

Teams and Electronic Technologies

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INTRODUCTION AND BACKGROUND

Teams¹ are integral elements in today's corporate and industrial worlds, considered by some to be the fundamental units of organizations, and technology has become essential to teamwork. Just as it is nearly impossible to engage in any type of organizational task without team support today, it is equally impossible to engage in effective teamwork without technological support. Technology, particularly computer and digital technology, has become essential to the functioning of both traditional teams (face-to-face) and virtual (distributed or geographically separated) teams. Technology and virtuality arguably change work groups in three important ways: they introduce new dimensions of communication among members by breaking down traditional barriers of space and time; they modify traditional group processes; and they enormously enhance the group's capacity to access, share, manipulate, retrieve, and store information.

There are inherent advantages of technology for teams. For example, technology frees team members from geographical constraints. People no longer must work in the same physical location to work together; participants can contribute from any part of the world, at any time of the day or night. By breaking down the barriers of space and time, technology enables teams to fully utilize the expertise of the members of an organization (or of several organizations) without pulling them from other projects or incurring relocation expenses. Hence, at least notionally, such teams have immense potential for improving organizational effectiveness.

Although there is a substantial amount of research on teams and technology, the focus on the technologies available to team members has hitherto remained the domain of Information Technology. This article takes an interpersonal focus to consider the software and communication technologies that allow individuals and teams to communicate, exchange information, interact collaboratively, and manage data within and outside of a group, synchronously and asynchronously. The technological support systems discussed here cover a wide range of technological applications, primarily, but not limited to, computer, audio-visual, and phone applica-

tions. To organize our discussion, we will use the classification scheme of messaging and conferencing systems (e.g., e-mail, discussion lists, electronic bulletin boards, Web logs and short message services), information-exchange and data-management systems (e.g., Internet, File Transfer Protocol, Gopher, Telnet, the World Wide Web, and Internet alternatives), and commercial groupware packages. Note that as our focus is on the team member as end-user rather than on the hardware, installation, programming, and setup as considerations of hardware and programming will not be discussed².

MESSAGING SYSTEMS

Messaging systems enable and facilitate communication among team members, which can be one-to-one, one-to-many, and synchronous or asynchronous. The earliest methods using computers and the Internet were largely asynchronous, with limited synchronous communication. The advent of the World Wide Web and wireless technology have increasingly allowed people to use messaging systems to communicate in real time. In this section, we will consider asynchronous messaging (e.g., e-mail, discussion lists, bulletin and message boards, Web logs, and short message service [SMS]), synchronous messaging (e.g., chat and instantaneous interactive messaging), and conferencing.

ASYNCHRONOUS COMPUTER MESSAGING SYSTEMS: FROM E-MAIL TO SMS

E-mail is the simplest form of messaging, with information-management features that allow for easy storage and retrieval, as well as easy editing, replying, and attaching. Perhaps because e-mail is transparent, it is the primary means of communication in organizations today (Barnes, 2003). Wireless access to the Internet, through personal digital assistants and cell phones, frees users from the constraints of a networked computer.

Evolutions in technology increasingly facilitate vocal and visual features for e-mail. Verbal elements require software and a microphone, and visual add-ons utilize Web cameras. The advent of cheaper technology and freeware may see catalyzed change in traditional text-based e-mail. For example, video software like CyberLink's VideoLive Mail (www.cyberlink-usa.com/), Cornell University's CU-See Me (www.cuworld.com/) is inexpensive, and Talk99 from MediaRing.com (<http://www.mediaring.com>) is a freeware telephony program melding voicemail and e-mail.

Electronic bulletin boards or BBSs are "worldwide, posted public messages on a wide variety of subjects" (Lamb, 1999, p.23), posted by individuals and read by groups. BBSs provide connected or disconnected individuals with a means of sharing knowledge and information, and help close the distance and isolation gap between individuals. Team members can utilize BBSs through links to their personal Web pages or through free task-focused BBSs like InsidetheWeb (<http://www.insidetheweb.com>) or NgBook (www.bigfoot.com/~huangng).

Discussion Lists provide an asynchronous communication medium with some similarities to BBS and e-mail. While listservs and newsgroups are rarely a primary means of communication for teams, moderated listservs can be useful for threaded discussion. Discussion lists can be set up through any networked computer system.

A final asynchronous messaging system is Web logs or blogs, Web-based individually maintained journaling sites. Like other technological innovations, Web logs have integrated themselves into the corporate world. Business software like Manilla (<http://manila.userland.com>) and Traction (<http://www.tractionsoftware.com>) allows corporate intranet teams to converse with each other and serves as a "community-building and coordinating tool" (Herman, 2003). Business blogs also allow for instantaneous communication between team members, tracking of team communication and decision-making, and communication with clients and other business partners; they serve as informational references for team members and clients to consult (Herman, 2003).

SMS is a growing phenomenon in the United States and Canada. SMS allows individuals to exchange short (less than 160 characters) wireless text messages with one to several recipients (Devi, 2003). At five to 20 cents per message, SMS messages are typically cheaper than voicemail messages (*Computer Weekly*, 2003), with limited character length allowing for straight-to-the-point messages and discouraging superfluous text (Yap, 2003). SMS is growing in popularity in the business sector for its many benefits to teams, such as global applications like general staff and other internal communication, specific

applications like reminders of, or changes, in meeting times, or quick answers to questions (Mills, 2003).

SYNCHRONOUS MESSAGING SYSTEMS: FROM IM TO CHAT

Synchronous interactive communication programs (SCs) are available in many different computer platforms—UNIX platforms "Talk" and "nTalk," BM VM/CMS systems "Tell," VAX systems "Send," and the popular America Online software "Instant Messenger" or "IM." All these systems allow for real-time communication among communicators, and, to facilitate use, most systems allow participants to check whether others are logged on at the same time, employing user IDs or preestablished lists. Since its adoption by such subscription services as America Online, Yahoo, and MSN, synchronous communication using freeware has achieved great popularity and expanded into use in business and industry. In fact, 42% of business Internet users report use of IM in the workplace, even though 70% of IT departments don't support it (Schwartz, 2002); it is predicted to rise from 5.5 million users in 2000 to 180 million in 2004 (Schwartz, 2002). A number of SC software programs exist for business use: Lotus' Sametime (used by the U.S. Navy), QuickConference (<http://www.quickconference.com>), and Ikimbo's Omniprise (<http://www.ikimbo.com>).

A sophisticated software protocol that enables participants to interact virtually is Chat. Internet Relay Chat (IRC) is Internet-based network that enables multiple communicators to synchronously interact in an online environment. IRC is easily undertaken by connecting to a server on the IRC network. While IRC can be a convenient and powerful virtual meeting tool, it is a public forum and can lead to lack of privacy. This issue can be circumvented by using cyber-meeting places on commercial networks, proprietary groupware and course management software, or by using chat rooms designed specifically for business and industry such as Webtrain (<http://www.webtrain.com>), Magma Communication's Chat Server (<http://www1.magma.ca>), ParaChat (<http://www.parachat.com>), Volano Chat (<http://www.volano.com>), and Divine's eShare Expressions (<http://www.divine.com>).

SYNCHRONOUS CONFERENCING SYSTEMS

Conferencing systems are more specifically designed to facilitate synchronous virtual meetings than Chat or IM. While many corporate and higher education facilities

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