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RESEARCH ARTICLE

'NEW LIFE' BEGINS WITH THE INTERNET!

***Alo LIliweri**

Jalan Batham No, 4 Oepoi, Kupang, Timor Barat, 85111, Indonesia

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ABSTRACT

Currently, computers and the internet are two "things" that cannot be separated. Computers have become "information management centers". Information is received, stored, retrieved, processed and then exchanged (shared) everywhere. The question of where the information is obtained and then shared means nothing if there is no such thing as the 'internet'. Does the computer have to be in the form of a 'Personal Computer, PC?", 'Note Book' or 'Laptop'. No. The android phone that we hold (we call it a "cell phone") is also a computer. Cell phones also utilize the internet. So, internet services, with the help of computers, are what allow everyone to communicate centrally. We call all these centralized facilities 'Computer Mediated Communication' (CMC).

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INTRODUCTION

Let's Start with the Internet: The development and spread of CMC can be divided into three phases (Herring, 2003).The first phase, pre-internet CMC which began in 1980. The second phase, 1994 (partly until now) is the internet era supported by social software. The third era, is the diffusion of CMC software which began around 2002. Social software that provides opportunities for research on artifacts in newer domains such as YouTube, Facebook, and Flickr (Farkas, 2007).

First Phase: In the 1970s, perhaps in our society, there were only a few people who believed in and used computers to share all information. Especially in the early days when people were arguing about the 'greatness' of computers that were able to share information signals that transcended geographical distances (Palme, 2010). This was a new idea. An idea that brought revolutionary events. Some considered this idea dangerous. For example, the Swedish Data Inspection Agency (Datainspektionen) prohibits people from storing e-mail messages (e-mail was first introduced in 1972) for more than a month. Why? So that people do not discuss political and religious issues just because they have shared information from the internet revolution. Although many parties tried hard to implement control systems and eradication and banning, the ideas of successful public internet use spread faster, and thank the public in the 1990s. Many wish they had realized this earlier (Hafner & Lyon, 1996). Indeed, at first the use of the internet was limited to military organizations, governments, universities, and businesses. However, after the emergence of the CMC concept, the popularity of the internet became stronger, allowing people to go online from home. This happened in the late 1980s and early 1990s. In the 1980s, information technology experts, including Hiltz and Turoff (1978), Martin (1978), and Toffler (1984) made 'prophetic' statements about the changes that human communication would experience, at least at that time and in the future. These changes were a consequence of the development of computer technology combined with telecommunications. In this context, Steinfield (1986) wrote about CMC in the 'Annual Review of Information Science and Technology'. In this paper, Steinfield introduced 'Computer Based Messaging Systems' (CBMS) - especially e-mail, conferencing systems, and bulletin boards - into a major area of discussion. These articles reflected the ongoing intellectual and academic work in the field of telecommunications, which examined the possibility of CBMS replacing traditional telegraph and postal systems. Miller and Vallee (1980), previously, had identified four types of packet-switched based on ARPANET (Advanced Research Projects Agency Network), namely network packets: (1) word processors that can communicate, (2) message switching, (3) correspondence via network, and (4) conference via computer. This is the first form of academic and theoretical attention. They focus on the question of how the new communication system carries out information transfer through three information source nodes, namely; (1) input node, (2) relay point (transmission node), and (3) information destination (output node). Or how these nodes are used in human communication networks. For Miller and Vallee; "The human communication network is a system consisting of; goals, objectives, and limitations. These are the three aspects that must be met in every communication group." In the pre-internet era, CMC was defined as a computer-based messaging system and human communication network, which has organizational aspects (Rice, 1987). In the words of Rice - who examines the CMC perspective on organizations - "computer-mediated communication systems are not only processes about innovation but also constitute information that must be processed by the organization, a situation that provides both opportunities and challenges for the organization, in the sense of enablingthe organization's own resources and responsiveness. Steinfield (1986) defined CMC as the use of computers in human communication. He noted; "a variety of CMC systems exist, each with unique attributes and applied in diverse contexts." Steinfield understood CMC as a system similar to the scientific perspective

