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# Computer Mediated Communication

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# Compendium D

*Note: There is also Compendium A, B and C!*

# A Personal History of CMC

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## ABSTRACT

Based on more than 30 years of experience in using and designing computer systems, this paper summarizes a somewhat controversial view on how software should be designed to be liked by its users. Basic to this view is that it is dangerous to use computers to ensure adherence to rules, laws and regulations. When rules are interpreted by humans, the humans are capable of interpreting the rules with discretion and understand that quite often, the rule should not be adhered to 100 % in every case. Computers are not so good at making such judgements.

### Keywords

CMC, Computer Mediated Communication, HMI, Human-Machine-Interaction, User influence in software design, Personal privacy, Power, Control, Influence.

## INTRODUCTION

Some people feel threatened by computer. Other people experience computers as enhancing their opportunities. I have been using computers since 1963 and been working in the area of CMC (Computer Meidated Communication) since 1975. This paper tries to summarize my experiences and the explanatory system which I have built to understand these issues. This system can be a tool in learning how to design user-friendly computer interfaces.

## PUBLIC VIEW OF COMPUTERS IN THE 1970s

The public view of computers in the 1970s can (somewhat simplified) be described as consisting of three main ideas:

1. Computers are used to register a lot of information about people. This registration is a threat to personal privacy.

2. Computers are used to impoverish people, taking away the interest and value from their work tasks, preventing them from using their knowledge and competence.

3. In spite of these two important drawbacks with computers, we must anyway use them in order to keep the competitiveness of our economy.

Nowadays (this is written in June 2000) people have a more varied and positive view of computers. But there is still reason to try to analyze and understand the issues which were so controversial in the 1970s, and which can still teach us much about how to use computers in human-friendly ways.

## A threat to personal privacy

**Case 1:** "The credit card company notes that mr X registers with his wife for a double room in a hotel in London. At the same time, his wife uses her credit card to pay her hairdresser in Sweden." This is a typical example of the arguments given by people about the threat of computers to personal privacy.

**Case 2:** An American computer company decided to add, to their internal e-mail system, a facility which let the sender check if and when an e-mail was read. This caused an uproar among employees who felt this to be an invasion of their personal privacy.

**Case 3:** In 1979, we introduced the KOM forum system. KOM gave users a lot of opportunity to check on each other. A KOM user could see which forums another user subscribed to, when this user last visited this forum, when a user read a personal message, etc. In spite of this, there were very few complaints that this was an invasion of privacy. Why? We did add a facility for KOM users to say that their personal information should not be shown to other users. Almost no users used this facility to protect their personal privacy. Why, if there is such a large risk with intrusion on personal privacy through computers?

**Case 4:** But in one case there was a conflict. The director of studies at a university department started a forum for information to teachers. After some weeks, he made a printout of the KOM page, which shows which teachers had not participated regularly in this forum, and put a copy into all their physical mail boxes. He wrote on this copy: "You are all obliged to participate in this Forum!". This caused an uproar among the teachers.

In trying to analyze these cases, my conclusion is as follows: When people complain about "a threat to personal privacy", their real complaint is actually against using computers to try to control them. The reason so few KOM users (Case 3 above) complained, was that KOM was designed very much to be controlled by each user. KOM users experience KOM as giving them much ability to control their usage. They can choose which forums to subscribe to, when to go to a forum, in which order to read news, what to read and what to skip. Because of this

design, they did not feel that KOM was used to control them.

People felt a threat to personal privacy, when they felt that large companies and organizations "spied upon them" and used this information to gain power over them. Because KOM was not (usually, case 4 is an exception) used in this way, people did not feel that KOM threatened their personal privacy, even though KOM allowed users to see a lot of personal information about other KOM users.

This is very important. Because if we believe that the problem is with a threat to personal privacy, we may resolve this problem with methods which makes the problem worse and not better. By understanding, that the real issue is about control and power, we can solve the real problem, by trying to design the software to empowerish the user, and to make it difficult for large organizations to use the computer to control people.

### The computer impoverishes people

While many people experienced, and sometimes even today experience, computers as impoverishing them, other people have the opposite view, that computers increases their capabilities, empower them instead of inpoverish them.

The more people are experts on the usage of the computer, the more they tend to feel that the computer empowerishes them. Especially programmers, who can actually make the computer do what they want by writing programs, feel that the computer empowerishes them.

### HELPNESSLESS CAUSES DEPRESSION

Seligman 1975 studied people who were depressed, and concluded that a real or experienced feeling of helplessness, of inability to influence one's life, was a major cause of depression.

Gordon 1970 describes how human conflicts are best solved. The major steps in solving a conflict, is that the parties try to understand each other. When they have learnt to understand each other, they can try to find solutions which are acceptable to both parties, so-called win-win-solutions.

Harris 1969 describes how a positive view of people accepting and respecting each other is the basis of solving problems and causing working relations.

How can the computer influence this? Well, when a user is using a computer program, this can be seen as a communication between the designers and programmers who made the program, and the user who uses them. But this communication usually very badly fulfills the requirements of Gordon and Harris. The user has usually little option to really communicate with those who made the program. Even when the user can communicate, the communicating is very much delayed. It often takes year from a user complaint to a change in the computer program, even in the best cases.

### Newspeak

One way of seeing this is to look at the famous novel *Nineteen eighty-four* by George Orwell [7]. This book describes a future earth, controlled by stalinistic dictatorships who use all possible tools to control people. One chapter in the book discusses how to prevent people from thinking thoughts which the government does not want them to think. The chapter proposes the invention of a new language *Newspeak*. This language would be designed in such a way that people cannot think unwanted thoughts. If everyone was allowed to use only this language, the government could control people's thoughts.

Computers have some similarities with Newspeak. Computers allow you to communicate only using the user interface of a particular program – i.e. a special language which only allows permitted thoughts. The user interface does not allow anything except what the program was designed for.

One article which discusses this issue, and which has meant much for me, is Hoare 1975. Hoare describes a common process of software development, where developers and advanced users go through an iterative process which makes the software more useful for the expert user, but which also makes the software very difficult to learn, and thus inpoverishes the non-expert user. So user influence on software design can actually make the software worse. I am fully aware that this is a very controversial statement, and it is not really my wish to argue against user influence in software design. There is strong reason to believe that user influence in software design is important. But one should be aware, that there are risks. There is often a tendency that the most advanced and expert users are best able to speak to the developers and have their wishes realized in new versions of the software.

