Chapter 4

Work Group Computing

Learning Objectives

Upon completing this chapter, you should be able to:

- Summarize the growing impetus for groupware development.
- Match specific categories of groupware tools with group communications and decision-making tasks.
- Point out how e-mail technologies have become foundations for the development of other groupware tools.

- Explain how the effective implementation of groupware requires both technology training and organizational culture changes.
- Identify the hardware and software required for desktop video conferencing systems.
- Appraise the potential for the growth of group support systems.
- Differentiate the functionality of distance learning technologies from more generic conferencing tools.
- Give examples of how software agents could assist in group communications and decision making.
- Describe the functionality of virtual office software.

4.1 INTRODUCTION

Words such as *downsizing* (or its more positive corollary, *rightsizing), outsourcing, reengineering, empowerment,* and *quality assurance* are on the lips of everyone in large organizations today. Such words have crept into common use as organizations attempt to become meaner and leaner—as they attempt to do more with less. Technologies were not the cause for the crises that spawned such measures; however, technology definitely can play a new role to facilitate the flat organizational structure that is increasingly the norm in business. Technology *is* the catalyst for the virtual workplace. Today's anywhere, anytime, anyplace work environment is made possible by a wide range of increasingly sophisticated communications and decision support technologies referred to as groupware.

This chapter gives an overview of the promises and challenges related to effective groupware choices and implementation. Groupware has been described as a useful infrastructure to support teams, departments, and organizations) First, groupware tools are overviewed, and then a discussion of how these tools are enabling virtual work and challenging virtual workers and their managers is discussed.

4.2 GROUP COLLABORATION AND ITS IMPACT

In his classic *Harvard Business Review* article "The Coming of the New Organization," Peter F. Drucker predicted that by the year 2008, large businesses would have fewer than half the levels of management of their counterparts in 1988, and no more than a third the managers.[2] Drucker explained that such a structure would he possible because organizations would become information based. This flat organization would be "composed largely of specialists who direct and discipline their own performance through organized feedback from colleagues, customers, and headquarters."[3] Drucker was, indeed, ahead of his time, and his predictions have come to pass sooner than he thought.

Today's organization, based on information sharing, needs software tools to help groups, which may or may not be in the same location, solve problems and make decisions. These groups or teams *(teams* are defined here as "groups with a purpose") are often ad hoc rather than standing (e.g., individuals will work together to achieve a specific goal and once that goal is met, the ad hoc team dissolves). Thus, the role of the individual

changes from that of solely a subject-matter expert to that of a team member. Companies already are restructuring their management compensation systems to reflect rewards for what a person knows and for team, not individual, performance.[4]

Team performance mandates shared information. If! have a dollar and give it to you, then you have the dollar and I don't. However, if I have information and give it to you, then we both have the information. This sharing of information will become more and more vital, assigning the computer the role of coordination and communication over and above the traditional roles it plays in transaction processing or decision support.

4.3 GROUP TECHNOLOGIES

This section is an overview of groupware products to support this flattened, team-based organization. As more employees become involved in teams, the need for tools that support group processes is increasing. Such technologies are referred to generically as groupware, with emphasis on *group* because the human side is always more important than the *ware*.[5] Groupware tools go by a variety of names, including group support systems (GSS), group decision support systems (GDSS), computer support for collaborative work (CSCW), electronic meeting systems (EMS), collaborative technologies, or simply team ware. "Groupware has been hailed as the hallmark of an empowering organization, as it goes beyond the scope of traditional e-mail systems to allow people to collaborate electronically, fostering creativity and teamwork in the process."[6]

Groupware technologies are expanding in functionality, and the number of vendors that are producing these technologies is expanding by leaps and bounds. Most development efforts are being driven by the Internet. The Internet is a technical environment that is enabling many new applications because it allows the user to gain access to applications with any computer that has a Web browser and a user with a password. Few compatibility issues exist. The Web also has resulted in groupware systems that are easy to use, more visual, and inexpensive. Market researchers have predicted that software developers will have revenues of $2.6 billion by 2OO3~ in groupware products alone.

Although it is difficult to put these versatile tools into categories, groupware products can be organized by their complexity and the length of time they have been on the market. Level 1 groupware products support communications. Level 2 systems include software tools with statistical features designed to help groups solve complex, unstructured problems. Level 3 systems, in various stages of development, are behind-the-scenes software agents that can operate to keep projects on track as a virtual team member or serve to facilitate information-gathering needs of group members. Figure 4-1, The Time/Place Dimensions of Groupware, depicts e-mail as the enabler, or hub, of group technologies that support same time (synchronous) and different time (asynchronous) communications from different places, and the Internet as the increasingly empowering environment for the delivery of all such services.

