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Applications used in workgroup information systems.

Group collaboration in business

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Abstract

Individuals in a business usually do not work entirely alone, but instead in teams, committees, departments, and other types of workgroups. To collaborate on common tasks, workgroup members can have meetings, talk on the telephone, send faxes, and distribute memos. Group members can also use workgroup information systems to help them collaborate. This type of system is also called a group support system because it supports the work of people in a group. This article looks at applications used in workgroup information systems, and shows how these applications affect group collaboration in businesses. First, we explain how workgroup information systems encourage group collaboration. Then we examine the characteristics of group collaboration and describe common workgroup applications and the software used for these applications, and finally we discuss about office automation and the virtual work environment.

Key words: group collaboration, workgroups, office automation, virtual environment

JEL Classification: M15

INTRODUCTION

Businesses use workgroup information systems to encourage group collaboration. Collaborating with others is an essential part of business. People need to discuss ideas, share thoughts, coordinate plans, and comment on the work of others. Employees have to exchange documents, transmit designs, send images, and communicate with different people. Group members need to solve problems together and make collective decisions. When done well, these activities can improve the effectiveness and productivity of the group beyond what individuals can do separately.

The principal difficulty with group collaboration is that group members often are not in the same place at the same time. If everyone in a workgroup can get together in one room at one time for a meeting, then much can be accomplished. But often meetings are difficult to arrange, especially when individuals work at distant locations. In addition, meetings can be very expensive and time-consuming when people travel significant distances to get together.

Group collaboration is also difficult because groups often change. Individuals come into a workgroup, work for a while, and then leave for another workgroup or job. Some people may be in several workgroups at the same time, and shift between groups from time to time. Workgroups can also cross departmental boundaries. Individuals from several departments, and in some cases several businesses, may be in a workgroup. All these situations make group collaboration complex.

Group collaboration can be characterized by *when* and *where* the collaboration takes place, and by *what* is communicated during the collaboration.

Two of the basic characteristics of group collaboration are time and place - the *when* and *where* of collaboration.

In this case are four possible combinations of these characteristics:

- People working at *the same time and place* can collaborate directly - a face-to-face meeting is an example of this type of collaboration;
- People working at *the same time but in different places* often use the telephone for collaboration; conference calls are also common in this situation.
- When people work at *different times but at the same place*, they collaborate by leaving messages, either on the telephone or in paper notes. Putting written messages in mailboxes in staff mail rooms is a common way of communicating in this situation.

- A complex situation is when people working at *different times and places* need to collaborate. Voice messages, faxes, overnight deliveries, and regular mail are used in this situation.

Table 1. Different uses of collaborative systems classified in time and space

	Synchronous	Asynchronous
Same location	Same time, same place Example: meeting support software	Different time, same place Example: workflow systems
Different location	Same time, different place Example: video-conferencing	Different time, different place Example: e-mail and discussion groups

Another characteristic of group collaboration is the form that the communication between people takes - the *what* of collaboration. Perhaps the most often used form of communication in business is audio communication; people talk to each other, either in person or on the telephone. Audio communication is not only what is said, but also how it is said. Tone, inflection, and other characteristics of speech often express information. In addition to live, verbal communication, recorded sound is used in group collaboration. Voice mail, taped sound, and other recorded sound are part of audio communication.

A second form of communication in group collaboration is visual communication, specifically sights of people or other real things. When groups meet in person, the members of the group can see each other. Their facial expressions and body language give visual clues that provide information about what they are saying and thinking. Recorded sights are also used in some collaborative situations. Still pictures or moving images on videotape may be shown to groups for discussion.

A final form of communication used in group collaboration is document (or data) communication. Documents may contain text, numbers, tables, diagrams, graphs, and other written representations of information. Examples are a report sent to members of a team, a table of data examined by committee members, a diagram of a design examined by several people, and a graph of data discussed by a group.

1. Types of Workgroup Applications

Without computers, face-to-face meetings, telephones, faxes, and mail are typically used for collaboration. With networked computers, however, various types of group collaborative software can be used. In general, these types of software are called *groupware*. The use of groupware by members of a workgroup for collaboration is sometimes referred to as group, or collaborative, computing.