### Language = Power

One should note that language is actually very often used as a tool for power. For example, medical doctors have a specialized language, which gives them more power over the patients, by describing the medical problems in words which the patient cannot understand. Lawyers and courts are famous for using legalize, a specialized language which keeps the ordinary people out. In courts, there are even rules about who is allowed to say what at what time. If you know these rules, you can accomodate them to your needs, if you do not know them, you are impoverished compared to the legal experts who know the rules. Witnesses are not allowed to listen to the trial before they are called. The reason for this is claimed to be that they should not be influenced by other witnesses. But one could as well argue for the reverse: By allowing the witnesses to listen, they can note lies and falsehoods in what other witnesses say. But the real reason for keeping witnesses outside may be an issue of power and control: By not letting the witnesses listen, their information is less, and their control of their

situation is reduced. The power of the insiders is increased, the outsiders are kept down.

There is ample reason why discussions about language often gets so heated. People defend their language, because they defend the security which their ability to communicate in this language give them.

### Cultural fields

The french sociologist Pierre Bourdieus [1] describes how groups of people form so-called cultural fields, areas in which insiders follow certain behavioural rules, and outsiders are kept outside unless they learn to adhere to the insiders' thinking and behaviour. In the computer area, the number of cultural fields is large. Every software system or network protocol has its own insiders, those who are experts on the software, knows all its facilities and knows how to get the software to produce what they want. Outside this group, there is a large group of casual users who struggle with the software and more or less suceed in getting the desired result. With time, some of the casual users become experts and get admitted to the inside circles.

## CAN COMPUTERS DECIDE WHAT IS RIGHT AND WRONG?

It is dangerous to use computers to ensure adherence to rules, laws and regulations. When rules are interpreted by humans, the humans are capable of interpreting the rules with discretion and understand that quite often, the rule should not be adhered to 100 % in every case. Computers are not so good at making such judgements. Because of this, it can be unsuitable to put to much of rule-checking into software.

### Introducing the Issue by an Example



**Example:** Suppose you equip a motorcar with a computer-controlled device, a so-called breathanalyzer, which makes it impossible for you to drive when your blood alcohol level is above a certain level. And suppose there is an exceptional case. John has a heart attack, and the only person available to drive to the hospital, Mary, has drunk a little too much. The computer stops Mary from driving the car, and John dies.

**My argument:** This is an example of a computer making a decision. The computer decides that John is not allowed to drive the car, and in this particular case, the decision made by the computer might be ethically wrong. This is no easy issue, the best may still be to have such a computer device in the car. But the example illustrates the problem and the danger of programming computers to make decisions about right and wrong.

**Counter-argument:** No, the computer did not make any decision. The decision was made by the humans who programmed the computer. They may have weighed pros and cons, and decided that the advantage with such a drunk-driving-protection device is worth the risk that in some exceptional cases the outcome may be wrong.

**My counter-counter-argument:** This is becoming a discussion of the meaning of words. You do not accept that the computer made a *decision*. OK, let us then say that the computer made a *ruling*, or whatever word you prefer to apply to the case where a computer prohibits you from doing something. You are avoiding the ethical issues: In what way should we program computers to control human beings.

I am not a fanatical liberal who is against all laws and rules. I am quite willing to accept that in some cases it may be ethically right to program computers to prohibit you from drunken driving or stop children from downloading bomb-making recipes from the Internet. But I am advocating that in those cases you are programming the computer into making *decisions*, or *rulings* or whatever word you prefer to use. And this can be dangerous and you should be aware of the risks.

**Solution:** In this special case, a solution might be to allow the driver of the car to communicate with SOS Alarm, and allow them to send a code to override the breathanalyzer lock in some very exceptional cases. By doing this, we are moving the final decision from computers to humans.

### Explanation of Problem

One mode of human communication is the setting of rules. Some human beings make a list of rules. The rules may be a law, a local ordinance, ethical rules of a professional organizations, company rules for employees or published in other ways. The human beings may also introduce ways of enforcing the rules, such as courts of law, committees on ethical conduct, etc. This is sometimes (not always) necessary even though the rulings made are sometimes wrong, like convicting innocent people. But we accept that this risk must be taken because without law and order society would not work.

An example: Even if it is forbidden for a pedestrian to step into the street against a red light, there are special cases where this rule does not apply. Suppose a child runs out on the street, and the only way to stop the child from getting run over by a car is to run out and catch the child. Such special cases are easily handled by humans. No human court would sentence a person for running across a red light in such a case. But it is not so easy to teach a computer to understand such exceptions.

The danger is that people do not always understand, that putting such rules or laws into a computer, and programming the computer to enforce the rules, is something very different from having humans implement the rules by human decisions. Humans can understand the special conditions of special circumstances. A human might decide, in the example above, that in this special case the importance of getting John to a hospital is higher than the risk of Mary driving while intoxicated.

**Counter-argument:** A counter-argument [6] is that in this case it was humans who made the decisions, by programming the car computer, but their decisions were wrong. They did not take all circumstances into account. They should have made a more advanced program, which could take into account the special circumstance of the heart attack situation.

**Counter-counter-argument:** What you are doing, with this kind of argument, is to make the computer program more advanced and complicated, to reduce the risk that the decisions/rulings made by the computer are wrong. The path you are treading may make things worse instead of better. More complex and advanced computer rulings may increase the risk of wrong decisions instead of reducing them. The right solution may sometimes instead be to accept that the computer is not perfect, and thus that all rules do not have to be enforced by computers alone.

### "Italian Strike" Example

A well-known method for strikes is to continue to work, but to adhere 100 % to all rules while working. This rapidly causes many businesses to a complete standstill, or at least makes them work much slower and less efficiently before. The reason for this is that even good and benevolent rules can have disastrous effects if adhered to 100 %, the way a computer would do if programmed to enforce them.