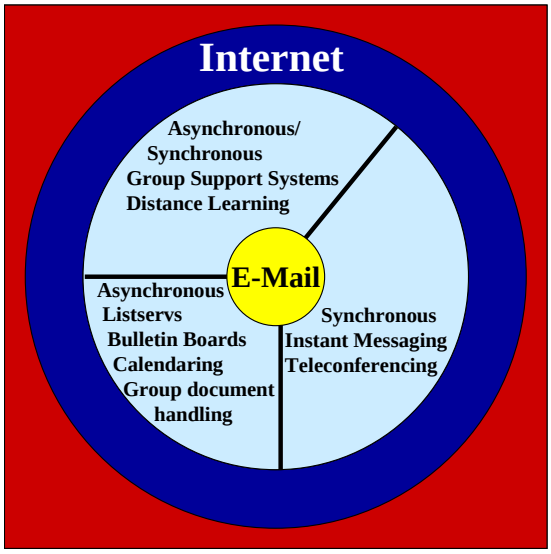


Figure 4-1 The time/place dimension of groupware

4.3.1 Level 1 Groupware Products: Supporting Asynchronous Communications

The simplest and most prevalent of groupware products are those that support group communications. Asynchronous products in Level I groupware include e-mail, listservs, calendaring, group document handling, an4 virtual office software.

4.3.1.1 E-mail

Full-service electronic mail (e-mail) systems send messages or documents from location to location without the need for physical transfer of paper. Almost overnight, e-mail has become the preferred communication medium of millions of users. In addition to short text messages, full-service systems allow users to send and receive full-page memos, letters, and reports and access other documents such as mailing lists, directories, and bulletin boards. Although e-mail systems are considered one-to-one communication, messages can be sent to multiple recipients simultaneously and documents can be annotated and forwarded. Moreover, the Internet is transforming e-mail systems from an era of closed, proprietary systems that work only at one location to systems that provide anytime, anywhere access to messages.

Eudora	Qualcomm Inc.	qualcomm.com
Imail	Ipswitch, Inc.	ipswitch.com
CommuniGate	Stalker Software	stalker.com
N-Plex Globa	Isocor, Inc.	isocor.com
Outlook	Microsoft Corp.	microsoft.com

Figure 4-2 A sampling of e-mail products

By themselves, electronic mail systems move mail messages or documents among users. To be the foundation for groupware products, however, additional features are needed such as application development tools and hooks to end-user applications. A growing number of vendors are attempting to deliver these enhancements and position their products as the foundation for groupware products. These features include e-mail across the Web, fax or paging gateways, mail lists, aliases, e-mail forwarding, and auto reply features such as vacation notices. Sophisticated systems also are capable of spam filtering, archival/storage of old messages, and serving as hooks for antivirus software—checking messages and attachments for viruses. Simple Network Management Protocol (SNMP) can stop advertisers from overpowering the system. User accounting features can generate per-user reports based on message number and size of messages transmitted or received, or on the amount of disk space used. Figure 4-2 is a listing of popular e-mail products and their vendors.

IT managers are concerned about a wide range of issues relative to the effectiveness and efficiency of their e-mail systems. In addition to ensuring that the system is operable at all times, issues related to data security and privacy are uppermost in IT managers' concerns. Moreover, policies that attempt to lessen its misuse are increasingly the norm in organizations. Policy statements, for example, may require users to limit their use of the e-mail system for personal use. Most organizations are clear that e-mail messages are subject to random monitoring. Use of e-mail systems has resulted in new vocabulary that describes technology features and issues (see Figure 4-3).

Other issues are poorly written messages. In fact, one organization found that almost 60 percent of its e-mail messages failed, as they did not include the right information for the user to act. In this same report, e-mail users cited issues related to misinformation, grammar, spelling, poorly constructed sentences,[8] and the proper etiquette for using e-mail

Spain	:	Unwanted, unsolicited e-mail
Alias	:	Shorthand for an individual's e-mail address; may also be an e-mail mailing list
E-mail filter	:	Software that scans a user's incoming e-mail and prioritizes messages based on user's preferences
Electronic arrow	:	Misdirected e-mail
Flaming	:	Term used to describe quick and angry e-mail

Figure 4-3 E-mail vocabulary

(see Figure 4-4). However, the biggest issue from the user's point of view may be how to respond to, file, store, and retrieve the thousands of e-mail messages received.

4.3.1.2 Listservs and Bulletin Boards

Although e-mail is typically one-to-one communication, *listservs* and *bulletin boards* are one-to-many communications. Because the capabilities of listservs and bulletin boards increasingly are being integrated into e-mail systems, their distinctions are blurring. However, listservs and bulletin boards traditionally have supported self-selected groups and have provided a means of message distribution. Most professional associations have

these services, which allow members to stay up to date on issues and announcements. Automated listservs, such as Lyris, provide easy-to-use, sophisticated communications capabilities such as conversation threading, file archiving, and search capabilities.

4.3.1.3 Calendaring

Initially, *calendaring* systems were considered tools for secretaries and administrative assistants to schedule meetings for others. It wasn't until users took control of the systems themselves that they began to gain in popularity.

Calendar management software can improve control of appointment scheduling and time management. Calendar entries, scheduled by date and time, may include locations, descriptions, and agenda items. Electronic appointment calendar systems can be synchronized with handheld personal organizers. Software can help the user schedule appointments, manage contacts (e.g., digitize information from business cards), make to-do lists, keep notes, and share calendars. Many products are internet based.