adopted in telecommunications. Important contributions to CMC were also made by Meyer (1980) through his taxonomy for CMC, as well as the work of Miller and Vallee (1980) who defined a formal representation of electronic messaging systems. Subsequently, Rice & Gattiker (2001) presented writings to develop the idea of the impact of CMC on organizations, the concept of computer-mediated communication and information systems (CIS, Computer Information Systems). The fundamental argument is that CMC is an information system that affects individuals and organizations. This opinion is the same as Detlor (2003), CMC should be seen as an information system. Deltor even specifically mentions the use of the internet in organizations that process information. This is evident in Steinfield's (1986) discussion of the pre-Internet literature, that CMC focused on message systems, information load, group processes and decision making, productivity and media substitution, and organizational structure. Over the next decade, information scientists turned their attention to topics such as electronic publishing (Hjerppe, 1986), computer-supported cooperative work (Twidale, 1998), Internet policy (Braman, 1995), and the use of the Internet to access information (Lynch & Preston, 1990).

Second Phase: The Internet debate continued into the late 1990s. This was the "golden age" of CMC. This phase saw the emergence of public, multi-participant textual interaction, such as electronic mailing lists, newsgroups, Usenet, MUDs (Multi-User Dimension) and MOOs (Multi-user Object Oriented), and Internet relay chat. The more popular modes of CMC today—such as text messaging on mobile phones, instant messaging, weblogs, and wikis—and textual interactions continue to be important even on the latest convergent multimedia platforms. All of these media sharing and social networking sites (Herring, 2009). Thus, the exchange of typed information has been, and continues to be, a type of computer-mediated 'conversation'. This picture was drawn in the mid- to late 1990s, when Voice over Internet Protocol (VoIP) communications were few or far between. At that time, CMC was still text-based, and its presence was almost unmatched on the Internet. While it may seem taken for granted now, at the time the claim that text-based CMC was 'conversation' was somewhat controversial. Many scholars consider that, at best, such 'conversation' could be a metaphor for CMC, but not a literal description, since it is not produced orally or received auditorily as speech and conversation are. By definition, it deals only with what is said and what is heard. Some conversation analysts in the ethnomethodological tradition went further, rejecting CMC as a legitimate object of study in its early days, although they had changed their views by the late 1990s. These questions remain relevant today, as the study of CMC—both textual and vocal—has and continues to grow. Furthermore, a number of scholars explicitly contrast CMC with speech and conversation. Early on, Horowitz and Samuels (1987) characterized CMC as "speech written down," Maynor (1994) called it "written speech." Even Colomb and Simutis (1996) referred to it as "visible conversation," for example? Cherny's (1999) characterization of chat in MOO (Massively Multiplayer Online). The 2000s characterization of Usenet newsgroups and discussion forums as "very large-scale conversations" and the description of weblog content. Scoble and Israel (2006) called it "naked conversation." With the exception of Cherny, all of these characterizations are made about the asynchronous nature of CMC. It has even been placed as a primary indicator by scholars, for example Herring (2001). Or synchronous CMC modes such as chat, which tend to show more 'verbal' features (Ko, 1996). Asynchronous nature is starting to be recognized as one of the characteristics of CMC, meaning the availability of facilities that allow communicators to spend more time editing messages before sending them, as in traditional writing.