People working in groups can use personal computer software, such as spreadsheet software, to assist in workgroup tasks. For example, a worksheet may be used by several people in a workgroup to analyze data. The worksheet could be stored on a server in a LAN, and different individuals, using spreadsheet software on personal computers connected to the network, could use the worksheet at different times.

Although personal computer software can be beneficial in workgroup tasks, these programs are not designed specifically for group work. Groupware, on the other hand, is intended only for workgroup information systems. These programs are used on networks, either LANs or WANs, and group members use the programs through personal computers connected to the network.

Increasingly, groupware is being designed for use through a Web browser. The Internet, or an intranet or extranet, provides the communication link between users. Called *Web-based groupware*, this software makes it easy for individuals at distant locations to collaborate.

This section takes a look at the main types of workgroup applications and examines the time (when), place (where), and form (what) characteristics of each type. It also introduces common groupware used for each type of application. It is important to note, however, that many workgroup programs encompass several types of applications.

Groupware is software for enabling collaboration within and between companies. It spans a wide range of software that enables teams of people to work together efficiently. These teams may be working on a new product launch or more loosely coupled teams made up of individuals from different parts of the business.

Groupware provides functions to promote team work and improve efficiency through:

- increasing information sharing;
- reducing communications overheads;
- providing coordination.

Therefore, groupware is software to enable group working or *computer supported cooperative work* which is the term used by academics researching this area. Computer

supported cooperative work was first used in 1984 by Irene Greif, of the Massachusetts Institute of Technology, and David Cashman, of Digital Equipment Corporation, as the title for a workshop they were arranging. The term groupware covers a diverse range of products with varying functions and applications. Another point of view is the term *workgroup systems* to define collaborative systems. The properties of workgroup systems are described as a cohesive architecture based on distributed logic client/server technology and inter-enterprise-capable, enterprise-class platforms for communications, collaboration, coordination and knowledge reuse.

1.1. Electronic messaging

One of the most common forms of collaboration in workgroups is simple document communication; written notes, memos, task lists, notices, and other messages are commonly sent between members of a group. This form of communication is essential for all aspects of business, and software designed to facilitate it is at the heart of most workgroup information systems. In general, this type of application is called electronic messaging.

Electronic messaging allows document communication to take place between group members at different times from different places. Individuals can send written messages to others at any time of the day or night, and from any place in the world. A disadvantage of electronic messaging, however, is that an important message may not be read immediately. In fact, it could be several days before a message is read. In addition, communication in written form has limitations.

A basic form of electronic messaging is *electronic mail* (e-mail) in which simple text messages are sent between people. Electronic mail software is needed to send and receive e-mail. When sending e-mail, the sender identifies the receiver by his or her electronic mail address, and the e-mail software stores the mail in the receiver's electronic mailbox, which is a space on a disk in the network reserved for e-mail. The receiver can review the mail in the mailbox at any time. E-mail is designed mainly for document communication. It is possible, however, to send various types of files, including non-document files, along with an e-mail message. The file that is sent is called an *attachment*, and it could contain sound, a photographic image, a video image, or just about anything that can be stored in the computer. Using attachments, e-mail becomes audio and visual communication, as well as document communication.

Because electronic messaging is different-time collaboration, a message may not be read immediately upon receipt. Some messaging software uses a technique called instant

messaging to overcome this problem. With this technique, the sender uses the messaging software to determine whether the intended receiver is currently connected to the network. If the receiver is connected, the sender can send a message that appears almost immediately on the receiver's screen. The receiver can then read the message and reply, using instant messaging.

With instant messaging, individuals can send electronic messages back and forth quickly. An alternative to this approach is to use *chat*, which is an application that allows two or more individuals to have an electronic "conversation". Using chat, each person's screen shows all messages entered by each chat user in sequence, along with the name of the person who entered the message. When someone enters a new message, it is added to the list of messages for all others to see immediately on their screens. Chat extends electronic messaging to same-time communication. It does not, however, provide all the capabilities of electronic messaging software.

1.2. Information Sharing

In addition to being able to send messages to each other, members of a workgroup need to be able to share information in other ways. Although information to be shared could be sent from one person to another by using e-mail, it often is easier to put the shared information in a single location and let each group member access it as needed. One way of accomplishing this is with database software. A database of shared information can be created, and each person can use database software to access the database.