4.3.1.4 Group Document Handling

Document management refers to a systems approach to handling complex documents. It entails managing all steps in preparing and producing documents from their creation to subsequent editing, formatting, composition and makeup, printing and reproduction, distribution, presentation, and storage. The approach encompasses four elements:

1. Integrating the various activities that go into composing documents.
2. Reducing the number of steps required to produce complex documents.
3. Distributing the documents electronically.
4. Presenting documents in the most appropriate medium.

Group document handling systems enable users to communicate, create and share databases, and create and share documents. Lotus Notes was the pioneer product in this category and remains a popular choice. Notes, a customizable environment,

AVOID TYPING IN ALL CAPS CAPS (virtual shouting)
avoid typing in all lowercase (virtual whispering)
Address your recipient by name
Limit the number of issues/ideas per message
Use a descriptive subject line
Proofread messages before sending

Figure 4-4 E-mail etiquette

QuickPlace	LotusDevelopment Corp	lotus.com
Livelink	Open Text Corp	opentext.com
Teamspace	lnvolv Corp	involv.com
ActiveProject	Framework Technologies Corp.	frametech.com

Figure 4-5 Project management groupware products

acts as central access to both structured and unstructured data, and stores and manages documents. Lotus Notes R5 also includes integrated e-mail, calendaring, group scheduling, Web access, and information management. Lotus Notes Reporter is a read-only report writing and analysis tool offering drill-down to databases, allowing the user, for example, to see the detailed data underlying chart summaries. Another example is X-Collaboration.com, which lets users in emerging enterprises work together on projects and documents on the Web, facilitating data gathering and document assembly, organization, publishing, and archiving—in other words, enabling digital group document handling.

A more specialized application of group document management systems is project management. Project management software initially was limited to software that supported project planning and costing. However, the Web has spawned a number of products that go beyond, allowing groups to set up document libraries for nonspecialized, short-term projects and to support other aspects of their work, including document sharing and calendaring. Using a browser interface, teams can share documents, post graphics and photos, interact with others, and alert participants to changes. Web-based groupware can be an inexpensive alternative to Intranet groupware products. Figure 4-5 is a listing of project management groupware products.

4.3.1.5 Virtual Office Software

The virtual office is any location where a worker uses groupware technology to stay in touch with the office or clients. An independent agent for an insurance agency, for example, described his technology needs as a laptop; a four-in-one printer that prints, faxes, scans, and copies; and two phone lines.[9] Other support technologies could include a Personal Digital Assistant (PDA) for tracking clients and keeping a calendar. Cellular telephones also are considered must-have devices.

One way that small companies can support the groupware needs of their workforce is to subscribe to an Intranet or Internet service such as those listed in Figure 4-6. These (usually) Level 1 groupware services may be free when bundled

HotOffice™	Virtual Office Service	hotoffice.com
Instant TeamRoom	Lotus Development Corp	lotus.com
NetMeeting	Microsoft Corp.	microsoft.com
Virtual Office	Netopia, Inc	netopia.com
Innovative Network Integration	Ininet, Inc.	ininet.com

Figure 4-6 Virtual office products

with other software products or can be leased for a monthly fee. These products can be used to share and retrieve documents, send and receive e-mail, maintain threaded discussions, update calendars, host bulletin board discussions, hold online conferences, make travel arrangements, and the like. These inexpensive services are useful for organizations that want to avoid the costs associated with developing their own software and hardware and supporting IT personnel.

4.3.2 Level 1 Groupware Products: Supporting Synchronous Communications

Synchronous or real-time conferencing refers to those communications or decision-making meetings that connect group members at the same time. Real-time conferencing tools discussed here are instant messaging and chat sessions, and desktop video teleconferencing tools.

4.3.2.1 Instant Messaging and Chat Sessions

Instant messaging allows users to see who else is online. A user can send a message that instantly pops up on the addressee's screen, and two or more users can have an interactive discussion. Chat sessions allow (usually) larg~r groups to communicate either publicly or privately by typing to each other. However, some products in this category are blurring distinctions between instant messaging and chat sessions to include audio and video. For example, the instant meeting technology in Lotus's Sametime product builds on the product's existing real-time chat technology. Sametime lets users know when others in their group are online and instantly convenes an interactive data conference, complete with documents, spreadsheets, interactive presentations, and other applications. Vendors, such as those listed in Figure 4-7(a), also are creating audio and video add-on products to their instant messaging and chat tools. Figure 4-7(b) shows screen shots from Lotus's Sametime online meeting room. A discussion of desktop video conferencing systems appears later in this chapter.

Information technology managers tend to discount the value of instant messaging and chat systems, but end users are increasingly enamoured with them. IT managers, struggling with issues related to the working and security of their e-mail systems, often consider such tools as unnecessary as they say their existing e-mail and groupware systems work fine[10] However, user demand may force IT managers to support these products; in fact, it is anticipated that as instant messaging becomes more standardized, it will be part of every e-mail system.

