research regarding CMC evaluate the efficiency of these technologies based on their cost and technical capabilities. For example, studies looked at how computer communications can work in organizations such as libraries and engineering firms; conducted surveys related to the introduction of computer networks in the work place; and also undertook experimental studies comparing the effects of various communication channels.

In general, the technical capabilities of computers have addressed questions such as to how organizational efficiency or effectiveness is related to particular technical, economic, or ergonomic characteristics of the technology. The speed of information exchange provided by e-mail, for example, might allow task completion regardless of geographic dispersion, time zones, and access to secretaries, energy costs, and workers’ schedules. Increased efficiency may result in the work
place since e-mail discourages chatting and “off-task” interactions, and some employees may read more capably than they listen (Haynes, 1995). If CMC replaces face-to-face communication, it may affect the way in which individuals form alliances, develop a sense of belonging and community, and understand changes in power relations. A new employee, with whom the majority of communication is electronic, may have a sense of isolation and may lack the opportunity for informal exchanges with other colleagues that occur as part of a telephone conversation. Consequently, their sense of belonging and community may be slow to develop and may result in lack of motivation, absenteeism, and an increased staff turnover.

Many problems with CMC systems are associated with human nature. People are hesitant to use a system that may invade their privacy. For example, some CMC systems allow users to view others’ calendars or offices (e.g., Tan & Rua, 1994). Additionally, since the use of these systems often requires additional learning, problems are encountered when people change their forms of communication and in general, people will resist change (Rogers, 1980). It is important to realize that CMC systems are not independent entities, but must work in conjunction with individuals who are willing to use them.
For some employees and organizations, CMC is a new technology. Consequently, it is not surprising that people may have little know-how about its use. In today's business, employees must learn how to use the new technology and constantly update their skills as needed. The completed task increasingly requires a better appreciation and understanding of the objectives and context of communication. The variables can include, but are not limited to, the ability of the user to adopt the available technology, the skill to integrate the technology, and the capability to integrate this technology when communicating interpersonally via a computer (Rowley, 1999). There is a danger of stereotyping and categorization which normally works to the detriment of effective working relations and is counter to the values embedded in equal opportunities (Becker, 1990).

Theories in Computer-Mediated Communication

Several theories in CMC revolve around why participants use the computer and the internet for communication. In addition to meeting work tasks, employees use CMC to communicate with family and friends, therefore, creating a social network (Rowley, 1999). According to Birnie and Horvath (2002), other CMC theories
indicated users having social motives for communicating with non-employees during work hours, how they used CMC technologies, and what level of gratification is obtained after the communication.

To better understand how groups use CMC, the literature suggests several theories (Barge & Hirokawa, 1989; Hollingshed, McGrath, & O’Connor, 1993; Whitworth, Gallupe, & McQueen, 200; Zigurs & Buckland, 1998). McGrath and Hollingshead (1993) present a theory of group communication based on task-media fit. These two components interact to produce a model from which group communication systems can be created to enhance group performance and satisfaction (McGrath & Hollingshead, 1993). The communication medium is an important component of task-media fit (Hollingshead, McGrath, & O’Connor, 1993; McGrath & Hollingshead, 1993). On a basic level, communication can be thought of as the simple exchange of ideas between members. Today, groups can exchange ideas using a variety of communication media. Task-media fit first focuses on the different qualities each communication method offers (McGrath & Hollingshead, 1993). First, communication can be synchronous (where information can be sent and received at the same time) or asynchronous (information is limited to either only
sending or only receiving at any one time). Face-to-face communication is a synchronous form of communication. While speaking to someone face-to-face, a person is sending information while at the same time receiving information, typically in the form of non-verbal cues. Asynchronous communication does not allow individuals to send and receive information at the same time. E-mail is a good example of asynchronous communication. A sender types out and then transmits an e-mail message without knowing if the receiver will understand the information, is interested in the information, or even if the message is received.

Media Richness Model

The media richness model was proposed by Daft & Lengel (1984, 1986) as a framework for understanding the choices employees made about communication media use. These theorists selected four criteria to differentiate the information carrying capacity of media: (1) the availability of instant feedback, (2) the use of multiple cues, (3) the use of natural language, and (4) the personal focus of the medium. Daft, Lengel, and their colleagues studied the process through which managers choose one communication medium over another for a wide
variety of organizational tasks. For example, when faced with the task of reminding employees about an upcoming meeting, a manager will opt for whichever forms of communication are available to disseminate the message, be it face-to-face, telephone, memo, or an e-mail. With regard to the termination of an employee or conflict resolution, the manager will apply discretion in selecting the appropriate form of communication. To explain such communication choices, these theories first suggested that organizational communication tasks vary in their level of ambiguity. Ambiguity refers to the existence of conflicting and multiple interpretations of an issue. As Trevino, Lengel, and Daft (1987) noted: “Like a Rorschach inkblot, an ambiguous message can be interpreted in many ways. No established scripts or symbols exist to guide behavior. Meaning must be created and negotiated as individuals look to others for cues and feedback to help interpret the message.”

According to media richness theories, every organizational communication task can be characterized in terms of its level of ambiguity (Daft & Macintosh, 1981; Daft & Lengel, 1984, 1986; Daft, Lengel, & Trevino, 1987). Consider, for instance, the incidents mentioned above. The manager informing employees about an upcoming meeting is
faced with a relatively unambiguous task because multiple interpretations about a simple reminder are unlikely. In contrast, a manager who must resolve a conflict between two subordinates is faced with a communication situation that has great potential for misunderstanding and emergent meaning. Thus, this communicative interaction would be characterized as much more ambiguous. Daft, Lengel, and associates argue that communication channels available to the organizational manager differ markedly in their capability to convey information.