### Filling in a Form Example

If you fill in a form manually, you have the option of adding an accompanying sheet of paper explaining why you filled in the form in a particular way. In most forms, where there is a "yes-no" question, it is quite possible to omit the checkboxes and write a more nuanced explanation below or above. The human who receives the form will read and understand and interpret this. When the form becomes computerized, this freedom to not follow the prescribed way of filling in the form often disappears.

### Society Evolves by Many People doing Things in Better Ways

An important way in which human society is evolving is that many people make small and large decisions to try out new and better ways of doing things. If the computer program stops them from doing things in other ways that those specifically allowed, this will prevent people from finding better ways of doing things, and thus stop imrovements.

Sometimes this may be necessary. For example, there is a human tendency to stop performing actions which are necessary only to avoid seldom occurring risks. Example: A pilot forgets an item on the pre-flight check list, or a night watchman forgets to go to a normally empty part of the building. In such cases, it may be necessary to use technical means to ensure that the human follows the rules, for example the night watchman must turn a key to show that he has passed that part of the building. But this does not forbid the night watchman from disobeying the rules in special cases, for example skip the empty corridor if there is a thief in another part of the building. The danger is when the computer does not allow you to do things in other ways than those foreseen when programming it.

### Two-sided Communication is Better than Enforcing one Solution

It is a well-known fact that power is addictive. That is why we design human societies with so many safe-guards against giving individual people too much power. We must understand that the power to control other humans by design of computer software can also be addictive [5]. Only by understanding this, can we stop people from putting too much control of humans into their software. I am not arguing that there should be no control of humans by software. The common "Are you sure?" dialog boxes are often motivated, even though they are sometimes a nuisance. But those who design computer software should

be aware of the risks of putting too much control of humans into the software.

This will reduce the possibillities for people to influence their environment, and will create a feeling of helplessness, which may cause dissatisfaction and depression [11]. When two humans communicate regarding a task, the outcome of their discussion is usually twosided or so called win-win solution, a solution where the needs of both are taken into account [5, 2]. When the task is controlled by a computer (even though a human did originally program the computer) the interaction necessary to achieve a win-win solution is often not possible. It iw well-known that such situations easily cause frustration and dissatisfaction and also often mean that a less good way of performing the task has to be used.

### Stopping the Porn

An example of an application area, which illustrates the problems with computers deciding what is right and wrong, is the area of the porn-blockers, program modules meant to prevent use of the Internet for unsuitable purposes [6]. They are used by parents who do not want their children to download porn on the net, by schools and libraries, and also by employers to stop employees misusing thir office computers, and even by countries to control the flow of information and stop undesirable information. The People's republic of China and Singapore are examples of countries who want to stop unaccceptable information, such as views by so-called dissidents.

These programs, however, have severe problems. Either they permit only access to listed and allowed sites. But since the developers cannot keep up with all pages on the Internet, only a small subset is listed. Alternatively, they try to guess whether a document is suitable or not, this is done by scanning for certain character strings, like "sex", "breast" and "xxx". This has led to horrendous mistakes, such as prohibiting information from Middlesex (a local government in England) or prohibiting information about breast cancer. A computer user complained that when he downloaded code in a particular script language from the Internet, the code was distorted in funny ways. For example, the following piece of script code:

```
#define one 1 /* foo menu */
#define two 2 /* bar baz */
```

Was corrupted in the following way:

```
#define one 1 /* foo      */
#  fine two 2 /* bar baz */
```

I leave it to the reader to compare the scripts and conclude what "Cybersitter" had done with his script code and why.

### Is the Internet Illegal

Actually, almost all usage of the Internet is illegal according to the privacy protection laws in many countries. These laws prohibit all transport of personal data from one country to another without permission from the government. If these laws had been programmed into the computers, then we could not have had the Internet we have today. We should be happy that the laws are enforced by humans who understand that the intention of privacy protection laws are not to prohibit free speech. You cannot be sure of this. I ran one of the first Swedish BBS-es in 1978. We were forbidden to run our BBS by the Swedish Data Inspection Directorate. Later on, we were allowed to start it again, provided that we did not allow anyone to write any political or religious opinions in forums on the BBS (Since the Swedish Data Act forbade the creation of registries of political and religious opinions, except in certain special cases, but in contradiction to the Swedish constitution, which specifically says that the right to communicate freely on political and religiuous issues should be protected). We continued to use our BBS including some discussions of political or religious issues. No one prosecuted us. But what would have happened if the computer had been programmed to recognize and automatically prohibit any message with political or religious content?

### The Computer need not Stop all Unwanted Behavior

The idea that human rulebooks should be programmed into computers is closely connected to another faulty idea. This other faulty idea is that anything is legal, which the computer permits you to do. "The computer did not stop me from accessing this data", is the standard defense from the cracker who breaks into a computer.

If you believe that anything allowed by the computer is legal, then obviously you have to program the computer to prohibit all unpermitted behavior. One can understand the danger of this by trying to envision a society where all illegal acts are made impossible to perform. Hammers are not allowed, since you can kill people with a hammer. Suppose you need a hammer in woodworking. Tough luck, this is illegal, hammers are inherently dangerous. In order to prevent crime, every movement from one place to another without permission might be prohibited and monitored. Is this the kind of society we want?

A real example which I have actually seen: A building where I worked was split into zones. Whenever you moved from one zone to another, you had to insert a keycard into a slot to open the door. A person inserted the keycard, opened the door, then dropped the keycard, bent to pick it up, while the door closed with the person still in front of the door. The door locked automatically, so the person inserted the keycard again to open the door. This did not work. The computer obviously reasoned as follows: "This person has already passed into the new zone. She cannot be in front of the door. So her keycard must be falsified or wrongly used."

Faulty programming of the computer? Perhaps, but you can never be sure that your program is perfect. And making the program more complex by taking into account more special cases in deciding what the computer allows and prohibits may introduce more bugs, while removing old bugs in the software. The new bugs may be more insidious and difficult to find. All problems are not best solved by making computer software more complex. Some problems are better solved by letting humans, instead of computers, make decisions!

### Calendar Scheduling

A good example to discuss these issues is the use of computers to schedule meetings. This may at first seem like a good way of using computers. But the more you look at the problem, the more you find that real meeting scheduling includes so many special cases, where human judgment is needed, that it becomes very difficult to get the computer to do this automatically. For example, some meetings are more important than other meetings, and may cause other meetings to be rescheduled, but such a decision cannot be done by a computer. And there are contextual factors, like knowing that you should never schedule a meeting with a certain person on a Monday morning, which everyone knows, but which are difficult to put into the computer.