Most instant messaging today is by typed conversations; in the very near future, instant messages may be real-time video, voice, or text. Moreover, users will be able to send "smart" messages that find the recipients wherever they may be and through whatever medium they may be using at the time—a desktop PC, a wireless phone, or a TV. "This vision will be enabled by the interoperability of Internet-based systems.

4.3.2.2 Desktop Videoconferencing

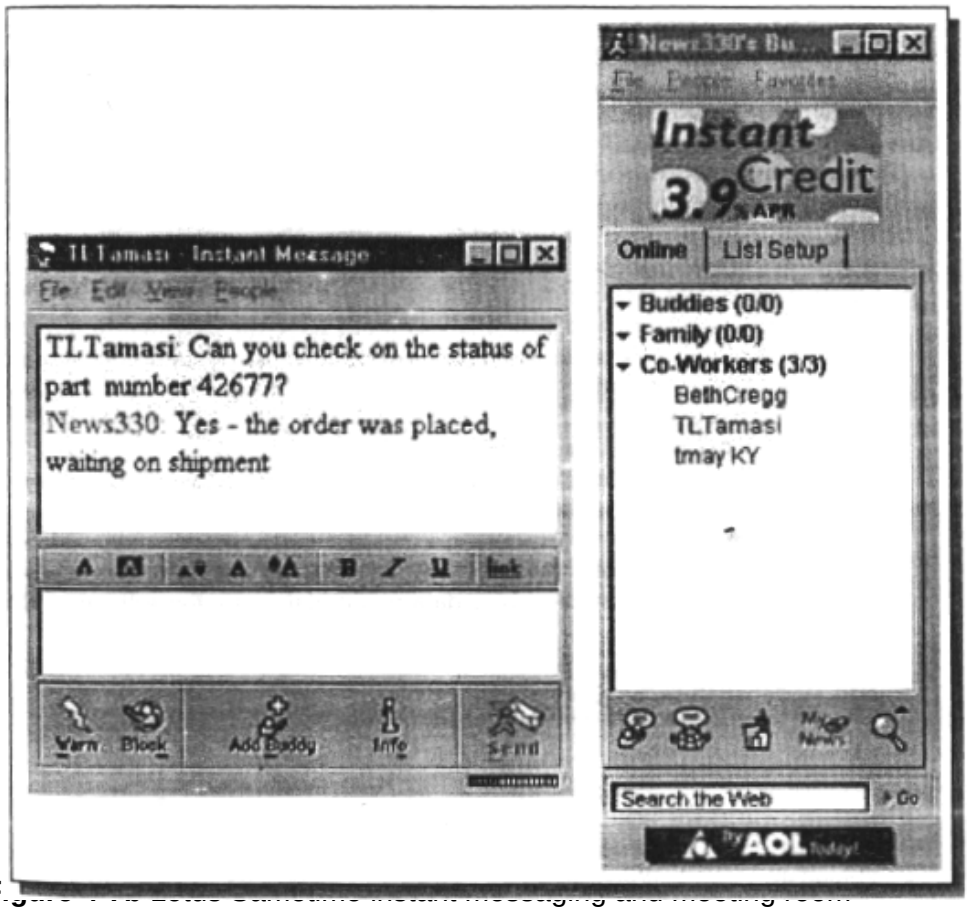
Videoconferencing originally was marketed as a means for lowering executive travel costs. Today, however, the conference's biggest selling point is the timeliness and convenience it offers: quick communication with little disruption in normal work patterns. Videoconferencing allows for facial expressions and body language, which is lost in text-based, audio-only, or chat conferencing.

Instant Messenger	America Online	aoLcom
Sametime	Lotus Development Corp.	lotus.com
NetMeeting	Microsoft Corp.	microsoft.com
CoolTalk	Netscape Communications Corp.	netscape.com
Netscape Conference	Netscape Communications Corp.	netscape.com

Figure 4-7a Instant messaging and chat tools

Room-sized videoconferencing systems were initially expensive and difficult to use. However, as costs come down and the need for one-to-many or many-to-many communications increases, users are finding room-sized conferencing systems, such as those offered by PictureTel, versatile and cost effective.

The discussion here centers on desktop videoconferencing Systems, which are incredibly inexpensive and simple. These systems support one-to-one and one-to-many communications. For one-to-one communications, the only technology required is a small camera that sits on top of the user's microcomputer, a microphone,



Source: Reproduced with permission from Lotus Development Corporation

and software to compress the audio and video files. The software allows the user to send and receive information that is stored on the computer. Because users are in their offices rather than a conference room, conferences can be set up quickly and conferees have instant access to everything on their computers.

