

Application Venues of Computer-Mediated Communication (CMC) : Analytical Review

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Abstract

This entry first provided a description of Computer-Mediated Communication (CMCs), including areas in which computers have been used to facilitate collaboration, automation, and management. Next it provides a framework for classifying various types of CMC and discusses each portion of the framework in terms of both example applications and research topics. This paper also presents a discourse on how CMS applications are used in various communication venues. In general these venues are: interpersonal, groups, and mass communication. Finally, CMC research areas has been found as multidisciplinary including communications, and journalism, library science, engineering and computer science, management, business, etc.

Keywords: *Computer-Mediated Communication, Characteristics of CMC, CMC application venues, CMC research areas*

Introduction

Computer-Mediated Communication (CMC) is a field that studies the use of computers and related technologies as a means of facilitating human communication. With the decrease in cost of computer-based systems, use as a communication and collaboration medium has increased dramatically. Applications have been developed for business, educational institutions, and governmental agencies to meet the demand of emerging environments, and to enhance personal use of social networks. Scholarly research in the area of CMC has mirrored this growth. . Computer-mediated communication is defined by Wikipedia¹ as any communication that occurs through the use of two or more electronic devices.

CMC has been described in various ways by academics and practitioners. Although some would describe CMC as virtually all computer uses that employ a user interface or involve the manipulation of data, this description may not include data or information flow between two or more people. Thus, computer applications such as statistical analysis programmes, remote-sensing systems, and financial modeling programmes would fit within

this concept². A narrower view holds that CMC only encompasses those applications that directly assist human communication. That the term includes the word, “mediate”, implies reliance upon a third party or entity to enhance the information flow between two or more people. This entity adds something to the communication that helps improve (or at least provides the opportunity to do so) the efficiency and/or effectiveness of information flow. The addition of elements to aid information flow is what distinguishes CMC from ordinary telephone conversations, FAX communications, and electronic broadcasts (such as “webinars”, which are unidirectional). An example of an element that a computer might provide to enhance communications is the storage and presentation of large amounts of data, which is beyond the capability of human short-term memory to store. From this perspective, CMC encompasses not just the communication itself, but the entire process by which people create and exchange information using electronic systems and the extent to which computers assist the communications by adding some element of facilitation.

CMC can further be described according to its function. CMC is utilized in such diverse areas as teaching and learning in social networking (for both personal and professional reasons), for dissemination and/or control of information, and for entertainment of various kinds. As stated by Chilton³ the methods by which each of these functions are accomplished, provide additional ways of classifying a particular CMC system:

- Systems may require synchronous communications or allow sharing or information asynchronously;
- Systems may provide for unidirectional communications or they may allow interactive participation;
- Systems may provide for either small or large numbers of simultaneous participants; and
- Systems may provide elaborate interfaces in very controlled circumstances or they may allow very informal settings that utilize simple interfaces.

Characteristics of Computer-Mediated Communication

Communication occurring within a computer-mediated format has an effect on many different aspects of an interaction. Some of these that have received attention in the scholarly literature include impression formation, deception, group dynamics, disclosure reciprocity, disinhibition and especially relationship formation.

CMC is examined and compared to other communication media through a number of aspects thought to be universal to all forms of communication, including (but not limited to) synchronicity, persistence or "recordability", and anonymity. The association of these aspects with different forms of communication varies widely. For example, instant messaging is intrinsically synchronous but not persistent, since one loses all the content when one closes the dialog box unless one has a message log set up or has manually copy-pasted the conversation. E-mail and message boards, on the other hand, are low in synchronicity since response time varies, but high in persistence since messages sent and received are saved. Properties that separate CMC from other media also include transience, its multimodal nature, and its relative lack of governing codes of conduct⁴. CMC is able to overcome physical and social limitations of other forms of communication and therefore allow the interaction of people who are not physically sharing the same space.

The medium in which people choose to communicate influences the extent to which people disclose personal information. CMC is marked with higher levels of self-disclosure in conversation as opposed to face-to-face interactions. Self disclosure is any verbal communication of personally relevant information, thought, and feeling which establishes and maintains interpersonal relationships⁵. This is due in part to visual anonymity and the absence of nonverbal cues which reduce concern for losing positive 'Face' (sociological concept). According to Walther's⁶ Hyperpersonal communication Model, computer-mediated communication is valuable on providing a better communication and better first impressions. Moreover, Dunn⁷ asserts that computer-mediated communication allows more closeness and attraction between two individuals than a face-to-face communication.