### INTELLIGENT USER INTERFACES

When we designed the KOM forum system user interface in the 1980s, we wanted to make the software easy to use and adaptible to user needs. To achieve this, a user could rapidly scan through everything new to this user, by a very simple repeated command. But different forums have different importance to different people. We then let users order the list of subscribed forums according to their personal preferences. The default method of scanning through news made this in the user-preferred order.

But how should users tell the computer which forums are of special importance? In the first version, we did not want to burden users with special commands to reorder the list of forums. Instead, we designed the software so that whenever a user exited from a forum, without reading everything new in this forum, the system automatically concluded that the forum left should be lowered in priority, and the forum to which the user moved should get increased priority.

Users, however, did not like this. They felt that the computer tried to control them, by reordering the list of forums automatically. So in a later version, we removed the automatic reordering of forums, and gave users explicit commands to do this reordering instead.

### Conclusions

The successes of human society is based on the flexibility of humans and their willingness to adapt their activities to different circumstances.

Humans are most happy and productive if they can influence their living environment and contribute to solving problems together.

Laws and regulation are a form of communication between humans. They are in reality only guidelines, people have to adapt to varying circumstances and interpret and apply the rules with understanding and human compassion. If everyone had to adhere 100 % to all laws and regulations, human societies would not work any more.

This is usually no problem when the laws and regulations are written on paper. But if the laws and regulations are programmed into computers, so that the computers control what is allowed and not allowed, serious problems will often occur. In the best case, people will only be unhappy and unproductive, in the worst case, major catastrophs can occur.

Computer software must be designed to allow flexibility and human choice. Laws and regulations should be interpreted by humans, not by machines.

Making the software more complex, to include in it more different special handling of special circumstances, will often only make it worse. Instead of complex software, software should be flexible and open-ended.

There is a human tendency when designing software to want to include in it "proper procedure" and "experience how things should be done". This tendency can easily produce unusable or unsuitable software.

Possible exception: Certain security rules, where enforcement is needed to overcome human weaknesses.

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# A personal history of CMC (Computer Mediated Communication)



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http://www.dsv.su.se/~jpalme/
reports/a-personal-history-oh.pdf

## 1970: Gordon: P.E.T.: Parent Effectiveness Training

A book about how parents should solve family problems and train their children to become good people

**WHAT I LEARNT:**

• Listen to each other
• Understand each other's views
• Show that you understand each other
• Find win-win-solutions

## 1972: Horror stories about use of computers to spy on people

*"The credit card records show that John checks in with his wife into a hotel in London at the same time as his wife pays her hairdresser in Sweden"*

**WHAT I LEARNT:**

What is important?

• To protect personal privacy against spying computers?
• That people can control their own life

## 1973: Swedish Data Act

• It is illegal to store personal information in computers without permission by the Data Inspection Agency
• Every field type must have a specification of what kind of personal information can be stored in that field
• Storage of information about religious and political beliefs (illnesses, sex life, etc.) is only allowed under special circumstances
• Exception: Use of computers for typesetting

**WHAT I LEARNT:**

Politicians are not willing to see farther than their noses

## 1974: The General Public Information System
## Allmänhetens informationssystem

`<http://info.dsv.su.se/~jpalme/reports/general.html>`

Computers can be used to control people, or to give people more information and control over their own lives.

We must try to find uses of computers which give anyone easy access to lots of information, computers should open up information, not restrict information.

## 1970-s: The three truths of the 1970-s

⇒ Impoverishment of work tasks

⇒ Invasion of privacy

⇒ Industrial competitiveness

**WHAT I LEARNT:**

The only way to get people to understand that computers can aid people instead of controlling them is to show them practical applications.

## 1974: Arne Grip: ADB-system och kommunikation (Hermods-studentlitteratur 1974)

What I learnt (not all of this taken from the book):

- All computer usage is communication between humans
- Running a program is communication between its designer and its user, just like reading a book is communication between the author and a reader
- Computers can be used to control and regulate communication, by specifying *what* information *can* and *cannot* be transferred, by *whom*, to *whom*.
- In his book 1984, Orwell invented a new language, *newspeak*, in which forbidden utterances could not be stated. Compare rules about improper language in human communication.

- People feel strongly about language, because language is their tools for controlling their living conditions. Taking away language from people is taking away their power and security.

## 1975:
### Seeligman: Helplessness (Freeman, San Francisco, 1975)

A study of human depression showed that depression is strongly correlated by a feeling of helplessness, a feeling of not being able to control your own life.

**WHAT I LEARNT:**

Computer can cause this feeling, if the user feels that the computer (in reality, its designer) restricts the freedom of the user.

## 1988
### Donald Broady: Kulturens fält. Om Pierre Bordieus sociologi (in Masskommunikation och kultur, Nordicom 1988) and Desmond Morris's books

Human beings like to belong to groups with similar language, culture and values as themselves. Such groups give them a feeling of security and acceptance. Members of such groups tend to favour each other and to belittle and disparage the cultural utterings of people outside their own group.

**WHAT I LEARNT:**

Those who have control of computers tend to favour their own, those who are threatened by not having control of computers tend to disparage computer-oriented cultures.

## 1975:
### C.A.R. (Tony) Hoare: Software Design – a Parable (Software World, vol. 5, no. 9-10)

1. Computer software grows by adding more and more facilities.
2. This process is often strongly controlled by the present users of that software.
3. Through long experience with using the software, they master its usage and all its commands.
4. But computers by nature are restrictive, they only allow what their software is designed for.
5. Thus, the experienced users ask for new commands and facilities, and the developers give this to them.
6. Old software, which has gone through many such stages of evolution, tend to be very complex, with lots of commands, difficult to master for beginners.

7. Thus, strong user influence on software development can create a culture which frightens novice users away.

## 1975: Murray Turoff comes to Sweden

*"A computer is like a book with white pages. Any user can write what they like on these pages, and any other user can read what has been written."*

(This may sound self-evident today, but it was not at all self-evident when Murray Turoff first said it.)