Third Phase: Herring (2002) conducted empirical research on naturally occurring online communication in non-institutional and non-organizational contexts. He said that, "such communication arguably best reflects the organic potential of the Internet itself, as a large, geographically distributed, interconnected, and relatively unstructured medium for shaping human interaction. Herring's work represents a new perspective: Internet-focused CMC. Common phenomena of interest from this perspective include the effects of the Internet on language and communication, for example on interpersonal relationships and group dynamics, as well as the emergence of new social structures and norms, and the impact of the Internet on the macro-social. Herring (2002) developed the CMC transformation mode into a genre, when combining message protocols and socio-cultural practices in the use of the Internet and computers". Thus, the CMC mode began to offer a cultural context, in the analysis of online communication. Why not? At that time online communication began to be embedded in a cultural context, due to the presence of Internet-focused CMC e-mail, followed by listserv discussions, Usenet newsgroups, IRC (Internet Relay Chat), and websites that facilitate the exchange of information and interpersonal communication. With the advent of Internet-focused CMC, researchers have identified two forms of communication: (1) synchronous, and (2) asynchronous. According to Olarian (2006) "Synchronous CMC consists of the use of real-time or simultaneous mediated electronic communication technologies (e.g., IM, instant messaging, chat, computer conferencing) to facilitate interaction. In other words, the primary requirement of synchronous CMC is to serve the needs of all participants or users to be present during the interaction, regardless of physical geographic location. The opposite is asynchronous communication, where we do not require real-time communication, such as e-mail. Berry (2006) views asynchronous CMC as an archived memory that can be retrieved at a later date. CMC creates and allows us to conduct timely and rapid review of the permanent archived record. This review of the differences between synchronous and asynchronous communication is important so that we can compare CMAC (Computer-Mediated Asynchronous Communication) as asynchronous communication with face-to-face meetings which can be viewed as traditional synchronous communication (although there are techniques for capturing transcripts of some forms of synchronous CMC). Likewise, artifacts recorded in asynchronous CMC have been shown to have many uses, including promoting online learning (Zeiss & Isabelli-Garcia, 2005), including accelerating information retrieval (Westerman, 2008), and assisting researchers in various case studies (Paulus & Phipps, 2008).

Now?: Now, (2021) the internet and CMC have undergone significant changes. Part of this transformation is due to the development of social software (Farkas, 2007). For example, web-based software programs that allow users to interact and share data. Examples of social software include Weblogs, Wikis, MySpace and Facebook, media sites such as Flickr and YouTube. These applications are also known as collaborative software because they allow people to work together and interact on digital platforms that include text, sound, and images (Payne and Forum, 2007). This is the latest phase. We can say that the presence of CMC has been supported by social software. Farkas claims that this type of CMC has helped us to wisely utilize the 'crowd', assuming that the more users are connected through the network, the easier it is for us to utilize CMC. Farkas strongly recommends the use of this 'crowd'-based CMC to be applied in libraries as information networking centers. According to Farkas; "this social software can change the face of the library, which was previously a wall, into a human face when facing its consumers. This situation can present new ways for libraries to communicate, collaborate, educate, and market services to their customers or other community members (see: McNicol, 2008; Fitz-Gerald, 2008). Hasan and Pfaff (2006) argue that social software technology, which they call conversational technology, has succeeded in democratizing information systems in organizations. Similarly, Webb (2007) found that YouTube is an excellent medium for libraries to disseminate information to their clients who are physically far apart. This is also supported by Chudnov (2007) regarding how important social software is in the library context.

Computers, Awesome! Working to Serve All: The term computer - in the context of defining computer-mediated internet communication - means more than just a device that functions for calculations (computing). This means that the main function of a computer is not just to provide computing capabilities, but more than that, the computer provides a platform for operating systems and software

applications that support data transmission to users. On the internet, the relationship between computers usually follows the client-server model. This model is the same as the TCP/IP protocol, which is none other than the unifying characteristic of internet communication. A server is a computer and related hardware and software applications that act as a place to store information files or software programs. The server sends information through requests over the network to the client software user (December, 1996). Figure 1.1 summarizes the relationship between client and server. That, requests for information flow from the client to the server. Based on this request, the server sends information back to the client. This client-server communication is guaranteed to be secure because it follows a set of protocols. These protocols determine certain applications that must be used together by the client and server. For example, the Internet Gopher protocol defines an application for organizing information into a system of menus, submenus, and entries. A client, a Gopher user, requests a list of menu items from a Gopher server. The Gopher server sends the requested list to the user. The distributed form of the client-server request and service scheme is shown in Figure 1.1. This process has made efficiency possible and even possible. Why? Because the client software interacts with the server according to a standard data exchange protocol, meaning that the client software can adapt its work to the particular computer host of the user. That is, the server does not have to "worry" about the particular hardware or software of the computer, at least not where the client is located. Likewise, the client software does not have to "worry" about the particular type of server that is the source of the information; because all servers that work within a particular protocol will behave the same.