The features of desktop videoconferencing systems are similar. Video quality depends on the bandwidth of the network at both ends of the connection. The quality of images when POTS (plain old telephone services) lines are used can be shaky, and because the audio and video often are not synchronized, an annoying, 1-second delay is the result. However, addressing bandwidth issues are Digital Subscriber Lines (DSL) that can push data more quickly over POTS lines and direct-broadcast satellite. Also addressing these issues are Internet2, a development effort funded

by the U.S. Government, a separate network offering data transfer rates 100 to 1,000 times faster than the Internet (see chapter 2). It is anticipated that once desktop systems are Internet-based, multimedia communications will be more standard. Figure 4-8 lists several popular desktop videoconferencing products.

4.3.3 Level 2 Groupware Products: Supporting Group Processes

Level 2 groupware products are software and hardware tools, that add value to the group communication process by adding functionality to the group's deliberations, whether the task at hand is a meeting or learning. Groupware products under two functional areas, electronic meeting management and distance learning, are discussed in this section.

4.3.3.1 Group Support Systems

Group support systems (GSS), often referred to as electronic meeting systems, are software tools that support group processes such as brainstorming, voting, consensus building, and group writing, adding functionality way beyond the communications supported by chat rooms or videoconferencing. Dissatisfaction with the inefficiencies and ineffectiveness of meetings is nothing new; see Figure 4-9. GSS, by adding structure and data analysis tools, have the potential to improve meeting quality and effectiveness. Figure 4-10 is a list of popular GSS systems, and Figure 4-11 is a listing of the tools of one groupware product, from groupsystems.com. Meetings can be same time/same place, same time/different place, or different time/different place.

When used in a same time/same place dimension, users sit at individual workstations that are linked to a file server via a local area network, and users supplement their verbal interaction by using the software tools. At his or her workstation, the user views work privately before sending ideas anonymously to the file server for display on a public screen and/or data manipulation by the software.[12] The same set of tools can support groups that are not meeting at the same time or in the same location.

Figure 4-8 Desktop videoconferencing products

CU-SeeMe	White Pine Software, Inc	wpine.com
NetMeeting	Microsoft Corp	microsoft.com
MeetingPomt	White Pine Software, Inc	wpine.com
PictureTel	PictureTel Corp	picturetel.com
PictureTalk	Pixion, Inc.	pixion.com

Figure 4-8 Desktop videoconferencing products

Nothing is ever accomplished by a committee unless it consists of three members, one of whom happens to be sick and another absent

Hendrick W. Van Loon, *Reader's Digest*, 1934

A committee is a cul-de-sac down which ideas are lured and then quietly strangled.

Sir Barnett Crocks, 1973

I love meetings. NOT

Professor Mary Driscoll, 1992, after seeing the movie *Wayne's World*

Figure 4-9 Perceptions of meetings

GroupSystems	groupsystems.com	ventana.com
Council Services	CoVision	covision.com
Facilitate	Fadilitate.com, Inc	facilitate.com
Meeting Works	Meetingworks.com, Inc	entsol.com

Figure 4-10 Group support systems products and vendors

GroupSystems is a suite of team-based decision software tools with the power and vanety to help groups reach decisions. The suite consists of the following tools:

Standard Tools

The Standard Tools support business needs such as strategic planning, activity-based costing, business-process reengineering, innovative problem solving, product definition, knowledge management, and many more. To support these needs, the Standard Tools use group processes such as brainstorming, list building, information gathering, voting, organizing, prioritizing, and consensus building,

Survey

Survey expands the horizons of online surveys. Use Survey for face-to-face or distributed groups across local area networks, e-mail, the Internet, or your company's Intranet—and then collect and analyze results with push-button ease..

Alternative Analysis

Alternative Analysis allows your group to explore the strengths and weaknesses of strategic plans, select candidates, determine the impact of a plan on stakeholders, generate and prioritize product requirements—and much, much more

Figure 4-11 GroupSystems® overview, *Source:* Reprinted with permission from groupsystems.com.

In such cases, advance work on the part of a team leader and the technology facilitator is important. GSS cannot make a poor team function better, but it can help a good team work more efficiently and often more effectively. Evidence shows that GSS tools have the potential to reduce conflict and improve satisfaction with outcomes. For example, GSS tools may support communication and participation among members, reduce domination by overpowering individuals, allow for individual differences, and lessen the amount of time wasted.'[3] Studies also have shown that GSS-supported groups spend more time making decisions and make better decisions. However, other studies have shown just the opposite effect, perhaps because of decreased body language cues and a hesitancy to change the way decisions traditionally are made. Anonymous communication may reduce the risk associated with contributing unpopular ideas, but it will not deal with why such risk is not encouraged face to face, and it does not give credit for good ideas.[14]

4.3.3.2 Distance Learning

When learning is the goal of a conference and groupware technologies are being used, conferencing events are labeled distance learning. In some distance learning programs, technology supports asynchronous (different time/different place) communications; other times, distance learning programs are synchronous (same time/different place). Some programs are combinations of both.