Social Network Theory

The adoption of organizational technologies (and the use of all organizational communication media) can be expanded by looking at the social environment of the organization (Fulk, Schmitz, & Steinfield, 1990; Fulk et al., 1987). The communication with co-workers and supervisors has an influence on media usage. That is, communication with others in the organization can influence technology adoption in a number of ways. Following the media richness model, social information can impact perceived media characteristics and perceived task requirements. Communicative interaction can also directly influence attitudes toward the communication media and
media use behavior. In a traditional social network, individuals establish the network using face-to-face interactions. Face-to-face communication provides individuals with physical and context vocal cues to forward disclosure and further the relationship. The same idea, according to Parks and Floyd (1996), is also present in CMC except without the physical and vocal cues.

People who have complex social lives use CMC to further enhance their lines of communication (Rowley, 1999). The internet provides CMC users the local and geographic ability to connect globally with other users who share common values and shared interests via modes of communication like e-mail, chat rooms, discussion lists, and bulletin boards (Birnie & Horvath, 2002; Parks & Floyd, 1996). The medium of e-mail provides participants in a social network to extend their conversation until their next physical meeting. This type of interaction may influence the social behavior of the participants while on the internet. Participants in e-mails and chat rooms may be able to send a more precise and direct message than in face-to-face conversations. Since social cues are filtered out, participants may express their opinions more openly while using CMC than during face-to-face interactions. In most cases, and independent of participants' verbal
skills, the dialogue between communicators may have a positive affect. The ability to further conversations or topics and to influence behavior and attitudes can have positive associations among users of CMC. Users of CMC, when able to connect with each other, find the process of communication to be a positive experience (Parks & Floyd, 1996; Birnie & Horvath, 2002; Strickland, 1998).

Consider, for example, a company that has adopted an e-mail system for internal organizational communication. A media richness approach would suggest that this communication channel be used whenever it provides a proper match for the ambiguity of the communication task. However, a social information processing approach suggests that an individual’s use of e-mail be influenced by interaction with others in the organization (Becker, 1990). Rebecca, a hypothetical manager, may have heard through the office grapevine about the difficulties her staff have in using e-mail. This social information influences her perception and attitude regarding the usefulness of the medium’s characteristics. Other information may influence Rebecca’s perception of her and her co-workers’ tasks and their actual use of email. Rebecca may discuss with co-workers who have a negative attitude towards e-mail, their previous experiences with
the CMC medium, be it positive or negative. Consequent of these social influences, Rebecca may choose not to use e-mail even if the CMC medium provides an appropriate match to the ambiguity of the task at hand (Miller, 1998).

Uses and Gratification

People use media for many different purposes, but the uses and gratification approach is still extremely valid as technology moves the universe into an electronic information age. Advances in media technology have allowed consumers to be in more control of the media, and because uses-and-gratification perspective is based on the concept of an active audience, it is especially appropriate for studying new communication technologies (Rubin, 1989).

The different ways in which CMC participants use the internet to further enhance communication is small in comparison to the gratification after the initial interpersonal transaction (Parks & Floyd, 1996; Strickland 1998; Bennie & Horvath, 2002). Modes of communication must satisfy the needs of communicators. The initial needs and interests of CMC users must be met for the users to efficiently manage the CMC medium. Personal gratification in communication through CMC depends on how long a relationship will last. If the relationship continues
through time, the amount of gratification will increase in
comparison (Parks & Floyd, 1996; Strickland, 1998; Birnie & Horvath, 2002)

The type of gratification in CMC could be considered somewhat useless due to absence of physical cues being filtered out. However, Dietrich, Grear, and Ruth, and Parks and Floyd are surprised that communication in the CMC environment is not cold, faceless, and far from friendless. It essentially has become more of an extension of face-to-face interactions and does not seem to inhibit those who have never met other participants. Time seems to be the key factor in the gratification process (Dietrich, Grear, & Ruth, 2002; Parks & Floyd, 1996). Gratification through e-mails, chat rooms, bulletin boards and discussion lists seem to be the successful factors in CMC. Communicators may have the ability to secure low social anxiety when using CMC due to the anonymity provided by the computer. This can influence higher interpersonal communication and have some influence on specific attitudes and behavior among contributors, therefore, gratification in CMC increases (Dietrich, Grear, & Ruth, 2002; Parks & Floyd, 1996).
Effects on Communication Patterns

Technological advances in communication media have brought about an increased number of advantages and disadvantages (Benbasat & Lim, 1993; Boiney, 1998; Lam & Schaubroeck, 2000; Weisband, 1992). For example, e-mail may be a cheap and simple alternative for quick communication, yet it is a difficult medium in which to convey complicated or abstract ideas. The selection of an appropriate communication medium involves the consideration and understanding of many elements. It is important to remember that technologies do not determine particular outcomes (Olson, 1982) and that the effects of any communication technology depend on the manner in which it is employed or appropriated by users (Poole & DeSanctis, 1992). For example, it is possible to use an e-mail system that simply sends messages or expand its use to include messaging, computer conferencing, and bulletin boards. Not surprisingly, the effects of the medium will depend on the ways in which it is used.

Dependent upon the type of task, employees using CMC may perform better or worse than employees communicating via face-to-face. In order to clarify the various tasks employees face in a work-related context, McGrath (1984) classified tasks, using the Task Circumflex, into
categories based on two dimensions: the level of collaboration or conflict generated and the degree to which the task requires behavioral or cognitive action. The Task Circumflex divided tasks into four basic quadrants: generate, choose, negotiate and execute.