Anonymity and in part privacy and security depends more on the context and particular program being used or web page being visited. However, most researchers in the field acknowledge the importance of considering the psychological and social implications of these factors alongside the technical limitations.

General Applications of CMC

CMC scholarship covers a wide range of applications. This is due in part to the number of potential applications for this technology and in part to the number of fields it spans. The term CMC has been used to describe research in diverse areas such as: electronic messaging, office automation, distributed decision-making,⁸; electronic boardrooms, teleconferencing, informatics, computer-supported cooperative work or CSCW, decision support systems and group support systems or GDSS, and computer-assisted instruction of CAI.^{2, 10}

In general, Computer-Mediated Communication systems can be broken into three distinct areas based on application. These areas are conferencing, informatics, and Computer-Aided Instructions (CAI). While each area has unique characteristics, elements common to all CMC include communication, computers, and information exchange.

Computer-Mediated Communication (CMC) Application Venues

1. Interpersonal

CMC systems developed specifically for communication support between two individuals or within a very small group are classified as interpersonal. Interpersonal communication systems can be synchronous or asynchronous with text, audio, and video based-communication being passed between system users. Synchronous communications operate in a real-time or near real-time atmosphere. Text-based chat, video chat, and voice communication have all been implemented using computer technologies to facilitate synchronous interpersonal communication. Asynchronous systems generally are based on stored text, audio, or video files. One of the most common asynchronous interpersonal communication systems is e-mail, but other applications are gaining popularity with video, text, and audio implementations. These applications involve digitally storing information then transmitting them to the receiver who can listen to or view the message at his or her leisure³

Text-Based Chat and Messaging

Chat and messaging systems provide a synchronous, text-based way to communicate with people all over the world. Most real-time chat systems rely on the Internet as a transmission medium. In general terms, Internet Relay Chat (IRC) systems consist of various separate networks of chat servers or machines that allow users to connect. Once connected to a server, text-based

communication can begin. Besides providing a means for interpersonal communication, chat systems are often used to enable communication between larger groups of people. The largest chat networks at this time are EFnet, IRCnet, QuakeNet, and Undernet.

Internet relay chat is currently declining in use largely due to the popularity of instant messenger software systems. Providers such as Yahoo, Microsoft, and AOL all have provided software focused on allowing users connect to the Internet via computer or mobile device to send and receive text messages in real time. Additionally, other features such as webcam use, file transfers, and message storage have added to the sophistication and desirability of these applications.

Video Conferencing

Interpersonal video conferencing facilitates synchronous communication using video and audio. Like many CMC tools, this communication method can save time and reduce travel costs. Video conferencing software currently offers everything from compressed low-bandwidth images on desktop PCs with messenger software to full-motion, broadcast quality video. Frequent users may utilize private line video conferencing and less frequent users may opt for standard Internet access.

Voice Communication

Audio conferencing programmes digitize speech as the user speaks and sends the digital data over the Internet or other transmission media. Often this is called voice over IP or VOIP. In order to match sound quality comparable to regular telephone service, most audio communication applications compress sound information before transmitting. In full duplex conversations, sender and receiver can speak and hear the other person simultaneously. In half duplex applications, only one person can speak at a time.

Various commercial products have been developed to support audio CMC applications. Currently, cable television companies market Internet phones and applications such as Skype provide VOIP services for users via their computers. Messenger software also incorporates VOIP services for users via their computers. Messenger software also incorporates VOIP services.

E-mail

Electronic mail or e-mail provides a means of sending text-based messengers over a communications channel. E-mail is similar to regular mail with an added advantage – speed. E-

mail allows both the sender and receiver to asynchronously communicate at convenient times.

Asynchronous Voice and Video

Developed as an extension to e-mail software. Asynchronous voice and video applications have become more popular. Digitized voice and video files are transmitted as attachments to email and viewed or heard at a time convenient to the receiver. Some messenger software allows asynchronous messages to be sent to off-line users.

