Computer–Mediated Communication

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INTRODUCTION

The development of new communication technologies has opened a broad range of options for promoting learning, of which a significant one is CMC—computer-mediated communication. CMC refers to communication that utilizes a combination of telecommunication technologies and computer networks, and enables users to transmit, store, and receive information using synchronous and asynchronous tools.

The potential of CMC as a teaching and learning medium has been much examined and discussed, and it is widely agreed that CMC improves the effectiveness of distance learning by providing a shared environment that incorporates flexible learning and collaborative group learning. CMC enables geographically dispersed students to communicate with their peers and instructors, and provides opportunities for more active learning.

This article outlines the various CMC technologies, their implementation in distance learning, and the accumulated experience gained by the Open University of Israel in implementing CMC.

INTRODUCTION

Computer-mediated communication is a combination of telecommunication technologies and computer networks (Berge & Collins, 1995; Ryan, Scott, Freeman, & Patel, 2000) that enables users to transmit, store, and receive information (December, 1996; Jonassen, Davidson, Collins, Campbell, & Haag, 1995) via synchronous and asynchronous communication tools (Ryan et al.).

The development of new communication technologies has opened a broad range of options for promoting learning using CMC. CMC offers new approaches to extending the interactive aspects of teaching and learning with the opportunity to exchange ideas, unrestricted by classroom space and time. CMC has provided a valuable addition to interactivity and interactions in the process of teaching and learning in allowing collaboration and interaction between students and instructors (Muirhead & Juwah, 2004). While traditional distance education (DE) was based mainly on individual learning models, CMC and its emerging technologies have opened opportunities for group learning models, leading to significant changes in DE methods of study. The learner-to-learner dialog, within and between groups, makes it possible for distance learners to share in the construction of knowledge (Moore, 1993). CMC has been enthusiastically received by those involved in DE.

Models of DE have been characterized according to technological developments. Taylor (2001) characterizes the development of DE according to the generational model that parallels developments in technology. First-generation DE refers to purely print-based correspondence study. The second generation was an integration of print materials with broadcast TV, radio, and audio and videocassettes. Third-generation DE parallels the invention of hypertext and the rise in the use of teleconferencing. The fourth generation is characterized by flexible learning through Internet-accessible courses, and the fifth generation—what could be called "postmodern CMC"—is characterized by online interactive multimedia and Internet-based access to WWW (World Wide Web) resources. This development represents a move away from directed, noninteractive courses to courses with greater flexibility in learning, group-oriented processes, and a high degree of two-way communication.

SYNCHRONOUS VS. ASYNCHRONOUS CMC

CMC includes various kinds of communication, synchronous and asynchronous, in which the computer mediates part, or all, of the communication. Syn-

chronous communication occurs in real time. For two or more persons to communicate synchronously, they need to be available at the same time (as in a telephone system). Synchronous communication utilizes such tools as chats and videoconferencing.

In asynchronous communication, on the other hand, communication does not occur in real time and thus the interaction is more flexible. There can be a delay between sending information and retrieving it. Responses to messages may be delayed, with each message waiting until the recipient is ready to read and/or reply. Asynchronous communication utilizes such tools as e-mail and discussion groups. The key advantage of CMC in DE lies in the asynchronous possibilities of rapid communication.

Synchronous and asynchronous communication through CMC tools may enable various kinds of interactions: one-alone, one-to-one, one-to-many, or many-to-many interactions.

- **One-alone:** One-alone communication is learner-content communication. It can be asynchronous communication between an individual and a noninteractive online resource like a database, a library, or a journal; or synchronous communication between an individual and an online interactive resource, like a self-test providing immediate feedback or interactive courseware. Online resources can provide the learner with the means to access information flexibly and individually (Lin & Hsieh, 2001). Calverley and Shephard (2003) discuss the importance of good online resources and ways to improve the uptake of these resources to support learning. Other researchers relate to the potential of online resources and to the reusability of online learning objects (e.g., Anido, Fernández, Caeiro, Santos, Rodríguez, & Llamas, 2002; McDowell, 2002).

- **One-to-one:** One-to-one communication can be either learner-instructor or learner-learner communication. The most widely used form of asynchronous one-to-one communication is e-mail. The infrastructure requirements for e-mail are minimal, making it the most available of all CMC tools. A message is sent by the originator to be picked up by its intended recipient. The message can be read and responded to at the convenience of the receiver, and re-

sponses can be prioritized with due consideration given to the content and its importance. The messages can include attachments of various kinds of files—text files as well as sound and image files that enhance the context of the written communication. In the teaching-learning process, e-mail enables personal interaction between the instructor and the students. Teachers can easily incorporate e-mail into the learning process, thus enhancing instruction (Yu & Yu, 2002). Synchronous one-to-one communication in its most widely used form is chat, in which two persons exchange messages in real time.

- **One-to-many:** One-to-many communication is mainly between the instructor and a group of learners. Asynchronous one-to-one e-mail communication may be extended to one-to-many communication through the use of a distribution list, thus making the target recipient not one learner, but a named list of learners. Another example of asynchronous one-to-many communication is the notice board (or message board) in which a board coordinator, usually the instructor, posts messages (notices) on the board and all students can read them. Synchronous one-to-many communication is most frequently a lesson broadcast to remote classrooms via broad-band communication.

- **Many-to-many:** Many-to-many communication takes place among groups. The classic CMC form of asynchronous many-to-many communication is the discussion group or forum. In the discussion group, members of the group can post messages and all group members can read them. Each member can then post a reply to the message. Subsequent readers can reply to the original message or to the replies, and so on. The original message from which subsequent reply messages branch off is referred to as the "root" of the discussion. The subsequent sequence of replies to the original message is referred to as the "thread" of the discussion. Discussion groups generally are used as a locus for social interaction between learners and instructors, learners and their peers, and as a platform for cognitive discourse between course participants relating to course content (Garrison, Anderson, & Archer, 2001).

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