The difficulty with using database software to share information is that often the information does not fit the database approach.

Information sharing is a workgroup application that involves sharing different types of information among members of a group. With information sharing software, many different types of information, including text, graphics, spreadsheets, data-bases, video, and sound, can be shared. Users can access the information, change it, comment on it, and add new information.

Information sharing allows audio, visual, and document communication to take place between group members at *different times* from *different places*. The advantage of information sharing is that individuals in a workgroup can access the shared information at any time from any place. A disadvantage of information sharing is that a person may not access relevant information immediately. Using information sharing effectively requires that all members of a workgroup examine the shared information on a regular basis.

1.3. Document Conferencing

Information sharing lets members of a workgroup collaborate at different times. Often, however, group members want to confer at the same time. *Document conferencing*, also called *data conferencing*, is a workgroup application that provides this form of collaboration on documents. Group members at different locations can simultaneously view a document containing text, numbers, graphs, and other forms of information. Individuals can add comments to the document for others to see and can make changes in the document.

Document conferencing provides for *document communication* between group members at the *same time* from *different places*. It is useful in situations where individuals cannot meet face-to-face to discuss a document. A disadvantage, though, is that group members must be available at the same time to confer on the document.

Two main types of document conferencing are whiteboard conferencing and application conferencing. With whiteboard conferencing, each user sees the same document on an *electronic whiteboard*, which is a white area on the screen containing the document. Any user can write comments on the whiteboard, and all users see the comments simultaneously on their whiteboards.

1.4. Audio conferencing

Perhaps the most common way in which people in a workgroup communicate is by telephone. Telephones are universal and easy to use, so people find them very convenient for discussing group work. The telephone can also be used to communicate when working with computers. For example, two people can talk on the telephone about a document that is displayed on both their computer screens. Although not ideal, this form of collaboration is used often.

Many personal computers have speakers (or headphones) and a microphone, so it is natural to incorporate telephone capabilities into computers. Some personal computers come with telephone circuitry that allows communication over telephone lines. Another approach, called *computer telephony*, uses a network, usually the Internet, for audio communication, thus bypassing the regular telephone lines.

For computer telephony to work, each computer needs special *computer telephony software*, as well as the appropriate audio input (microphone) and output (speaker or headphone) devices. Many computer telephony programs are available.

With computer telephony, *audio conferencing* with computers is possible. In general, *audio conferencing* is a workgroup application in which two or more members of a group at different locations communicate with each other at the same time by voice over a computer network. It is not necessary to set up a telephone conference call or to use standard telephone lines. All communication takes place using computers and networks.

As with telephone communication, audio conferencing provides *audio communication* between group members at the *same time* from *different places*. Its advantage over a telephone is that it uses a computer network for communication, which may be less expensive than a telephone line. Its main disadvantage is the same as that of a telephone: Group members can only communicate verbally; visual and document communication is not provided in audio conferencing. In addition, group members must be available at the same time in order to have an audio conference.

1.5. *Videoconferencing*

During an audio conference, people often want to see who they are talking to. Facial expressions and body language can sometimes convey information as much as the words that are spoken. *Video conferencing* is a workgroup application in which members of a group at different locations can see each other at the same time that they talk to each other. Videoconferencing always includes audio, although audio conferencing can be done without video.

Videoconferencing allows audio and visual communication between group members at the *same time* from *different places*. It overcomes one of the disadvantages of audio conferencing by providing visual communication. It is especially beneficial as a replacement for face-to-face meetings that would require expensive travel by meeting participants. Videoconferencing does have some disadvantages, however. Documents cannot be communicated in a videoconference, and conference participants must be available at the same time.

To have a videoconference, each user location needs a video camera, monitor, microphone, and speaker. Audio and video signals are transmitted from one location to another. Video images are displayed on distant monitors, and sound is projected through a speaker. Some videoconferencing systems, called *point-to-point systems*, allow users at only two locations to communicate. Other videoconferencing systems, called *multipoint systems*, allow users at more than two locations to participate in a conference simultaneously.