The interest of CMC increases from two approaches to internet communication: the first considers the internet as simply a new medium, and the second states that the internet represents the birth of new paradigms (Hoffman & Novak, 1996). A similar situation can be found within an organization. Some employees do not have enough experience or adequate attitude when using the internet, although this situation is diminishing (Birnie & Horvath, 2002). New generations of CMC users are growing up in an environment favorable to digital learning, and in a few more years the diffusion of computer knowledge will be notably higher. The internet also permits many-to-many communication; nevertheless, it is still considered to be a marginal and restricted phenomenon (Tapscott, 1998).

Extensive attention has been given to the effects of communication technologies patterns of communication within the organization. The first finding in this area stems from an earlier observation that new technologies augment existing technologies rather than replace them.
As such, organizations that adopt new communication technologies are marked by an overall increase in the amount of communication (Kraemer, 1982; Rice & Case, 1983). For example, when video conferencing is available, it is used in addition to face-to-face meetings, increasing the overall level of organizational communication. Rice and Case (1983) found that an e-mail system increased the prevalence of upward communication in an organization, and Huber (1984) determined that communication contacts were more diverse with communication technology. Not surprisingly, the introduction of a communication technology increases the prominence of individuals knowledgeable about the technology (Aydin, 1989; Rice, 1982). If a company were to institute an expert system to enhance decision-making skills, an employee who used a similar expert system on another job would likely become an important member of the communication network. Finally, it appears that computer technology will lead to greater equality in group interactions (Hilts & Turoff, 1981).

Hypotheses

In an attempt to enhance CMC understanding and its affect on communication patterns, my hypotheses are that

27
CMC contributes to work efficiency; significantly affects forms of communication; and reflects a level of familiarity among its users' communications.

*H1: CMC will contribute to work efficiency*

The more employees use CMC, the more they believe CMC enhances their skill and abilities. Using new technologies like CMC can improve speed of work the transfer of documents and other types of information. Frequency in use of e-mail to communicate among employees or participation in electronic discussion groups correlates consistently with employee ratings of the utility of CMC (Birnie & Horvath, 2002). Significant correlations exist between overall frequency usage of CMC and how CMC benefits employees in (1) improving the speed to transfer information; (2) more timely access to information; (3) access to new tools for research; (4) enhanced contact with colleagues off-site; and (5) improved collaborations with colleagues on-site (Rowley, 1999).

*H2. There will be a significant CMC affect on overall workplace communications.*

Studies have shown that CMC technologies have significant effects on the patterns of communication among its participants (Birnie & Horvath, 2002).
Allbritton (2002) determined that CMC reduces the effects of communication to its lowest form and appears to be an extension of face-to-face communication. However, the findings of Gallagher and Kraut (2002) indicate that in the case of CMC, it takes more time to complete each stage of the task than in the case of face-to-face meetings. Groups communicating by means of the computer apparently spent more total time working as well as more time communicating with each other.

H3: The level of familiarity with CMC will be reflected in users’ forms of communication. Performance outcome may be affected by the chosen forms of communication. Group communication completing the idea generating task will exhibit lower performance outcome when communicating with sophisticated users via new technologies media (Birnie & Horvath, 2002).
In order to examine the effect of CMC in communication patterns, a questionnaire was decided to determine the effect of using CMC as the primary means of communication within the workplace. The participants of this study were recruited from the Local Inland Empire Public Relations Society of America, California. One hundred individuals were solicited to participate in the survey. The final survey sample group was generalized to the original sample for age and gender. This research received approval from the Institutional Review Board for the Protection of Human Subjects of Research at California State University, San Bernardino.

The survey participants received the questionnaire via e-mail since it was the fastest medium, has the capacity for rapid feedback and can quickly reach a large, geographically dispersed audience (Steninfield & Fulk, 1985). Electronic mail is considered an appropriate form for the routine exchange of unequivocal information (Rice & Case, 1983; Steinfield, 1985). In addition, using e-mail avoids time delays associated with sending the questionnaire by regular mail or messenger delivery.
services. If the participants did not respond to the survey after the first week, the survey questionnaire was mailed once again. Demographically, survey participants identified themselves in age and gender. To determine experience and familiarity, the survey included questions such as the number of years working with personal computers (PC); the daily average of times they used the PC; and how would they describe their competence with Microsoft NetMeeting software prior to the survey.

This study examined and measured employees' attitudes regarding face-to-face communication by using the standard Likert scale, a widely used rating scale that requires the respondents to indicate a degree of agreement or disagreement with each of a series of statements about the stimulus objects. Typically, each scale item has five response categories, ranging from "strongly disagree" to "strongly agree." Each statement was assigned a numerical score, ranging 1 to 5. Accordingly, a "strongly agree" response to favorable statements and a "strongly disagree" response to an unfavorable statement would both receive scores of five.

The analysis was conducted on an item-by-item basis (profile analysis) or a total (summated). The score can be calculated for each respondent by summing across items.
Profile analysis involved comparing the two ways of communication and scored in terms of the average respondent ratings for each item such as how familiar were employees with CMC technology.

Moreover the summated approach is most frequently used, and as a result the Likert scale is also referred to as a summated scale (Becker, 2000). If there is a list, and the respondent checks all that apply, the researcher can use a summated scale, meaning that the number of checks will be counted for each respondent, and that number will stand as the measure of the construct. In order to determine the total score for each respondent on each employee, it was important to use a consistent scoring procedure that reflected a favorable response. This required a reversing of scale scores for categories assigned to negative statements. That is for a negative statement, an agreement reflected an unfavorable response, whereas for a positive statement, an agreement represented a favorable response. As for scale scoring it denoted a more favorable attitude. The scoring of items 2, 4, 5 and 7 were reversed and each respondent’s total score for each answer was calculated.
Measures

To test the hypotheses, the survey assessed both satisfaction and performance outcomes of employees' abilities to communicate with fellow co-workers during work hours, via transfer of documents, use of chat rooms, and sending of e-mails. Three main questions along with several sub-questions guided the research regarding the role of CMC in maintaining work-related communication.