Distance learning products from groupware vendors add the functionality of classroom management and/or presentation strategies designed to support either self-paced materials or live interaction with an instructor and other students. Products, which are typically instructor controlled, can support registration, discussions, multipoint audio and video, whiteboards, class assignments, interactive quizzes, and course development. Internet streaming—both audio and video—allows learners to replay educational lectures

on demand. A total distance learning solution can integrate other products that support data and/or video transmissions. Software components can include an instructor client, a student client, and a server. Figure 4-12 is a listing of vendors and their products for distance learning. Figure 4-13 is a virtual college screen shot. Chapter 6 offers more discussion on this topic.

4.3.4 Level 3 Groupware Products: Supporting Software Agents

Software agents, self-contained pieces of computer code, carry out specific, electronic tasks for their human masters.[15] These agents are sometimes referred to as knowbots (or shopbots if they are used in electronic commerce applications). These agents learn your preferences. For example, software agents can sort electronic mail by analyzing a user's reading habits.'[6] Electronic mail can thus be sorted by whom the user typically responds to quickly, such as her CEO, her boss, or her favorite aunt. Bruce Springsteen is in town? Your know but can get you aisle seats)' Shopbots can automate comparison shopping for tasks such as choosing mortgages or cars. For discussion here, software agents that cooperate with each other or with groups of users are considered groupware. Although they remain in the developmental stage at this time, consider, for example, an agent that could serve as project manager, reminding team members of deadlines and tasks. The team'5 agent also could perform routine tasks for users such as finding critical information or accessing other team members' calendars to set up a video teleconference.

SPOTLIGHT ON SOLUTIONS → Technology, People, Structure, Processes

PAY-FOR-TEAM PERFORMANCE: BAILEY AND BAILEY

Bailey and Bailey, Inc. [pseudo name], a specialized financial-guarantee insurance company based in New York City, has a practice of giving biannual bonuses to its employees. The medium-sized organization's structure is flat, with group work being the norm. The corporation has a history of using computers in all phases of their everyday work. Work is organized around "deals," whereby a project director assigns the right mix of individuals to work together. Rarely does the exact same team work on a given deal, and deals could take as little as two hours or as long as six months to complete

The organization's Policy Committee makes bonus allocations based on profit figures and performance reviews describing the contributions of employees. This year, the committee wanted additional data on how effective employees were as team members as measured by their peers. The organization had previously used GroupSystems, a Level 2 groupware product, in a face-to-face strategic planning activity, and the CEO mandated that it should be used for this purpose. The Human Resource Director suggested several important guidelines: Employees would need to be assured of confidentiality, and the evaluation would have to take place in a different time/different place environment, allowing employees to complete their reviews in the privacy of their own offices. The HR director was responsible too, for developing the measures and ensuring training. Employees had access to the software via a local area network connected to their office computers and to a central file server. Within GroupSystems, the reluctantly complying information systems director had established an electronic folder for each specific deal, and individual reviewers had access to only those folders for which they were a deal participant. Signing on required users to click on the Agenda icon and then identify the deal in which they participated. At that point, eligible reviewers automatically were ushered into the vote tool, where they were asked to "click" the name of the individual they were rating, then asked to rate the individual's team contribution on a scale of 1—7, where 1 = low and 7 = high. Planners also wanted qualitative data in the form of critical incidents to back up the evaluation score. For example, an item measuring support read:

He/she has good communications skills; motivates the team; serves as a role model; takes time to mentor/coach; provides timely feedback; is approachable; demonstrates sensitivity; does not favor one team member over another.

Rating:

Critical Incident :

As to the use of GroupSystems to enable the evaluation, users were pleased, although not completely satisfied that their evaluations were confidential. The Information Systems Director initially had difficulty in providing reports (perhaps because of low personal enthusiasm about the project in the first place). However, data were used by Bailey and Bailey, and in their next attempt to use the groupware for this project, planners will have learned from what went right—and what went wrong.

Source: Adapted from *Informing Sciences International Journal of an Emerging Transdiscipline,* Vol.2, No 1, pp. 11—18.

4.4 AN OVERALL VISION FOR GROUPWARE

David Coleman, founder and Managing Director of Collaborative Strategies and author of *Groupware: Collaborative Strategies for Corporate LANs and Int~anets* (Prentice Hall, 1997), has done extensive research in the area of groupware tools and implementation issues. He reports that groupware tools typically are implemented by organizations piecemeal: "e-mail in this department, calendaring and scheduling in another department, Notes over in finance. To make matters worse, the technical/MIS people don't believe in groupware at all."[18] His vision of a fully integrated groupware system would include a work-flow tool that would track and route tasks and assignments with time and date stamps. His overall architecture for this vision is shown in Figure 4.14

Learning Space	Lotus Development Corp	lotus.com
ClassPoint	White Pine	wpine.com
Course Info	Blackboard	blackboard .com
Web CT	Web CT	webct.com
e-education	JonesKnowledge.com, Inc	jonesknowledge .com
Collegis	Collegis	collegis.com
Web Course in a Box	Mad Duck	madduck.com
TopClass	WBT Systems	wbtsystems.com
eCollege	eCollege.com	ecollege.com
Convene	Convene.com	convene.com

Figure 4-12 Distance learning technologies

Figure 4-14 illustrates the solid link between groupware tools and the previous chapter, Knowledge Management. Note how tools including calendaring, electronic meeting systems (group support systems), project management systems, and work-flow systems come together in this chart to provide a means for sharing data, storing data, and coordinating tasks to achieve organizational goals.