1.6. *Electronic Conferencing*

Videoconferencing systems let members of a workgroup at different locations have audio and visual communication with each other. Combining document conferencing with videoconferencing creates a system with which workgroup members can also have document communication. This combination forms a workgroup application called *electronic conferencing*.

Some desktop videoconferencing software can be combined with separate white-board or application conferencing software to create electronic conferencing systems. More often, however, *electronic conferencing software*, which integrates whiteboard or application conferencing with desktop videoconferencing, is used. Such integrated software offers the most versatility in electronic conferencing.

Electronic conferencing provides audio, visual, and document communication between group members at the *same time* from *different places*. Because all forms of communication can be used, it is a very useful tool for group collaboration. It requires powerful computers and networks, however, to handle the software and data, thus making it an expensive form of group computing.

1.7. *Electronic Meeting Support*

Members of a group work together in various ways, some informal and some formal. Informal collaboration includes everything from casual conversations to in-depth-discussions. More formal collaboration often takes the form of a meeting, which we usually think of as a group of people discussing specific topics from an agenda and reaching conclusions about those topics. When computer systems are used to facilitate the meeting, the result is often called an *electronic meeting*. A workgroup application that is designed to support electronic meetings is called an *electronic meeting system (EMS)*.

Electronic meeting systems come in two main forms: room systems and desktop systems. With a room electronic meeting system, a separate electronic meeting room is set up with special hardware and software. This type of room is also called a decision room because it is used for making group decisions.

An electronic meeting room includes individual workstations for the participants in the meeting. Each workstation has a personal computer that is connected by a network to the other personal computers in the room.

In addition, there is a special workstation for the meeting leader or facilitator. This workstation has a personal computer connected to the network and to a large screen, which can be seen by everyone in the room. Finally, special electronic meeting software is used to link the workstations and to coordinate the electronic meeting. This software includes a variety of features, including a common whiteboard.

Electronic meeting systems provide *document communication* between group members at the *same time* from the *same place* for room systems, or from *different places* for desktop systems. They go beyond basic document conferencing by providing special support needed in meetings. Room systems are very expensive, however, because of the cost of setting up the room. In addition, all group members must be available at the same time for an electronic meeting.

Electronic meeting systems often are used to help groups make decisions. In general, any workgroup application that facilitates group decision making is called a *group decision support system* (GDSS).

1.8. Group Calendaring and Scheduling

When people in a workgroup need to collaborate at the same time, conflicts often arise because of differences in schedules. People work various hours and have numerous time commitments because of work and other responsibilities. Finding a time when everyone can get together for a conference or meeting, whether face-to-face or electronic, can be difficult. The problem is even more complex when members of a workgroup are located in different time zones. Group calendaring and scheduling is a workgroup application that helps workgroup members coordinate their time.

Group calendaring and scheduling software includes calendaring capabilities that let users keep individual calendars of appointments and meetings. The software also includes scheduling capabilities to set up meetings. With these capabilities, a user who needs to schedule a meeting indicates in the software who must attend the meeting, and then the software searches the individual calendars for times that would be acceptable to all participants. The software can then notify the individuals about the meeting.

This application allows a specific type of document communication between group members at *different times* and *different places*. The documents communicated deal with calendars and schedules. For the application to be effective, users must keep their individual calendars up-to-date.

1.9. Workflow Management

Group work sometimes involves sequences of tasks that are done by different members of a group. For example, in a marketing department, the design of a new catalog must go through steps such as writing advertising copy, selecting product photographs, laying out the pages in the catalog, and proofreading the pages. Group work may also require that documents be passed from one person in a group to another for processing. For example, in a human resource management department, a prospective employee's application must be passed to several people for review and approval. In both examples, different people are involved in performing tasks or processing documents, with the work flowing from one person to the next. To make the work flow more smoothly, a workgroup application called *workflow management* can be used.

Workflow management software coordinates the tasks performed by different individuals in a workgroup and the flow of documents between people. Some workflow software is oriented toward tasks. These programs ensure that each task in the work-flow is performed by the right person and in the right sequence. This type of software could be used to coordinate the work of the people designing the new catalog described in the previous paragraph. Other workflow software is oriented toward documents. This type of program ensures that the right documents flow from one person to the next, a process called *document routing*. The processing of the job application described in the previous paragraph could be coordinated by this type of software.