The first main research question addressed how helpful CMC contributed to work efficiency. This question illustrated not only that CMC was necessary for collaboration among employees at different work sites, but that, in some instances, this technology could also be more efficient than face-to-face communication. To answer this question required the determination of the employees' familiarity with CMC and how they applied CMC technology in their work. The theory is that employees must well understand CMC processes or concept in order to advantageously apply it in their work. It was expected that this survey would indicate if employees lacked efficiency in adjusting CMC to meet their work needs. This determination would inform the organization as to its employees weaknesses, from which the organization could then use to create alternatives to address these
deficiencies. The questionnaire also examined the expedition with which employees could solve work-related problems by using CMC technologies.

I feel that computer mediated communication technologies improve the speed at which I can accomplish workplace tasks.

This question evaluated participants' satisfaction in CMC with their work, assuming that CMC could facilitate their work.

CMC is good for sharing technical information.

To determine if employees understand the concept of CMC efficiently contributing to meeting their tasks, the sharing of technical information between colleagues is a key indicator that the employees recognize the contributions of CMC to their work efficiency. Accordingly, CMC can meet the various work demands of the organization, be it through e-mail, discussion lists, file transfer protocol, synchronous computer conferencing, internet chat rooms, and telnet. These formats, according to (Mason & Kays, 1990) can give users the ability to send and receive information for the advancement of interpersonal communication.
Using CMC internet technology enables employees to search for the requested information within seconds. For example, searching websites using search engines such as Google and Yahoo reveal substantial information associated with the request. Another benefit is that many libraries are now accessible via the internet. Bibliographic or subject information can be sought via the public library or university libraries while remote accessing from the PC. Such innovations indicate that the use of CMC can be instrumental in improving organizational competitiveness by providing additional communication tools.

**CMC is useful during team project stages. And for solving work-related problems, I can get helpful feedback by using CMC technologies.**

This question supported the statement that CMC is one of the most functional and useful technologies available in organization. CMC improve model of use users-group meeting and decision support to develop project support. Participants agreed that by using CMC they got rapid feedback and responses from their colleagues.
I feel comfortable using CMC to ask for assistance on work I am doing.

This question helped determine which communication form (face-to-face or CMC) employees were more likely to choose when requesting or offering feedback to colleagues. Some employees may find it difficult or are uncomfortable in expressing their problem or idea via e-mail or chat rooms. Especially since other cues such as eye contact, voice and body language are filtered out. As previously mentioned, CMC is considered to be an appropriate form for the routine exchange of unequivocal information. Yet it is considered inappropriate when exchanging confidential information, resolving disagreements, getting to know someone, or establishing negotiations (Rice & Case, 1983; Steinfield, 1985).

CMC is effective for brain-storming about new idea.

To further measure employees' selection process when determining which communication form to choose, be it face-to-face or CMC, the question attempted to determine if employees felt certain modes of communication were best for specific work tasks. Computer-mediated communication systems are designed to help people work together more effectively
(Raciti, 1996). Systems like video conferencing, groupware, electronic mail, and GDSS can assist employees in coordinating activities such as product development, strategic planning, training, and systems design, development and implementation. These systems allow individuals throughout the world to work on a single project, participate in brainstorming sessions, and attend classes without leaving their offices (Raciti, 1996).

The second main research question focuses on CMC limitations within the workplace. Here the intent is to examine CMC's influence in the workplace social life. The questions were meant to reveal what were the most limiting factors of CMC and why. For example, face-to-face communication was necessary when an issue was too complex to explain over the phone, or an employee felt more assured in explaining things in person. Face-to-face communication provides immediate feedback and reduces the possibility of misunderstandings. However, interpersonal communication and the ability to socialize via the internet can be enhanced by the frequency of contact. The amount of disclosure in degrees and dimension can
also move CMC a linear fashion (Birnie & Horvath, 2002).

**CMC limits social contact between my colleagues and me.**

This question desired to investigate the impact CMC has on workplace socialization. Since all the employees do not share the same room when using CMC, there is a strong probability that little personal information will be exchanged. Distractions while using CMC may decrease the amount of information exchanged, and may even create a hostile atmosphere. Trust, as a value, may diminish creating a varied degree of stereotyping or status building because individuals are trying to negotiate some sort of identification in CMC (Dietrich, Grear, & Ruth, 1998). Common concern about the loss of organizational cohesiveness with increased reliance on CMC was shown to be unfounded in the current study. Research of online relationships may downplay the credibility of CMC.

**CMC can help me maintain relationships with my colleagues.**

And CMC can replace face-to-face communication in organization.

The interest here was to determine if employees recognized that CMC could help them maintain
relations with other colleagues. For example, if employees work in different departments and rarely see each other, they could maintain contact by using e-mail or chat rooms. In any case, there remains doubt regarding CMC's ability to enhance interpersonal communication and relationships.

*I am more likely to set up an appointment to talk by face-to-face communication than contact co-workers by using CMC.*

As with previous questions, the interest here is to determine the selection process among employees when they choose their mode of communication. This question desired to investigate participants' satisfaction between CMC and face-to-face communication.

The third main research question examined how sophisticated CMC users are. These survey questions measured the ability of employees to use CMC when communicating among each other. The internet permits many forms of communication. The control of communication no longer belongs exclusively in the organization; it is shared via the internet and by word-of-mouth, which may lead to unpredictable effects on the organizational image. The internet is
still considered a marginal and restricted phenomenon in today's business world. However, recent surveys regarding the internet show that the number of users has increased, thus shaping a new reality. This information indicates the need for both external and internal communication strategies to meet the demands of consumers and the business market. Therefore, using CMC in the workplace is not a complicated thing. Since most employees have the ability to use CMC to communicate with other colleagues be it for professional or personal reasons. However, there are employees who continue to experience difficulty in using CMC to communicate with others.