2. Groups

CMC systems have also been developed specifically to support communication within groups. Like the interpersonal systems, group CMC has been developed to support both synchronous and asynchronous modes of communication. Text, audio, and video formats can be used to facilitate the exchange of information between systems users. In terms of synchronous communication, chat systems, real-time video systems, networked meeting systems, multiple user dialog systems, and group collaboration systems have all been implemented. Asynchronous applications such as discussion boards, blogs, and electronic mailing list software have also been developed.

Chat Systems

Most text-based chat systems were designed to support synchronous communication within groups. The same applications used to support interpersonal communication are also used to support groups over the Internet or other computer networks.

Real-Time Video

Several real-time video conferencing software packages are currently available. Some of these have been developed for use in educational settings. Of these, Polycom is one of the best known and most widely used. Polycom allows users to hold desktop video conferences using the Internet as a transmission channel.

Networked Meeting Software

Networked meeting software generally refers to a package which supports synchronous collaboration tools like group chats, shared whiteboards, multiuser editors, Web slide shows, or and shared applications running simultaneously on the Internet or other network. A number of these platforms have emerged in both the business and education arenas.

Multiple User Dialog

A variety of multiuser environments have become available to support real-time group communication and collaboration over computer networks. Multiple User Dialogs or MUDs and related systems such as Object-Oriented MODs were derived from systems developed by the gaming community in the 1970s and 1980s. Many of the original MUDs have been extended to provide real-time conferencing and collaborative environments. Sometimes called text-based virtual realities, these multi-user environments can be used to facilitate group interaction through supporting software. In other words, the decision of one user can impact the perceived environment of another user. Synchronous communication is usually a component of the system. When logged onto a MUD, an individual types rather than talks, reads rather than listens, and manipulates programs to describe themselves and the current state of the virtual environment. Resulting descriptions are generally text-based and in real time.

Groupware and Collaboration

Groupware encompasses a wide set of technologies used to support interpersonal and group collaboration. Groupware ranges from e-mail to Electronic Meeting Systems (EMS) to workflow collaboration tools. Generally speaking, groupware provides tools to solve collaboration-oriented business problems. The general concept driving groupware is the intent to foster collaboration and interpersonal productivity. This is accomplished through the technical automation and enhancement of a variety of tasks. Some groupware applications seek to integrate the functionality of e-mail with other technologies such as calendar/scheduling software. Others integrate group work processes, workflows, and meetings¹¹.

Newsgroups and Blogs

Unlike the related asynchronous interpersonal CMC technology, e-mail, newsgroups facilitate group asynchronous communication. Rather than receiving messages directly, newsgroup messages are posted to groups. These groups are organized into topic headings. The user can decide which topics are of interest and choose which messages to view or download. An early newsgroup system was called the Usenet. Usenet was an international forum where asynchronous discussions on myriad topics are constantly taking place. Usenet discussion was been described as liberating because of its anonymous nature. As in many applications of CMC, participants are judged on their words, rather than on outward appearance, age, or gender. Newsgroups have declined in popularity over time until they have almost become

a relic of early Internet use. Their functionality has largely been replaced with Blogs and discussion boards which provide much of the same functionality.

Electronic Mailing Lists

Like newsgroups, electronic mailing lists are an asynchronous group communication technology. Mailing lists use e-mail technology to disseminate information and facilitate discussion. In many mailing list systems, a user subscribes to a list. After acceptance, copies of every message sent to the group will be routed to each member on the list. If the list is moderated each message will be reviewed by a moderator prior to being disseminated to each member. Most mailing lists will have three email addresses. These are:

- The Subscription e-mail: To subscribe to the list
- The List e-mail: To send messages to the list.
- The Administrator/Moderator e-mail: To contact the administrator or moderator of the list.

Mailing lists fall into two categories, manual and automatic. Manual lists are generally moderated or controlled by a particular person. This person accepts, rejects, or edits message contents. Automatic lists are not generally moderated. Instead computer programmes called robots are used for administration. Two common robots are LISTERV and Majordomo.

Social Networking Software

Like groupware, social networking software provides communication capabilities suited to group communication situations. However, beyond group communication, social networking also allows participants to engage in individual discussions and mass communication within a shared environment. In general, social networking focuses on the construction and development of like-minded online communities and provides a variety of Web-enabled ways for users to interact. Social networking is currently used by millions of people in both work settings and in their personal lives. Some of the most common social networking sites are MySpace, Facebook, Bebo, Orkut, Second Life (a virtual 3-D social network), and Cyworld (also 3-D).