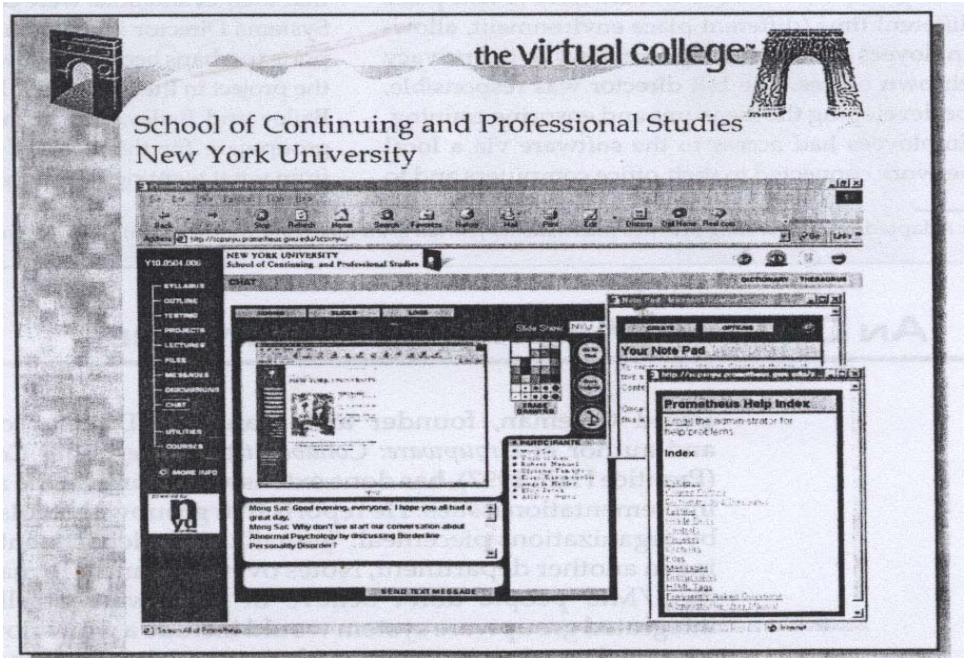


Figure 4-13 Screen shot from ClassPoint
Source: Reprinted with permission of Whitepine Software