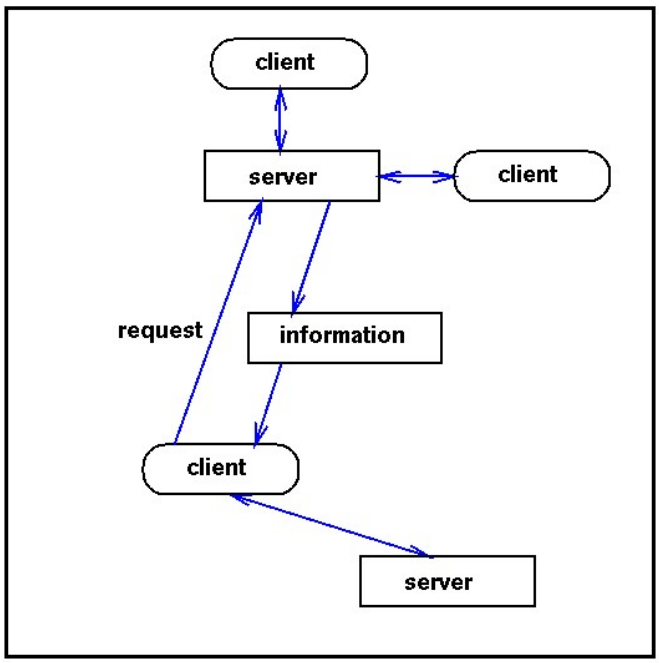

Figure 1. Data Communication Model between client and server

Another example. Especially for Mcintosh, Web clients can access any web server and then the client can develop further access. Why? Because, this same web server can be accessed by Web clients because it has been declared as a Unix workstation - so it can be run by other systems such as the X-Window system. This model is also advantageous because there is already a clear demarcation of tasks between the client and the server. The relationship system between the client-server version of the Web is easier to develop information; because the information distributed by the server has been separated from the server, meaning that the server does not need to develop another platform in specific hardware. Because, all the adjustments needed for the user's computer have been written in the client software for that platform. An analogy for the client-server model can be seen in the television broadcast system. Customers (clients) can buy any type of television set to watch broadcasts from over-the-air broadcast towers (servers). Does the user (client) have a 'wristband' TV or a TV projection screen, or a device that receives information from broadcast stations in a standard format and displays it in a way that suits the user's TV device. This means that TV programming does not need to create, for example, screen sizes for each type of TV set. From the description above, it can be concluded that the client-server relationship model is a key characteristic of the internet communication scheme that occurs between various applications.

Communication, Mediation and Integration: We have already seen the important meaning of 'internet' and 'computer', but CMC work is not only based on 'those two things'. It must involve communication, mediation, and (which) is integrated.

Communication: Basically, internet-based communication is human communication through the internet computer network, so that every definition of internet communication that is needed involves defining human communication itself. Human communication can be characterized as a process in which people exchange symbols (Littlejohn, 1989). The process of exchanging symbols occurs in the context of internet communication with the characteristics of mediation as described above, following the client-server model for information exchange and the TCP/IP protocol suite for data exchange. The content of internet communication, however, is more complex to explain, but can often be learned. Internet content can be encoded and decoded using a variety of media (text, graphics, sound, video, or other executable files). Because of its mediated nature, Internet communication often leaves visible artifacts that can be collected for study. For example, Usenet discussion groups produce a set of articles that can be examined and analyzed. Similarly, real-time discourse among a group of participants, as in the MU* system, can be recorded in transcripts. Other Internet communication artifacts include Web pages, files on Gopher sites, and transcripts of Listserv discussion lists. Likewise, the symbols that are important to researchers will vary. The interpretation of these artifacts depends on the purpose of the research. For example, Internet communication using real-time audio-video conferencing might occur with an application called CU-See Me. This application allows participants to send images and sounds, thereby displaying many nonverbal and paralinguistic cues that are absent in much text-based Internet communication. Thus, Internet communication represents a wide range of symbol-making possibilities, as some symbols may be similar to those examined in unmediated human communication.