*CMC are complicated technologies in the organization.*

Computer mediated communication systems can be complex and require a variety of computer hardware and software. Equipment can range from the most sophisticated super computers used for multimedia servers to a basic personal computer. The purpose for this question was to obtain participants' opinion regarding CMC.

In some organizations, not all employees have full access to the internet, and in others, employees may have no access at all. Some employees may be unable
to use a graphical browser that would give them full use of the web, despite being given the necessary system privileges to receive and send e-mail. What is appropriate cannot be decided in this study. Nevertheless, it is apparent that internet skills and its effective use will become greater criteria when hiring workers. Hence, the lack of these skills may prevent the employment of individuals, or reduce their career opportunities in the firm. Organizations must now assure that their employees keep abreast of new internet developments in order to ensure that the technology is being used to the firm’s advantage. For this reason, where appropriate, the wisest course for organizations will be to provide each worker with access to the internet. This will benefit the firm as well as the employee (Urs E. Gattiker, 2001).

Accordingly the survey focused on the difficulties in meeting with fellow colleagues when using CMC. In fact, it seems that in some ways developing relationships can be easier using CMC than it is for face-to-face communication.
Inexperience using CMC limits how my colleague and I communicate.

The question is meant to determine the effect CMC inexperience has on communication among co-workers. There is a disadvantage to employees who have access to CMC training.

This question leads to the idea about when there are sophisticated CMC users in organization; organization should plan to develop their abilities to use CMC in organization. And also to investigate that CMC have disadvantage to employees or not when it comes to stage of training.
CHAPTER FOUR
RESULTS

A total survey sample of 100 was taken from the Local Inland Empire Public Relations Society of America. The final survey sample group was generalized to the original sample for age and gender. 83 surveys were returned from the participants in the organization. The final focus group size was greatly reduced from the total sample. Both final sample groups contained a variety of job types, work experience, and as well as gender. SPSS Frequencies were used to evaluate the assumptions of profile analysis as prescribed by Tabachnick and Fidell (2001). The SPSS provided the measure of central tendency most appropriate for each variable. For nominal variables, I determined the mode by identifying the most frequent response in the frequency table, and generated a frequency table by using Analyze, Descriptive Statistics and frequencies. For ordinal variables, I identified the median by generating a frequency table and identifying the category where the cumulative frequency crosses 50 percent. Finally, for the interval variable, I found the mean and standard deviation by using Analyze and, Descriptive Statistics.
<table>
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<tr>
<th>Statistic</th>
<th>N</th>
<th>Missing</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Deviation</th>
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<tr>
<td>I know how to use computer mediated communication technologies well</td>
<td>83</td>
<td>0</td>
<td>4.51</td>
<td>5.00</td>
<td>.802</td>
</tr>
<tr>
<td>I feel that computer mediated communication technologies improve the speed at which I can accomplish workplace tasks</td>
<td>83</td>
<td>0</td>
<td>4.55</td>
<td>5.00</td>
<td>.667</td>
</tr>
<tr>
<td>CMC is good for sharing technical information.</td>
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<td>4.31</td>
<td>5.00</td>
<td>.949</td>
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<tr>
<td>CMC is useful during team project stages.</td>
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<td>0</td>
<td>4.17</td>
<td>4.00</td>
<td>.960</td>
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<td>For solving work-related problems, I can get helpful feedback by using CMC</td>
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<td>3.67</td>
<td>4.00</td>
<td>1.083</td>
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<td>I feel comfortable using CMC to ask for assistance on work I am doing</td>
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<td>3.89</td>
<td>4.00</td>
<td>.765</td>
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<tr>
<td>CMC is effective for brain-storming about new ideas</td>
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<td>3.23</td>
<td>3.00</td>
<td>1.193</td>
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<tr>
<td>For me, CMC is the primary form of communication for most subjects</td>
<td>83</td>
<td>0</td>
<td>3.66</td>
<td>4.00</td>
<td>1.252</td>
</tr>
<tr>
<td>CMC limits social contact between my co-workers and me</td>
<td>83</td>
<td>0</td>
<td>3.58</td>
<td>4.00</td>
<td>1.026</td>
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<td>CMC helps me maintain relationships with my colleagues</td>
<td>83</td>
<td>0</td>
<td>3.60</td>
<td>4.00</td>
<td>.987</td>
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<td>CMC can replace face-to-face communication in the organization</td>
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<td>2.17</td>
<td>2.00</td>
<td>1.248</td>
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<td>I am more likely to set up an appointment to talk by face-to-face communication than contact co-workers by using CMC</td>
<td>83</td>
<td>0</td>
<td>2.87</td>
<td>3.00</td>
<td>.985</td>
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<td>CMC are complicated technologies in the organization</td>
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<td>2.84</td>
<td>3.00</td>
<td>.969</td>
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<td>2.43</td>
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<td>There is disadvantage to employees who have access to CMC training</td>
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<td>Inexperience using CMC limits how my co-workers and I communicate</td>
<td>83</td>
<td>0</td>
<td>3.00</td>
<td>4.00</td>
<td>1.316</td>
</tr>
</tbody>
</table>
How helpful is computer mediated communication in work efficiency?

While there is variety of CMC used within an organization to facilitate exchange and sharing of information, the focus of this discussion is to determine if employees know how to use well CMC technologies. Ninety per cent of respondents felt that they were able to use CMC well (see Figure 1). On a scale of 1 to 5 (1 being strongly agree, 5 being strongly disagree) the mean was 4.51 (standard deviation was .802).