Murray Turoff introduced us to the *conference system paradigm* of software design.

## 1975-1990: EIES, Murray Turoff and Starr Roxanne Hiltz

The first software in this category was EMISARI invented by Murray Turoff in 1969, and another well-known software was Forum-Planet, invented by Jaques Vallee in 1971.

The EIES system, invented and set up by Murray Turoff in 1975, was very influential in developing the new ideas. Around EIES grew a community of users and a community of developers who invented and tried lots of novel ideas of organizing human communication. EIES was also the basis of much groundbreaking research on the effects of CMC.

## 1977-1978: STU (today NUTEK): Forum-Planet, Consumer Information Systems

Tomas Ohlin was a person who strongly believed in the new ideas. He was responsible for getting Murray Turoff to Sweden, he arranged for Forum-Planet to be installed in Sweden, he arranged for a number of prototypes to be developed to show how computers could be used for giving more information to more people, for example in the area of information for consumers.

**1978:** Turoff and Hiltz: The Network Nation

This revolutionary book describes a future society in which computer networks plays a central way in opening up new vistas for human-human communication and information exchange. It is a description of what Internet is beginning to become today, written more than a decade earlier.

**1978:** KOM forbidden by the Swedish Data Inspection Agency

The Swedish Data Act, as it looked like in 1978 (and to a large extent still today) makes almost all storage of plain text information about humans in computers illegal. I noted this in a debate with Jan Freese, the director of the Data Inspection Agency and the creator of the Swedish Data Act. He said that these problems should be solved, and I should apply for permission.

After several talks to people in the Data Inspection Agency, I applied for permission to use the KOM system, and stated in my application that we could not, in advance, prescribe exactly what people would want to write about in their messages to each other.

Result: Our system was forbidden by the Data Inspection Agency.

**1979:** KOM allowed with humiliating conditions

My employer at that time (FOA) did not dare to appeal the decision. Instead, they negotiated a settlement which allowed KOM to be started on the following conditions:

- All messages must be deleted after two years.
- Personally addressed messages must be deleted after one month.
- No search is allowed on personal information in message texts.
- No messages may contain information about political or religious beliefs, or information about a person's health, sexual behaviour, etc.

• FOA was to make a study of the effects of KOM on its users, and make a continued application for permission after two years.

**1980-s:** **BBS-es**

The first Swedish BBS-es appeared, many of them with software functions copied from KOM. Most of them were based on personal computers, many could only handle one user at a time.

**1980-s:** Mammoth BBS-es: Prestel, Minitel, Usenet News, Compuserve, the Source, the Well, Bix, Teledata, TeleGuide

Many people had the same ideas of using computers to make more information available to and exchanged between ordinary people.

Little success: Prestel, Teledata, TeleGuide, etc.

Restricted success: KOM, Usenet News, the Well, Bix, Teleguide, Compuserve, Prodigy, the Source, America Online.

Universal success: Minitel, and, much later in the 1990s, the Internet.

Why did Minitel and the Internet in the 1990s succeed where so many others failed? Because of the lack of central control and the market structure of these two nets.

**1981:** NADA: Everyone must read this!

**1981:** KOM: Which meetings does N.N.: subscribe to?

**1981:** Digital: Should sender be allowed to check if his messages have been read by their recipients?

## Invasion of privacy?

KOM in 1980: Anyone can see a list of the meetings any other user is a member of, and a list of the members of a meeting, and see when each member last visited this meeting.

At NADA: The director of studies distributed on paper a copy of the list of members of a meeting with the added statement: All teachers at NADA must read the news in this meeting.

**1981:** Connection between QZ-KOM, NADA-KOM and ADB-KOM

## Simula experience meeting

Researchers wanted to discuss use of Simula

Students wanted to discuss Simula versus other languages, like Pascal

**1982:** New Swedish Data Act: No understanding

I wrote a bill to the Swedish parliament, together with Olle Wästberg, that the parliament should, while making other changes to the Data Act, make a statement saying that the implementation of the Data Act should be done with careful consideration of the freedom of speech. The motion was denied with no given reason.

**WHAT I LEARNT:**

Do not believe that politicians want freedom of speech. They only want freedom of speech for themselves. Computer users were at that time a pariah whose human rights could be violated.

**1982:** Humiliating conditions on KOM withdrawn partly

personal messages for longer than one month. But all messages had still to be deleted after two years. They also lifted the restrictions on political and religious discussions.

Their given reason: Since no processing can be done of the message texts, they were not personal files in the meaning of the Data Act.

But a year later, they allowed us to do searches in the message texts, i.e. processing of the data!

## 1982: to the Internet (KOM, Usenet News)

## 1984: KOM for hobby computer users

SE-banken sponsored our very expensive transatlantic transfer of messages between the Internet and KOM.

QZ established a special, low rate for use of KOM by hobby computer users after 20:00 in the evening.

---

## 1985: Viruses, crackers, Aftonbladet

We began to hear about computer viruses.

Crackers tried to log in to the KOM computer. The access system warned us immediately, and they never succeeded.

Aftonbladet ran a number of articles claiming, falsely, that the crackers had succeeded. Their faulty statements were repeated by many other newspapers, our denials were not published.

The reporter at Aftonbladet was sentenced with a very light sentence for attempt at illegal misuse of computer information.

**WHAT I LEARNT:**

- There is evil also among computer users.
- Newspapers have no interest in the truth, only in saving their skin and increasing their sales.

---

## 1980-s: Automatic software not liked

Case 1: Sorting of conferences in a personal priority order.

Case 2: Recognition of commands in ordinary text (get encouragement, get scolding)

Case 4: Get user description in 10th session.

Case 3: Basic and advanced mode.

**WHAT I LEARNT:**

- Do not try to make computer software more intelligent than it can be.
- People want computer software to be predictable.

A manager of a messaging system has to do some censoring of what is written, relying on the legal system is too late.

---

## 1986: Eskil Block slanders Maj Wechselmann

Eskil Block, a futures researcher at FOA, became a very active user of KOM, wrote a very large part of all messages (about 1 percent). His dominance caused disruption of the human-human communication. In some cases, additional, parallel conferences were opened for discussion of "the topic without Eskil Block".