Mediation: In Internet communication, mediation literally involves placing messages into a medium, or encoding messages into electronic, magnetic, or optical patterns that are easy to store and send. The messages are transmitted according to the rules of the client-server application and the TCP/IP protocol suite as described above. This Internet-mediated message delivery can have various mediation characteristics, such as time, distribution, and media type. Regarding time, for example, there can be variations, namely time delays or real time between sending and receiving messages. Examples of time delays (sometimes instantaneous) occur in certain applications, where users take part in text exchanges. Internet applications that allow users to engage in this kind of communication occur in mass and group communication systems, such as Internet Relay Chat (IRC), and Multiple User Dialogue/ Dimension/ Dungeon (MUDs) or their variants (known as MU* systems). In information retrieval systems, communications can be persistent, that is, they can be on a server for retrieval on demand, such as hypertext files on a Web server, information on a Gopher server, or files available from an FTP server.

A message on the Internet can be distributed from sender to recipient according to various schemes, namely:

1) Point to point: a single user sends a message to a single recipient (e.g., electronic mail).
2) Point to multipoint: a single user sends a message to a specified number of recipients (e.g., an electronic mailing list)

or an application that sends messages to many recipients (e.g., the Listserv or Majordomo programs).
3) Point to server broadcast: a user sends a message to a server. This server then makes this message available to any user with appropriate client software. With near real-time response, this distribution scheme is used to propagate IRC communications. Alternately, a server can broadcast an incoming message to one or more other servers in a message propagation scheme. This server-to-server distribution scheme is used to propagate Usenet news.
4) Point to server narrowcast: a user sends a message to a server. This server then makes this message available only to a select group of users who employ clients that are directly connected to that server. In addition, these users may have to identify themselves with a login and password. For example, a MU* system requires a password and ID for access to the communication system. Typically, only MU* participants can observe the activity on a particular MU* server.
5) Broadcast servers: servers contain stored information that is available to any user with an appropriate client. This information is broadcast in the sense that the server provides this information to any requesting client. Users can observe this information anonymously. This information is often created by the organization or individual that owns the server. A Web site is an example of this form of distribution.
6) Narrowcast servers: servers provide information only to a select group of authorized users. Users typically provide authentication information through their clients for access to the information on the server.

It can be said that, Internet applications display information in various types of media, including text, sound, graphics, images, video, or binary (executable) files. The Multipurpose Internet Mail Extensions (MIME) specification defines the types of multimedia commonly used in Internet communications. Text that uses an associative linking system is called hypertext. Hypertext that uses multimedia is called hypermedia. Note that other media may exhibit similar characteristics. For example, a radio broadcast is available in real time to anyone with an appropriate client (radio receiver) within range of the broadcast station. A person who calls into a radio program with his or her voice as part of the program is using a form of broadcast point-to-server distribution. The characteristics mentioned here for time, distribution, and media, typify the mediation process in Internet communication content. The range of characteristics outlined above highlights the variety of possibilities for Internet communication involving variations in time, distribution schemes, and media types. A researcher must be able to identify each of these characteristics for the particular form of Internet communication being studied.

Integration: The discussion above outlines the boundaries of the definition of Internet-based computer-mediated communication. Using this definition, we can identify what is not Internet communication (e.g., electronic mail exchanged between users of a commercial on-line service such as America Online) as well as what is Internet communication (e.g., users communicating via text exchange at Diversity University's MU*).

Examples of Internet Communication: People use Internet communication for a variety of purposes. I identify some of these primary purposes with the broad categories of communication, interaction, and information. These categories are not mutually exclusive: a person can participate in Internet communication for any combination of communication, information, and interaction at the same time.

1) Communication: people use the Internet for communication in one-to-one, one-to-many, or many-to-many settings. This communication can be used for scholarly and research activities or for personal and group communication and discussion. Examples include Usenet, electronic mail, and Listserv.
2) Interaction: people can use the Internet for play or learning purposes, not just for information transfer or discussion. Interaction spaces are often used for social activities and for group interaction and education. Examples include MU*s and IRC.
3) Information: people use the Internet for the dissemination and retrieval of information. This information relates to subject matter that encompasses a wide range of human activities and knowledge. Examples include the World Wide Web, Gopher, and FTP.