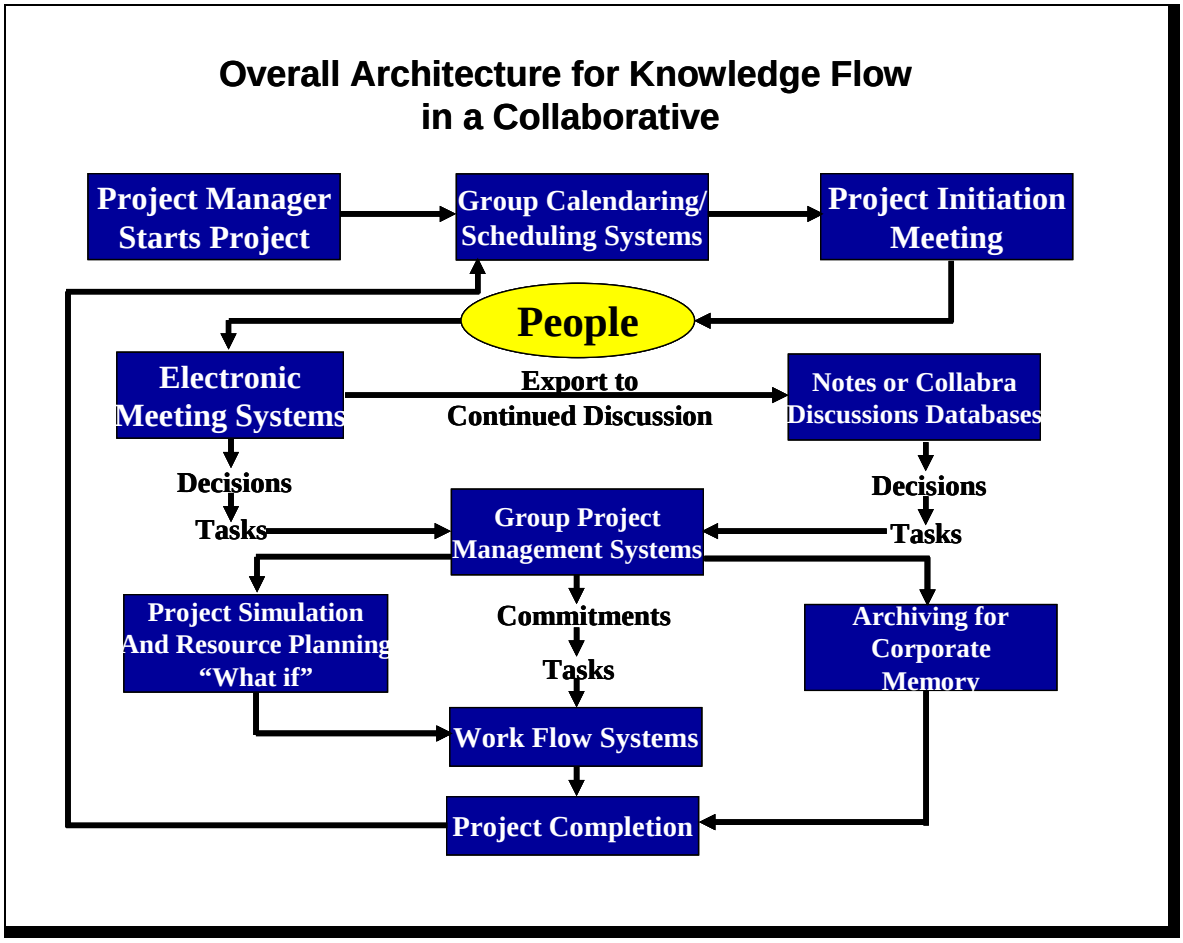


Figure 4-14 Overall architecture for knowledge flow in a collaborative project
Source: Group Ware by Coleman © 1998. Reprinted by permission of Prentice-Hall, Inc., Upper Saddle

4.5 SUMMARY

Groupware technology selection and successful implementation has been described as a task that requires technical know-how and knowledge of the organization's culture and how individuals prefer to work. Discussed in this chapter were descriptions and issues related to three levels of groupware products. In all categories, the ubiquitous Web, because it eliminates compatibility issues, is the empowering technology that is pushing for improved and new products and services that support the way groups work.

Level 1 groupware products are those software (and sometimes hardware) tools that support communications. E-mail is usually one-to-one communication. Instant messaging fadlities allow users to communicate (usually by typing) to each other in real time. Listservs and bulletin boards support one-to-many communications. Calendaring systems allow groups a variety of options related to scheduling meetings, managing contacts, and keeping notes. Group document handling products allow users to share in the creation and sharing of databases and documents. Desktop videoconferencing systems are inexpensive, easy-to-use tools that add a visual dimension to communications. E-mail is

considered an enabling technology for most group communications tools, including those described here as Level 2 groupware products.

Virtual Office Software is a separate category in this chapter because tools in this category tend to be those that support small organizations that typically do not have the interest, time, or money to support their own Intranet-based systems. Internet-based and free when bundled with other software products or inexpensively leased, virtual office products provide a large range of (usually) Level 1 groupware tools.

Level 2 groupware products go a step further than supporting communications needs. This level includes products that actually support group processes such as brainstorming, voting, and evaluating by adding functionality to tabulate, summarize, and provide quick statistical analysis of actions, such as a vote tool that can calculate means, modes, medians, and standard deviations. Level2 products that support learning are labeled distance learning tools. Distance learning tools add classroom management and communications capabilities to the groupware mix, bundling a wide range of activities such as class registration, instant quizzes, document sharing, and even videoconferencing. Although the use of Level 1 tools is increasingly the way business (or education!) is done today, getting buy in and support for Level2 tools is frequently a challenge because these tools can change the way work is done, not just automate information sharing.

Level 3 tools, software agents, are more than pie-in-the-sky applications. Software developers and organizational decision makers are increasingly intrigued by the potential of such automated team members (agents), and we can expect these agents to expand in currently envisioned functions such as project management or information gophers.

KEY TERMS

- Bulletin boards
- Calendaring
- Chat sessions
- Desktop videoconferencing
- Distance learning
- Document management
- E-mail
- Electronic meeting systems
- Group support systems
- Groupware
- Instant messaging
- Instant messaging
- Project management
- Software agents

DISCUSSION QUESTIONS

1. List features of e-mail systems. How many~f these features are on the system you currently use? Which are most beneficial to you?
2. Summarize the evolution of groupware products. Draw a diagram with e-mail products at the bottom and know bots at the top. Where would you put the other tools in this hierarchy?
3. Match the following group tasks with appropriate groupware tools:

- Notifying a group of a meeting
- Writing a proposal for governmental funding
- Processing an insurance claim
- Training program delivery
- Deciding who to hire for a specific position in the organization

4. Assume that you are responsible for implementing a Level 2 group support tool. Prepare an "elevator speech" (no longer than 1 minute) explaining how it could be useful to someone who needs to be convinced of its value.
5. It's been said that a picture is worth a thousand words. What other value does desktop video conferencing add to communications?
6. Identify business needs that point to the future success of groupware systems and list barriers to effective implementation.

APPLICATION EXERCISES

1. Check out the Web site of a Virtual Office Products vendor. Identify how the vendor's most recent product offering could help a small business with its groupware needs.
2. Survey three or four executives from varying industries to see how they use groupware in their environments.
3. Read reviews of new groupware products in journals such as *PC Week* or *PC World.* Summarize those reviews in a report to your class.

SUGGESTED READINGS

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