Workflow management allows document communication between group members working at different times and different places. The document communicated might indicate the tasks to be performed on some other document, or it might be the actual document being worked on. In any case, the software is used to coordinate the flow of work between group members. Users, however, must check the system regularly to see if they have received work.

Table 2 summarizes the main types of workgroup applications discussed in this section in terms of their time, place, and form characteristics. Some applications are designed for same-time collaboration, and some are designed for collaborating at different times. Most group applications are designed for different-place collaboration, although electronic meeting systems are used in the same place (room systems) or different places (desktop systems). Document communication is the main form of communication used in group applications, although some applications provide audio and visual communication. As you can see from the table, many combinations of time, place, and form characteristics are found in workgroup applications.

Table 2. Summary of types of workgroup applications

Type of workgroup application	Time of collaboration		Place of collaboration		Form of communication		
	Same	Different	Same	Different	Document	Audio	Visual
Electronic messaging		×		×	×		
Information sharing		×		×	×	×	×
Document conferencing	×	×		×	×		
Audio conferencing	×			×		×	
Video conferencing	×			×		×	×
Electronic conferencing	×	×		×	×	×	×
Electronic meeting support	×		×	×	×		
Group calendaring and scheduling		×		×	×		
Workflow management		×		×	×		

2. Office Automation

Workgroup applications are often used together with individual applications, such as word processing, and other applications to provide support for a variety of office functions in an organization. The use of these applications together is sometimes called *office automation*. People at all levels of an organization need office support to do their jobs. Secretarial and clerical personnel are not the only ones who do office work. Managers throughout an organization perform office functions to assist them in their managerial activities. Office automation is used in almost all areas of a business.

Historically, office tasks have been done mainly by secretarial personnel. For example, a manager would dictate a memo to a secretary, who would type, copy, mail, and file it. With the introduction of personal computers, managers and other personnel began doing more of their own office work. For example, a manager would use word processing to prepare a memo. Still, a secretary would copy, mail, and file the memo. The next step was to link the office personal computers to a LAN that included special hardware and software to perform office functions. The result was office automation.

Office automation may include individual applications such as word processing, desktop publishing, and presentation graphics. It may also include workgroup applications such as e-mail, information sharing, calendaring and scheduling, and workflow management. In addition, office automation may provide special applications such as

- *Voice processing.* With voice processing, voice messages can be recorded and stored in secondary storage. Then, a stored message can be sent to another person who has access to the system. The person can listen to the voice message by playing it back.
- *Facsimile.* A fax modem can be connected to the network so that users can fax documents from their personal computers.
- *Unified messaging.* With unified messaging, common forms of messaging - including e-mail, voice mail, paging, and fax - are combined into one system.
- *Electronic filing.* Instead of filing a paper copy of a document in order to save it, a copy can be filed electronically in secondary storage. The document can be retrieved in the future and printed if necessary.
- *Image processing.* In image processing, copies of graphs, charts, photographs, and other images can be stored in secondary storage. The images can be viewed by people who have access to the system, or they can be graphed or printed.
- *Document management.* Image processing and electronic filing are often combined to form a document management application that stores and keeps track of documents.

Office automation can support almost any function in an office. In the future, the distinction between individual applications, workgroup applications, and office automation applications may diminish, until they all converge into one common type of application.

3. The Virtual Work Environment

Workgroup applications make it possible for people to collaborate in many ways, at any time, and from any place. As a result, it is no longer necessary for everyone in an organization to be at a central office at the same time. People can work in remote offices, at home, in a hotel room, or even in a car. People can work during the day, in the evening, late at night, and in different time zones. The result is that the work environment no longer has to be a real place where everyone comes at the same time. Instead, for many types of work, the workplace can be a *virtual work environment* consisting of wherever and whenever people work.

3.1. Telecommuting

The first step toward a virtual work environment came when some employees of businesses began working at home, using personal computers with modems to communicate with their companies' computer systems. This way of working is called telecommuting because instead of commuting by car or public transit, the employees "commute" over the telephone. Initially, mainly computer professionals such as programmers telecommuted, but now many types of employees work this way.