So the first step in characterizing the unit of analysis for internet communication research is to define what internet communication is and show how this definition encompasses the various purposes of human communication, interaction, and information. In the following sections, we both use and expand the terms of the computer-based and/or internet-based communication definitions to describe more specific units of analysis.

What is Computer Mediated Communication?

Do We Still Need to Define CMC?

I am not quoting the definition of CMC. Why? With the increasing development of communication technology that affects the work of CMC, I only present the "meaning of the definition of CMC". That is if there is a definition of CMC. I quote in full the writing of Mike Z Yao, Rich Ling (2020) "What Is Computer-Mediated Communication? - An Introduction to the Special Issue". In my opinion, this writing invites us all to think about what we are experiencing with CMC. Then, how should we change our way of thinking, beyond what is currently available with CMC, especially human communication in the future (Mike's last thought I quoted at the end of this writing).

According to Mike (2020) …. at a time when almost any social activity can be, and likely is, mediated in some way by some form of computing technology, what should be the focus of CMC research? How do we theorize and study computer-mediated (or should we say digitally mediated) communication when our research topics—the technologies, concepts and processes of mediation, our understanding of what constitutes communication, and the theories and methods used to examine these—are all in flux?

In early spring 2018, the Journal of Computer-Mediated Communication invited scholars to submit ideas for a special issue to consider these questions. The collection of meta-theoretical discussions, literature reviews/analyses, and conceptual explanations included in this special issue will point the general direction and offer a launching point for systematic theory construction and research in this evolving field. The tensions between technological developments and associated social processes raise questions about how we should understand, theorize, and study technology, mediation, and communication.

In the quarter-century since the inception of the Journal of Computer-Mediated Communication, a central question for this field has shifted from "what is computer-mediated communication?" for "what's not?" In 1994, personal computers were bulky, desktop-top, and therefore stationary terminals. The Internet was just beginning to be purchased by certain segments of society. Text-based Usenet and Internet Relay Chat (IRC) were common platforms. Email (or electronic mail) was considered the cutting edge of communication. Online social networking sites were still in the distant future, and short message service (SMS) was just making its debut as a form of digitally mediated interpersonal communication. At the time of this writing (2019), among the 7.7 billion people on the planet, there are 4.33 billion active internet users (Statista, 2019), 5.14 billion connected via mobile devices using over 9 billion subscriptions (GSMA Intelligence, 2019), and 3.5 billion active social media users (Hootsuite, 2019). American adults spend over 11 hours a day interacting with various (computerized) media (Nielsen, 2019). In

short, the technical landscape has changed dramatically. Nowadays, almost all social activities can, and most likely will, be mediated in some way.