One claim by Eskil Block was that the prominent Swedish film maker Maj Wechselmann was a Soviet spy. This caused scandal articles condemning KOM in newspapers and TV programs. Very little opportunity to get retractions and corrections published. Eskil Block was sentenced for slander to pay 15000 kronor in damage to Maj Wechselmann.

**WHAT I LEARNT:**

Mass media want to protect their monopoly on information exchange by scandal writings about competing media.

**1986:** Why people use CMC

"KOM is like a living encyclopedia, where you usually get many answers in a short time."

"You can even put a question in the middle of the night and get reply within a few minutes."

"We could not get the Swedish national characters printed on our printer. This plagued us for months, until I put in a question in KOM. Within a few hours, I had the solution."

"If you have special interests, you may only be able to talk about them to others for me become the channel for contacts with alike-minded bout within and outside of my work."

"KOM is something of an elite group: everyone of importance in the computer area can be found in KOM. You can reach people of importance. I have regular contact with some of the most qualified experts in the country through KOM."

"The contacts through KOM got me into my work as computer consultant."

"I have contact with like-minded people, with the same burning interest for computers as I have. These contacts have several times grown into personal contacts with new friends."

"You regularly meet people you did not know before, and exchange very much information".

**WHAT I LEARNT:**

---

## Why people use CMC

**Status and self-esteem**
Communicate with experts and qualified equals

**Confidence, competence**
Keep up with progress, not slide behind in your area of expertise

**Communion, comradeship**

**Inspiration**
Exchange of ideas with other people, which will inspire yourself

**Generosity**
Help others, feel that others appreciate your help

See URL `http://www.dsv.su.se/~jpalme/why-people-use-cmc.html`

---

**1995–1997:** Risk project

information exchange between researchers and society about risk research.

Moderate success the first half year. Then a saboteur got into the system, and frightened other users away.

**WHAT I LEARNT:**

"Open for everyone" does not work anymore.

---

**1990-s:** Internet, World Wide Web, First Class, Lotus Notes

**1991:** SuperKOM

Graphical user interfaces

Graphical messages

Data base integration

Replication

The big American software companies take over. Are there any openings for research development any more?

## 1998: Conclusions

Computer usage is communication between humans.

Human communication is a sensitive area.

Restrictions and "newspeak" should be avoided.

Humans should get freedom to express themselves and to adjust their actions to new circumstances.

Software should not be designed to give unfair advantage to the most experienced users.

Programmer egotism must be recognized and countered.

## 1995-1997: Ethics of the networks, spamming, rough justice

## 1997: Swedish BBS law proposed

There is evil in humans also on the networks.

Cancelbots, spam filters, virus filters.

Swedish BBS law proposal: The service provider is responsible, also for closed groups.

**WHAT I LEARNT:**

Rough justice more effective than legal action. But legal help would be useful, if the lawmakers were willing to listen to us and help us with our problems instead of making laws which will not work.

**Not:** Put all the burden on the service provider.

**Instead:** More efficient way of finding the perpetrators, require spam marking of spam messages.

## 1996-1998: Web4Groups

An EU-funded research project with partners in Sweden, Finland, Austria, Italy, England, Switzerland, Hungary.

• Web-based conferencing.
• HTML-formatted messages.
• Annotation facility.
• Multi-language support.
• Joint editing.
• Voting facility.
Controversial issues:
• Number of roles and permissions
• Example: Conference in which you are not allowed to unsubscribe

## Pull the Card and then Drop it on the Floor

## Never have a Meeting with the Boss on Monday Mornings

| Week 47 | | | |
|---|---|---|---|
| **21** Monday | | **22** Tuesday | |
| 8 | | | |
| 9 | | | |
| 10 | | | |
| 11 | | | |
| 12 | | | |
| 13 | | | |
| 14 | | | |
| 15 | | | |
| 16 | | | |
| 17 | | | |

## Software Design and User Control

by:
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## A Child Runs in front of the Cars

# Breathanalyzer Lock

# Electronic Shackle

# A Haircut or an Important Meeting?

Week 47

| 21 Monday | 22 Tuesday |
|---|---|
| HAIR BOSS | |

# Too Long Wait Time for the Lifts

Technician: Faster lifts will cost $$$.

Economist: The saved time is not worth the cost.

Administrator: Reorganize so that people do not have to move between floors.

Psychologist:

# Distortion of communication

NT used by several people. Lines corrupted when downloaded from the Internet:

The lines that were corrupted were of the form

```
#define one 1 /* foo menu */
#define two 2 /* bar baz */
```

What was transferred to this machine only was:

```
#define one 1 /* foo me */
#   fine two 2 /* bar baz */
```

# Too Long Wait Time for the Lifts

Technician: Faster lifts will cost $$$.

Economist: The saved time is not worth the cost.

Administrator: Reorganize so that people do not have to move between floors.

Psychologist: Install mirrors in the Halls.

# How People Handle this Problem

**User representatives:** We know what is right and wrong. We will not let the computer allow what we know is wrong.

**Result:** Users cannot adapt to the nuances of real life.

**Technical developers:** Just insert a new software feature!

**Result:** A complex system, with lots of features, like a christmas tree. Those who know the sacred books can get what they want. Those who do not know become helpless.
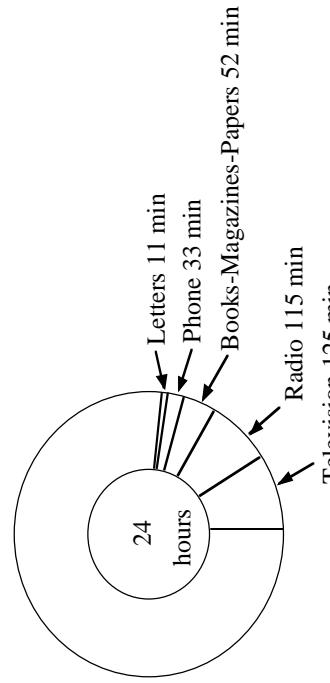
what is allowed and not allowed, serious problems will often occur. In the best case, people will only be unhappy and unproductive, in the worst case, major catastrophs can occur.