Telecommuting offers several advantages to individuals and businesses. Individuals do not have the expense of commuting to work, and businesses do not have to provide office space. Employees can work whenever they find it convenient, and can watch after their children while they work. Businesses often find that telecommuting increases productivity and decreases absenteeism. Disadvantages of telecommuting for individuals include the expense of setting up a home office, although some companies provide the necessary computer systems and telephone lines. Another disadvantage for individuals is the lack of face-to-face contact with coworkers and the feeling of isolation. For businesses, disadvantages include difficulty supervising employee work. Despite the disadvantages, telecommuting continues to become more popular.

3.2. Virtual Offices

When a large number of employees in a group work at home or at other nontraditional locations, using computers to telecommute and to collaborate with others, the result is a virtual office. Employees may receive work through electronic messaging and information sharing systems. Workflow management systems may be used to coordinate the work. Electronic conferencing systems may be used to allow employees to collaborate on ideas. Employees can work wherever they happen to be; the office exists where the employees are. Virtual offices compound the advantages and disadvantages of telecommuting because the number of people involved tends to be greater. In addition, more sophisticated software is needed so that electronic conferences and meetings can be held. Still, so many employees telecommute that virtual offices are becoming increasingly common.

3.3. Virtual Meetings

Using electronic conferencing and meeting systems allows people at different locations to confer and meet at the same time. Sometimes, however, an electronic meeting occurs in which not everyone is available simultaneously. For example, an electronic meeting may be

held between research and development people to discuss a product design, but the participants do not communicate simultaneously. Instead, different people contribute ideas at different times. The meeting may last several days, until all involved have had a chance to comment and a conclusion is reached. This type of meeting is sometimes called a virtual meeting. Virtual meetings are possible because of the store-and-forward capabilities of some groupware. One participant in a virtual meeting can enter his comments and forward them to another participant, who enters her comments and then forwards everything to the next participant. When the meeting participants are located around the world, the virtual meeting can take place during daytime working hours in many time zones. Such global virtual meetings are becoming increasingly common in inter- national businesses.

3.4. *Virtual Companies*

Sometimes a company is set up in such a way that it does not have any regular place of business or an office. Each employee works at his or her home, or uses a rented space near where the employee lives. When an employee is traveling, he or she may work out of a hotel room, or from a client's or customer's office. Employees of the company communicate and collaborate using groupware. This type of company is sometimes called a virtual company. Virtual companies are especially common among new, start-up businesses. Workgroup applications and groupware make it possible for a business to operate in non-traditional ways. Telecommuting, virtual offices, virtual meetings, and virtual companies are the result of workgroup systems. In the future, you can expect even more businesses to have virtual work environments.

CONCLUSIONS

Businesses use workgroup information systems to encourage group collaboration because collaborating with others is an essential part of business.

The main difficulty with workgroup collaboration is that people often are not in the same place at the same time. Group collaboration is also difficult because groups often change.

Workgroup information systems encourage group collaboration by making it easier for members of a workgroup to communicate, share information, and collaborate over distance and time.

REFERENCES

Chaffey, D. (1998) *Groupware, Workflow and Intranets: Reengineering the Enterprise with Collaborative Software*, Digital Press

Mehediñu, A. (2008) *Baze de date. Aplicații*, Universitaria, Craiova

Mehediñu, A. (2008) *Sisteme informatice distribuite pentru management bancar*, Universitaria, Craiova

Mehediñu, A., Buligiu, I., Pîrvu C. (2008) *Technologies used in Enterprise Application Integration and Business-to-Business Integration processes*, International conference: Management of International Business and Economic Systems, Larissa, Greece, July 2008, pp. 757-766

Nickerson, R. (2001) *Business and Informational Systems*, Prentice Hall, Upper Saddle River, New Jersey

Robson, W. (1997) *Strategic Management and Information Systems*, Second Edition, London: Pitman Publishing

Stanford N. (2005) *Organization Design: The Collaborative Approach*, Elsevier Butterworth-Heinemann Linacre House

Șoavă, G., Mehediñu, A., Buligiu, I., Bușe, R. (2006) *Sisteme Informatice Economice*, Reprograph, Craiova