Figure 1. I Know How to use Computer Mediated Communication Technologies Well
The survey showed not only is CMC necessary for collaboration among employees at different work sites, but that CMC can also be more efficient than face-to-face communication in some instances. The participants also appeared to be comfortable with the speed with which they could get help in solving work-related problems (see Figure 2). Ninety percent agreed that they could get helpful feedback in a timely fashion using a combination of CMC. On a scale of 1 to 5 (1 being strongly agree, 5 being strongly disagree), the mean was 4.55 (standard deviation was 0.667).

![Figure 2. I Feel That Computer Mediated Communication Technologies Improve the Speed at which I can Accomplish Workplace Tasks](image-url)
Internet is the fastest tool in today’s communication as well as for searching for information from different sources. Nearly 80 percent agreed with the statement, "I feel comfortable using CMC to ask for assistance on work I am doing," including 60 percent who strongly agreed (see Figure 3). On a scale of 1 to 5 (1 being strongly agree, 5 being strongly disagree), the mean was 3.89 (standard deviation was 0.765).

Figure 3. I Feel Comfortable Using CMC to Ask for Assistance on Work I am Doing

Employees appeared comfortable in asking their co-workers questions by using CMC, it may be determined that they received timely responses on
technical and work-related problems. However, when asked "I can get helpful feedback by using CMC technologies" the response was 51 percent of respondents selecting the "somewhat agree" response category and 19 percent choosing "strongly agree" (see Figure 4). On a scale of 1 to 5 (1 being strongly agree, 5 being strongly disagree), the mean was 3.67 (standard deviation was 1.083). The statistical analysis suggested a significant difference between the levels of work experience and the likeliness of offering feedback via CMC rather than face-to-face communication.

Figure 4. For Solving Work-related Problems, I Can Get Helpful Feedback by Suing CMC Technologies
The different characteristics of communication using CMC versus a face-to-face meeting were further investigated by examining whether subjects felt that a specific medium was better for certain aspects of their work. Subjects were asked for their agreement with the statement: "CMC is effective for brain-storming about new ideas." There was only 34 percent who agreed that CMC is effective for brain-storming about new ideas. Thirty percent was neutral, which showed that people are still unsure the usefulness of CMC while brain-storming. However, there is no general agreement regarding this issue (see Figure 5). On a scale of 1 to 5 (1 being strongly agree, 5 being strongly disagree) the mean was 3.23 (standard deviation was 1.193).
Figure 5. CMC is Effective for Brain-storming About New Ideas

Although there was no agreement on the issue of the usefulness of CMC for brain-storming tasks, the subjects' comments indicate that most could see benefits to their use. However, many also had strong reservations about brainstorming using CMC. It appears likely that the preferred method of communication would depend on the purpose of the brain-storming session.

The different options of communication, while using CMC versus face-to-face interactions, were also investigated by examining which particular stage of a project could be completed with one particular CMC, namely e-mail. In general, most subjects seemed to feel that e-mail was especially useful during the
middle project stages, including: technical and administrative implementation tasks and project management (see Figure 6).

Figure 6. CMC is Useful During Team Project Stages

Seventy-three percent felt e-mail was useful for the team project stages. On a scale of 1 to 5 the mean was 4.17 (standard deviation was .960). About 34 percent felt that e-mail was good for brainstorming. One comment reflected these overall findings well: “There is only performance in brainstorming mixed with face-to-face the rest or the performance agreed that CMC can substitute face-to-face communication; for the next sharing technical information, which is primarily bureaucratic in intention.”
Apparently, the best role for e-mail is circulating minutes or drafts. Most subjects seemed to agree that e-mail was especially useful for technical and administrative implementations and also for project management. Nearly 80 percent agreed that CMC was good for sharing technical information (see Figure 7). The mean was 4.31 (stand deviation .949).

![Bar Chart]

**Figure 7. CMC is Good for Sharing Technical Information**

Assessments of its usefulness were determined by the majority of "strongly agree". Many of those sampled commented that e-mail was useful throughout the process and its usefulness was tied more to the particular communication need than to the particular project stage. There seemed to be numerous factors that influenced subjects choosing a particular
communication medium for a given task: the type of feedback, medium or personal preference for electronic versus face-to-face interactions. Hence, for the current study it would seem that medium choice is dependent on the specific circumstances surrounding the communication message.

In what ways does CMC affect overall workplace communication?

The intent of this question was for the participants to determine what usually prompted a face-to-face meeting between themselves and one or more co-workers who they regularly communicated with via CMC. A content analysis of the responses to this question, in addition to a review of subjects' responses to all the questions, revealed that CMC is the primary form of communication in the organization. For example, face-to-face communication was necessary when:
Something is hard to explain over the phone, or the person feels that he/she will explain things better if he/she comes over. Face-to-face communication was better for "complex issues that require interactive feedback to move forward" or for a difficult problem.

Another research question asked if CMC was the primary form of communication for most subjects (see
Sixty five percent agreed and 25 percent disagreed. On a scale of 1 to 5 (1 being 1-20 percent of daily communication via CMC, 5 being 81-100 percent) the mean was 3.66 (standard deviation was 1.252).

Subjects appeared to have little disagreement in using CMC as their primary form of communication in the organization. In fact, it seems that in some ways developing relationships can be easier using CMC than in regular face-to-face communication. One can join newsgroups and meet others who are interested in the same thing as oneself. This way, people can make connections with others they might otherwise have
never met. Those who are shy or uncomfortable meeting others face-to-face may benefit by being able to meet people for the first time via electronic media. Subjects also appealed to the relationship stage between colleagues that "CMC helps me maintain relationships with my colleagues" (see figure 9). There were 55 percent of respondents who agreed that CMC helped them maintain relationships, 29 percent were unsure, and 16 percent somewhat disagreed. The small percentage of participants who somewhat disagreed may determine that face-to-face interactions are their best form for maintaining relationships.