- Computer software must be designed to allow flexibility and human choice. Laws and regulations should be interpreted by humans, not by machines.

- Making the software more complex, to include in it more different special handling of special circumstances, will often only make it worse. Instead of complex software, software should be flexible and open-ended.

- There is a human tendency when designing software to want to include in it "proper procedure" and "experience how things should be done". This tendency can easily produce unusable or unsuitable software.

- Possible exception: Certain security rules, where enforcement is needed to overcome human weaknesses.

# Laws, Rules and Regulations

- A tool for control and power
- A tool for communication

## Rules are based on a model of the system they are used for

This model is always incomplete, because it is not possible for any activity to include all variations and special cases.

# Summary

- The successes of human society is based on the flexibility of humans and their willingness to adapt their activities to different circumstances.

- Humans are most happy and productive if they can influence their living environment and contribute to solving problems together.

- Laws and regulation are a form of communication between humans. They are in reality only guidelines, people have to adapt to varying circumstances and interpret and apply the rules with understanding and human compassion. If everyone had to adhere 100 % to all laws and regulations, human societies would not work any more.

- This is usually no problem when the laws and regulations are written on paper. But if the laws and regulations are programmed into computers, so that the computers control

*Excerpts from the book "Electronic Mail" by Jacob Palme, with some additions of new information after the publication of the original book.*
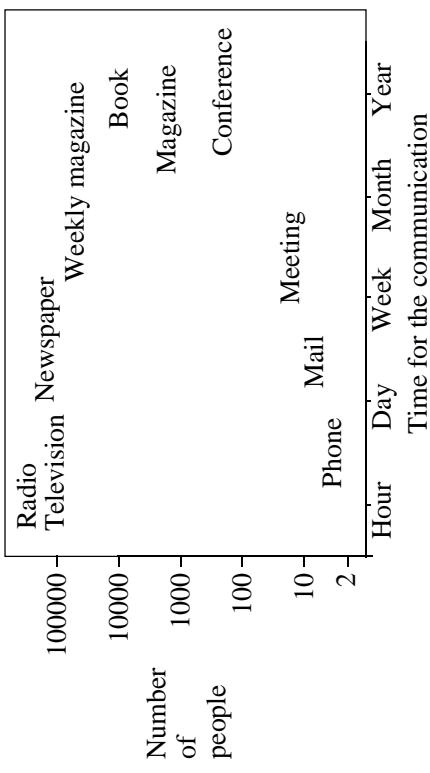
## Chapter 2

# Electronic Mail and Other Media

People today spend a large part of their time on communication with other people by technical means. The figure below shows how much time the average Swede spends on the most common technical communication media.



24 hours

Letters 11 min
Phone 33 min
Books-Magazines-Papers 52 min
Radio 115 min
Television 125 min

**Use of technical communication modes.**

If you compare the speed with the number of people reached, you get the diagram in the figure below.



Radio
Television   Newspaper
Weekly magazine
Book
Magazine
Conference
Meeting
Mail
Phone

Number of people: 100000, 10000, 1000, 100, 10, 2

Hour   Day   Week   Month   Year
Time for the communication

**Speed and size of the user group in various media.**

What is interesting about the figure above is the large empty space in the middle. There are no good conventional media for communicating to groups of 8-1000 people in a day or less. Electronic mail and other computerized media makes such communication possible.

The figures above only include well-known, traditional media. New media, whose use is not yet very prominent in statistics for the whole population of a country, include, for example:

- Telex and its more modern variant teletex;
- Fax,
- Group telephone calls (audio conferencing);
- Video conferencing;
- Databases and videotex systems;
- Electronic mail and voice mail systems; and
- Bulletin board systems and computer conferencing systems.

Even if the term "electronic mail" could be interpreted to include most of these media, the term is normally used for those media where the ability of a computer to organize and sort information is used in a more qualified way. That is the way the term is defined in this book. This book is thus not about, for example, telex, teletex, or fax. The book does, however, include group communication via distribution lists, bulletin board systems, and computer conference systems.

*Electronic mail*, as defined in this book, has the following properties

1

2

- The user produces, sends, and usually also receives mail at a computer screen, a terminal, or a personal computer.
- The messages sent have a data structure, which can be handled by a computer. This structure can be more or less advanced: it can, for example, allow the user to ask his computer to find the last received letter from person $N$ about the subject $XYZ$, or to find the outgoing message, to which a certain incoming message replies.

A better term for such systems might be *computer mail*, but since electronic mail enjoys widespread usage, that term will be used in this book.

Another common term for systems in this area is *CMC (computer-mediated communication)*. This term encompasses all computer systems whose primary aim is to relay information between persons. Electronic mail, bulletin board systems, and computer conferencing systems are most common for CMC. Since e-mail is more often embedded in other applications, the borderline between e-mail and other computer applications is not well defined.

Another term in this area is *groupware* or *CSCW (computer supported cooperative work)*. This is software for communication between groups of people. Johansen [1] proposes that different groupware applications can fit into different quadrants of the figure below [2].

|  | **Same place** | **Different place** |
|---|---|---|
| **Same time** | Ordinary *face-to-face* meetings, but may be supported by computer tools, for voting, producing records, pinpointing issues, etc. | *Video and audio conferences*, supported by computer tools similar to those for same time/same place but operating in a wide-area networked environment. |
| **Different time** | *Electronic mail, voice mail* and *computer conferencing* usually belong to this area. Such systems must be able to store messages and a structured organization of such message stores is often useful. The functionality for different time applications is usually similar for same place and different place usage. | |

**Time-place functions of different media. After [2].**

Electronic mail and related applications are common tools in the *different time* half of the figure above. The term electronic mail is not normally used to refer to *same-time* text communication systems. Thus, electronic mail needs facilities to store messages. Messages are usually stored in personal mailboxes for senders and

recipients, but some systems for group communication employ storage areas shared by several users.

## REFERENCES

[1] Robert Johansen *Groupware—Computer Support for Business Teams*, The Free Press, New York, 1988.*Johansen, RobertJohansen, Robert*

[2] Robert Johansen *Leading Business Teams: How Teams can use Technology and Group Process Tools to Enhance Performance.* Addison-Wesley ISBM 0-201-52829-0, 1991.