3. Mass

CMC systems have also been developed specifically for mass communication. This means computer systems facilitate one-to-many

communication in either a synchronous or asynchronous mode.

Text

Technologies such as mailing lists, newsgroups, and Web sites have been implemented to effectively allow one-to-many communication. This is particularly true of mediated newsgroups, Blogs, and mailing lists where a single individual is able to communicate to an audience which cannot be limited.

Audio

Systems have been developed to present real-time audio over the Internet and other networks. Users with conventional multimedia personal computers, a network connection, and the appropriate software are able to listen to real-time sound broadcasts. The term podcasts has been used as descriptor.

Video

One-to-many video applications operate over the Internet and other networks. Multicast provides one-to-many and many-to-many networks delivery services. Sometimes called video casting, Vidcasts, video podcasts, video streaming has become a very important Internet application. Web sites such as YouTube and iTunes have provided infrastructure that has allowed video casting to become commonplace.

The CMC applications venues disused are summarized in the table 1:

S/N	Interpersonal	Groups	Mass
1	Text-Based Chat and Messaging	Chat Systems	Text
2	Video Conferencing	Real-Time Video	Audio
3	Voice Communication	Networked Meeting Software	Video
4	E-mail	Multiple User Dialog	
5	Asynchronous voice and video	Groupware and Collaboration	
6		Newsgroups and Blogs	
7		Electronic Mailing Lists	
8		Social Networking Software	

Source: Tabulation – Authors'

Computer-Mediated Communication Research Areas

CMC research has been found in a multitude of disciplines including communications and journalism, library science, engineering and computer science, business, criminology and forensics, knowledge and operations management, education, psychology, including cognitive science, sociology and anthropology, law and ethics, and both human and veterinary medicine. Research is not limited to each single discipline, however, and the norm is more multidisciplinary. For examples, engineering teams with medicine to discover new ways of treating and detecting disease and communicating these techniques to both engineers and physicians; computer science may team with anthropology do discover new ways to analyze ancient texts.

As research helps humankind to improve the sharing of information and to solve intractable problems, much of the problem solving is turned over to the computer because of its ability to store massive amounts of data and recall it quickly and to process massive numbers of calculations in a short period of time. Thus, this type of research is *autocatalytic* in nature – bigger and more powerful machines allow us to solve more problems, and this in turn provides even more problems to solve. This germinates the need for bigger and better machines, and the cycle is repeated³. The other end other end of the research spectrum focuses on the user. Such questions as the perceived value of an information system, the perceived success of an installed information system, and how well a user is able to interact with a system (so-called human-computer interaction) are some of areas which have received a lot of attention. Additional topical areas fall in between the devices and the programmes and the users, and include group work and interactions, individual work, performance and productivity enhancement, software that supports social networking, religion and cross cultural issues, security, cyber and information warfare, comparisons of different communications techniques, and entertainment.

Conclusion

Computer-Mediated Communication (CMC) has been defined and explained. While the term has traditionally referred to those communications that occur via computer-mediated formats (e.g., instant messaging, email, chat rooms), it has also been applied to other forms of text-based interaction such as text messaging. Research on CMC focuses largely on the social effects of different computer-supported communication technologies. Many recent studies involve Internet-based social networking supported by social software.

There are basically three areas of CMC systems applications: conferencing, informatics, and Computer-Aided Instructions (CAI). While each area has unique characteristics, elements common to all CMC include communication, computers, and information exchange. Characteristics of CMC were briefly highlighted on communication occurring within a computer-mediated format which has an effect on many different aspects of an interaction. These include impression formation, deception, group dynamics, disclosure reciprocity, disinhibition and especially relationship formation.

CMC has been classified viewing how applications are used in various communication venues. In general, these venues are: **Interpersonal** (Text-Based Chat and Messaging, Video Conferencing, Voice Communication, E-mail, Asynchronous voice and video); **Groups** (Chat Systems, Real-Time Video, Networked Meeting Software, Multiple User Dialog, Groupware and Collaboration, Newsgroups and Blogs, Electronic Mailing Lists, Social Networking Software); and **Mass** (Text, Audio and Video).

Research areas in Computer-Mediated Communication is not limited to each single discipline, the norm is rather more multidisciplinary, covering science, engineering, humanities and social sciences disciplines.

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