Figure 9. CMC Helps me Maintain Relationships with My Colleagues

55
Subjects appeared to be persons more likely to schedule appointments to talk face-to-face with their colleagues than by using CMC (see Figure 10). The response was mixed on the issue with the greatest percentage; 35 percent of respondents, choosing the "neutral" response category, with a 35 percent of "somewhat disagree". On a scale of 1 to 5 (1 being strongly agree, 5 being strongly disagree), the mean was 2.87 (stand deviation was 9.85). The statistical analysis showed that people were still more comfortable in scheduling appointments by face-to-face way or the telephone.

Figure 10. I am More Likely to Set Up an Appointment to Talk by Face-to-face Communication than Contact Colleagues by Using CMC
One of the survey questions asked if CMC could replace face-to-face communication in the organization. Nearly 70 percent disagreed with the statement, 41 percent strongly disagreed; 25 percent somewhat disagreed; and only 19 percent agreed with the statement (see Figure 11). In general it would seem that people recognize CMC is an effective tool in the organization, but that CMC cannot replace the face-to-face communication in organization.

![Figure 11. CMC can Replace Face-to-face Communication in the Organization](image)

**How sophisticated are CMC users?**

The survey question provided an idea of how a technologically sophisticated company uses CMC as part of its overall communication patterns. The
organization is a dynamic, technologically advanced corporation with employees working and collaborating from a wide variety of locations. Employees have a range of CMC available to them which they are expected to use in order to accomplish their collaborative work. Subjects were asked for their agreement with the statement: "CMC are complicated technologies in the organization." There was a general agreement regarding this issue (see Figure 12). Forty-one percent somewhat disagreed that CMC were complicated technologies in the organization. It was shown the participants knew how to use CMC well and were able to understand and apply it to their work. On a scale of 1 to 5 the mean 2.84 was (standard deviation .969).

Figure 12. CMC is Complicated Technologies in Organization
It was felt that the comments and experiences from subjects would be particularly useful in giving a picture of the effects of CMC on workplace communications. As a result, their experience is more likely to be indicative of what the future holds than that of a company that has just started using e-mail. Many individuals who have no, or limited, experience using CMC are convinced that media like e-mail are a limited, if not poor, way of communicating, and that they are no substitute for face-to-face communication. The aim of this study was to examine how relatively sophisticated CMC users used CMC to communicate. Hence, the subject was asked about their "inexperience using CMC limits on how my colleagues and I communicate" (see Figure 13). The subjects were split equally between agreement and disagreement in the scale of means 3.0 (stand deviation 1.316).
Figure 13. Inexperience Using CMC Limits How my Colleagues and I Communicate
CHAPTER FIVE
DISCUSSION, LIMITATIONS AND IMPLICATIONS

Discussion

The purpose of this study was to investigate the performance and satisfaction of co-workers who use computer mediated communication (CMC) to communicate in the workplace and to review their performance when using CMC. Since CMC technologies can be advantageous for organizations, employees must know how to apply and adapt CMC in to their daily work. This study also attempted to understand how electronic mail (e-mail) and the internet influence communication in the workplace, and addressed some potential issues and solutions with CMC.

In order to further understand the function of CMC, the effect to communication pattern in organization survey questionnaire including three main questions along with several sub question were assessed. The series of questionnaire were designed to investigate employees’ satisfaction to CMC and investigate their skills with CMC technologies. In determining “how helpful is computer mediated communication in work-efficiency” in the analysis of manipulation check showed 90 percent of employees knew how to use CMC, and they could use CMC to communicate with
their colleague. It also showed that most employees were aware of CMC advantages in the workplace. Also, a majority of employees appeared to be satisfied with the speed of CMC for transfers of documents and for more efficiently resolving work-related problems. Apparently, not only is CMC necessary for collaboration with employees at different work sites, but in some instances, it can also be more efficient than face-to-face communication. Even though theory showed that at times individuals preferred to communicate face-to-face, especially regarding difficult issues, the survey showed that over 50 percent of those sampled were comfortable in asking questions via CMC. As time is a critical factor, especially regarding technical problems, the study checked on CMC's time efficiency. Seventy percent of those sampled supported the idea that helpful and timely feedback was obtainable by using CMC technology. The statistical analysis suggested a significant difference between levels of work experience and the likeliness of offering feedback via CMC rather than face-to-face communication.

With only partial support found for the hypotheses regarding satisfaction, and no support found for those addressing performance, the study results show that people still are unsure about whether CMC is good enough for
brain-storming. Most subjects seemed to agree that CMC was especially useful for technical and administrative implementations and also for project management. Many of those sampled felt that e-mail was actually useful throughout the process and its usefulness was tied more to the particular communication need than to the particular project stage.

Most employees agreed that CMC was the primary form of communication for most affairs within their organization. Nevertheless, nearly 70 percent of those sampled believed that CMC could replace face-to-face communication. The common concern about the loss of organizational cohesiveness with the increased reliance on CMC was shown to be unfounded in the current study. Implicitly, participants seemed to feel that there was no change in face-to-face communication or there was an increase in face-to-face communication as a result of their use of CMC.

In terms of familiarity and levels of knowledge with CMC, the participants thought that CMC were uncomplicated technologies for them, nor did they find it difficult to communicate with their colleagues within the organization. However, when determining if inexperience using CMC can

63
limit communication, there was a consensus in the belief that the level of CMC know-how could affect communication.