Meaning of CMC Definition

- *First,* Santoro (1995), stated: "at the broadest level, CMC can encompass almost any use of computers... (including) applications as diverse as statistical analysis programs, remote sensing systems, and financial modeling programs, all of which fit the concept. Human communication".
- *Second,* Pixy Ferris (1997) stated that computer-mediated communication (CMC) is a relatively new field of study, but as computers have become an integral part of society, spanning education, industry and government, the field has grown significantly. Lower costs and easier access to computer technology have increased the number of users. This in turn has been accompanied by the rapid growth of scientific studies of CMC.
- *Third,* according to Baron (2003), computer-mediated communication can be defined as "any natural language message sent and/or received via a computer connection". However, this definition does not exclude other forms of written/oral messages such as short text messages (SMS) or communication via webcam.
- *Fourth,* CMC is defined as human communication that occurs through the use of two or more electronic devices. While the term CMC traditionally refers to communication that occurs through computer-mediated formats (e.g., instant messaging, e-mail, chat rooms, online forums, social networking services), it has also been applied to other forms of text-based interaction such as text messaging (Mc. Quail, 2005). Research on CMC has largely focused on the social effects of various computer-supported communication technologies. Much recent research has involved Internet-based social networks supported by social software (Thurlow, 2004).
- *Fifth*, social science and humanities researchers have examined CMC environments as information spaces (Walker, 2006) and have studied the specific technologies that enable this form of communication (Schrecker, 2007). CMC is understood as a means for the dissemination of information (Porta & Diani, 1999), through which people seek and exchange information (Westerman, 2008) and influence opinions (Blasio & Milani, 2008). It is also how we get work done, conduct business, and entertain ourselves. Through applications such as e-mail, online collaborative learning/education recordings, blogs, podcasts, and YouTube—all asynchronous communication vehicles—people post textual and sometimes audiovisual information that can be accessed by others with an Internet connection.
- *Sixth*, CMC is an interactive medium (technology) for enhancing the way interactivity occurs, channeling communication from the point-to-point exchanges seen in face-to-face interpersonal communication, to networks whose interactions are supported by the structured nature of technology (Holmes, 2009). Technology has provided a new medium through which people can co-construct their social realities across traditional geographic and temporal barriers.
- *Seventh*, communication (CMC) is the process by which human data interaction occurs over one or more telecommunications network systems. CMC interactions occur over a variety of technology networks and software, including e-mail, Internet Relay Chat (IRC), instant messaging (IM, Usenet, and mailing list servers). CMC technologies save time and money in IT (information technology) organizations by facilitating the use of all communication formats (Sobel-Lojeski, 2016).
- *Eighth*, Marisa C. Garcia Rodriguez, in 'Emotions, Technology and Health' (2016) understands CMC focusing on the role of interactivity between parties through mediated communication channels (Rafaeli, 1988). CMC focuses on the relationship of new messages to previous messages, not on the number, content, frequency, or time of message exchange. Interactivity is present in both face-to-face and mediated communication and focuses on responsiveness between conversation partners. Interactivity provides acceptance, satisfaction, and generates attention, sociability, and full attention (Rafaeli, 1988).
- *Ninth*, the working definition of computer-mediated communication is "communication between parties separated in space and/or time, mediated by interconnected computers." Computer networks act as a communication medium as if it were a printed book containing text and graphics or a video broadcasting system. However, computers bring certain characteristics to the communication process that are not offered by most previously available communication media (Martin-Rubió, 2018).
- *Tenth.* Communication is a tool to process the exchange of information or express the thoughts and feelings of users. It has many formats, such as interpersonal communication, organizational communication, oral communication, small group communication, intercultural communication etc.

CONCLUSION

Computer-mediated communication is a system consisting of humans and computers. This is certainly not some rigid facility. Human participation must be taken into account because it has made CMC a creator, user, ameliorator, moreover this is the core of the computer-mediated communication system. That is, without humans, the CMC system will only have cold equipment. The combination of humans and computers, that is what is able to build a network, forming a complex information transmission system that aims to exchange and share information freely. There are some general characteristics of information systems in computer-mediated communication systems, along with some specific characteristics of human social systems. This is a matter worth studying. There are at least two caveats to the transformative effects of communication technology that are worth considering.

- First, the working definition of computer-mediated communication is "communication between parties separated in space and/or time, mediated by interconnected computers." Computer networks act as a communication medium only as if it were a printed book containing text and graphics or a video broadcasting system. However, computers bring certain characteristics to the communication process that most previously available communication media do not offer.
- Second, from a theoretical perspective, the strong effects perspective of communication technologies has dominated communication science research. There has been a tendency, especially in the early stages of theory following the diffusion of new technologies, to over-attribute effects to the technology and underestimate effects to the individual and social context. For example, early research tended to view mass communication messages as "magic bullets" that unidirectionally produce strong effects of persuasion. This paradigm gave way to a more moderate, interactionist paradigm that recognizes the importance of social and contextual forces in both tempering and accelerating the effects of mass communication. This interactionist paradigm is more fully reflected in current trends in CMC research (Hardy & Scheufele, 2005), although some scholars anticipate that the strong effects approach will again dominate media effects research (Herring, 2004).
- Third. A second caveat to the strong effects model of communication technologies is that the complexity of technology and human relationships tends to require some degree of background review (Herring, 2004). Such warnings now frame scholarly understanding of the Internet and its associated technological enablers (e.g., the World Wide Web, chat rooms, MUDs (Metropolitan Utilities Districts), MOOs, blogging, instant messaging, videoconferencing, etc.). Collectively, these various uses of CMC have had a

transformative effect on human relationships, but a full appreciation of the complexity of these effects remains elusive.

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