Research Limitations

The participant organization, the Local Inland Empire Public Relations Society of America, have a unique organizational culture. It provided an idea of how a technologically sophisticated organization uses CMC as part of its overall communication patterns. The organization is a dynamic, technologically advanced corporation with employees working and collaborating from a wide variety of locations. Employees have a range of CMC available to them which they are expected to use in order to accomplish their collaborative work. Clearly the participant organization and the employees are somewhat unusual in the corporate world. However, since the employees were advanced in using many forms of electronic communications rather than being new to the CMC technologies, it was felt that the comments and experiences from these subjects would be particularly useful. Also their responses would most likely be indicative of what the future holds then that of a company initiating in the use of e-mail. However from the result
of the survey study is about organizations that already use CMC frequently.

As technology progresses and information communicated via CMC increases, there will be many changes in people's perception of whether or not CMC can replace face-to-face communication. Perhaps in the near future, when desktop video-conferences are as common as sending e-mail is today, there will be a change in the barriers people perceive. No longer will conflict resolution and other such judgmental tasks require people to be in the same room.

From the survey, I can conclude that CMC have no effect on the amount of face-to-face contact among co-workers in organizations. In general, subjects felt there were still times when people had to meet face-to-face for certain issues. What really will change when using CMC? Can CMC affect interpersonal communication? In some respects, it does. People who communicate through CMC have numerous approaches, attitudes, and motives for using the internet. Although face-to-face is considered the most salient of communication, interpersonal responses through CMC is an extension of face-to-face and can enhance the relationship by continuing communication via e-mail, chat rooms, list
serves, and bulletin boards. Communication via CMC is considered an expansion when applied in business, academia, science, and personal use. It is important to realize that computer-mediated communication systems are not independent entities, but must work in conjunction with individuals who are willing to use them.

Implications

CMC is a viable communication media for work groups. The results of this investigation demonstrate that groups using CMC can attain high level of various types of work and satisfaction of employees. However, many individuals who have no, or limited, experience using CMC are convinced that media like e-mail are a limited, if not poor way of communicating, and that they are no substitute for face-to-face communication. The aim of this study was to examine how relatively sophisticated CMC users used CMC to communicate, and how electronic communication might affect face-to-face communication. The current study suggests that:

CMC effectiveness for obtaining work-related information is substantial, and that it complements but does not eliminate the need or value of face-to-face communication.
CMC can play a critical role in obtaining work-related information in a timely and effective manner. This suggests that meaningful aspects of face-to-face communication can be achieved using CMC, thus removing some of the perceived barriers to new ways of working such as telework that involves working off-site work and communicating through remote access. Working remotely should not be viewed as working 100 percent in isolation; rather, it involves a dynamic pattern of electronic and face-to-face communication in which the value of both varies over the course of a project, but in which electronic communication may be prevalent.

As technology progresses of information communicated via CMC increases, there will be many changes in people’s perception of whether or not CMC can replace face-to-face communication. Perhaps in the near future, when technology more development, there will be a change in communication between people. High and model technology will have an effect to the way people use for communicate. No longer will conflict resolution and other such judgmental tasks require people to be in the same room. Instead, people who work together may only see each other face-to-face on social occasions which will help to maintain the human side of organizations.
Moreover, computer mediated communication systems will incorporate many capabilities for the user. People tend to retain more of what they see and hear than what they see on a computer screen. This enhanced capability will make computer mediated communication systems more effective by increasing their ability to communicate information to the end users. In addition to the incorporation of multimedia, these systems will permeate organizations that traditionally do not use advanced system to do their work.

If people know how to use CMC in the correct way they will get the highest benefit from using this technology.
APPENDIX

SPECIAL TERMS
Bulletin Board System (BBS): A type of online computer service that functions as an electronic notice online board. Users can read or post messages, download programs, and play online games. Some functions of BBS are similar to that of the Internet, but on a smaller scale.

Electronic discussion lists: a program that will enable information to be posted in a public forum for response. Users must subscribe to the list in order to post and receive information. Messages are sent to all subscribers for response. The various topics of interest and related answers to questions can either be posted or entice dialogue with others in distribution list offered by the program (Allritton, 2002)

Electronic mail: a tool that allows users to create and distribute electronic messages. In addition to electronic messages, many systems allow users to transmit binary file attachments. These attachments may contain application programs, graphic images, audio clips, video clips, word processing documents, spreadsheets, and a variety of other types of files.

Group decision-support system (GDSS): an interactive computer-based system that helps groups of people solve unstructured problems (Gallupe & Desanctis, 1987). GDSS also facilitates disseminating, evaluating, recording and implementing ideas (e.g., in Gallupe & Cooper, 1993).

Internet: This is a network of computer net works. The internet makes it possible to download World Wide Web information and to receive and send e-mail. It is open to the public, thereby permitting all users to access the information on a server (e.g., a firm's Web site). In turn, this also increases the security challenges to prevent hackers and cyberpunks from unauthorized access.

Intranet: An intranet is a private computer network that uses the technology of the internet (e.g., some browser of web software/technology) to disseminate information within an organization. The key concept here is privacy and security: Intranets are off-limits unless one has the proper authorization. For instance, a department's server may be accessible to department employees only, without permitting them to receive and send mail from and to the internet. Nevertheless, the employee may have access to another server and software to take advantage of the internet or the extranet.

Telnet: Access to databases, computerized library card catalogues, weather reports, and other information services, as well as live, online game
(e.g., playing bridge) that let you compete with players from around the world.

Web: This term implies either using a graphical software browser such as Microsoft Explorer or Netscape to answer e-mail or using such free e-mail services as Hotmail.

Browser: An access tool to the WWW that uses hyperlinks to access remote information. Browsing is using the browser to look at the information on the WWW. Cruising and surfing are synonymous with browser.

Video conferencing: a system that allows users to see and speak to individuals at different locations. In addition to seeing and hearing other parties, modern video conferencing systems allow users to transmit computer files over the data connection. This feature allows many users to work on the same computer file and application while on the video conference.
REFERENCES