# Chapter 3

## When is Electronic Mail Successful?

Few people will obtain a computer just to use electronic mail. *Electronic mail* is usually a fringe benefit of having a computer at your work or home. Many people feel that it is not worth the effort of learning to use a computer just to be able to use electronic mail. If, however, you already have a computer and regularly use it, then it requires little extra effort to use electronic mail. Also, a person who has entered the "wonderful world of computers" often needs to communicate with other people who use computers and electronic mail is a natural medium to use.

Everyone makes a personal choice of whether electronic mail is worth the cost just for him/her (It is seldom successful to try to force electronic mail on people who do not themselves feel the need for it).



The effort of learning to use the system. Cost of computer and communications.

The contacts and the information you can get and give.

**Factors in a personal decision to use or not to use electronic mail.**

The figure above shows the most important pros and cons in this personal choice.

These factors are important, if you want to predict whether the introduction of electronic mail in a group will be successful. If the people involved already use computers and if you can make the electronic mail application easy to use, then this will increase the probability of success. If the electronic mail application allows its users to reach many people and if they find it important to exchange information with these people, then the probability of success will again increase. Note that the pros are related to the volume of e-mail usage, while the cons are volume independent. Thus, higher volume increases the likelihood that the pros will outweigh the cons.

The following criteria are especially important to the success of electronic mail:

- The users should be accustomed to using computers. (Typing capability, however, is of less importance.)
- Each user should have a computer screen at his workplace and not need go to another area to use the electronic mail system.
- People who the users find it important to communicate with should be active users.
- The users should feel a real need to communicate with people who they can reach via electronic mail.
- users should feel a "solidarity" with other active users of electronic mail.
- The total amount of communication offered should be large enough to satisfy the user. This is often related to the number of people the user can reach via electronic mail.

Note that lack of other communication channels is *not* necessary for success with electronic mail. Even though an advantage of electronic mail is that it makes it simpler to communicate across large distances, much electronic mail is in fact between people in the same building or place.

As a consequence of the above factors, one can conclude that the introduction of electronic mail will often *not* be successful in two common cases
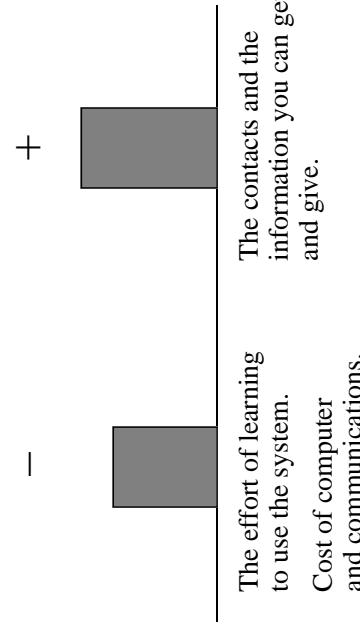
- The decision to use electronic mail has been made by people other than the actual users, simply because the decision makers believe that the use electronic mail is a high priority, even though the users themselves find other things more important.
- Electronic mail is introduced on a too small a scale, so that it does not reach the necessary critical mass (see Section 4.6   Group Size and the Critical-Mass Hypothesis) of users and/or communication volume.

# Chapter 4

# Value for People and Organizations

## 4.1 NEW COMMUNICATION OR OLD COMMUNICATION IN A NEW MEDIUM?

Much behavioral-science research has been done on electronic mail . This research has resulted in a considerable amount of data about the effects of electronic mail on people and organizations. One important result is that electronic mail does more than just change the form of communication from other media to computers. The introduction of electronic mail changes communication patterns, so that people communicate with different people than before, more often and about other subjects than before.



| | |
|---|---|
| 13 % | Replacement for formal and informal face-to-face meetings |
| 14 % | Replacement for phone calls |
| 6 % | Replacement for postal mail, circulars, message slips |
| 65 % | New communication |
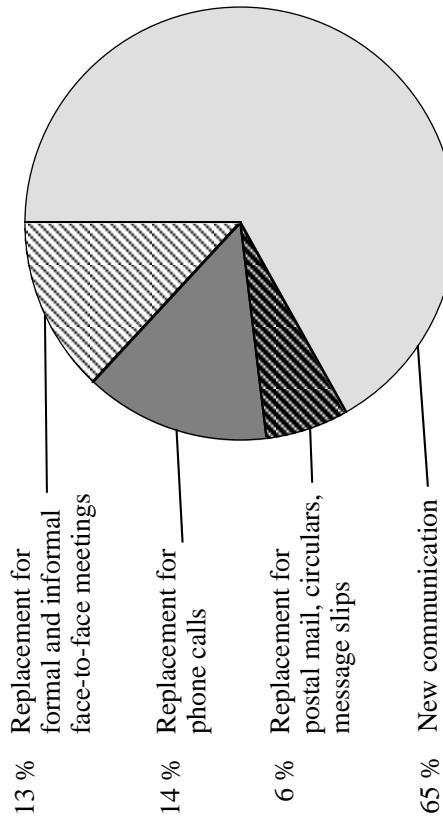
**Is electronic mail a replacement for other media?**

The figure above shows the result of an investigation [1] into the use of an e-mail system, a few years after its introduction. The percentages given show how much of the communication is new communication, that would not have occurred without e-mail and how much is communication that would have occurred with conventional media. The results may seem surprising but will not be so after some consideration. Look at other important media, such as print or telecommunication. If you look at all the communication via books, journals, newspapers, and the telephone, you would certainly conclude that most simply would not occur if these or other similar media had not been available and thus that most of the actual communication, in the printed and phone media, is new communication. If a communication medium opens possibilities for new kinds of contacts that would not have been practical or economically possible without the new medium, then people will take advantage of the new possibilities and change their patterns of behavior.

## 4.2 CHANGES TO ORGANIZATIONS

Thus most of the communication is new, then electronic mail has changed with whom and about what people communicate. In other words, electronic mail has changed the social behavior in an organization and has probably also changed the social workings of the organization.

How, then, has the behavior of an organization changed? The investigation [1] this looked at how much communication was between people who were close to each other (employed in the same department) and how much was between different

departments and with people outside the organization. The investigation compared personally addressed messages and group messages. A group message is a message in which the sender did not explicitly input the names of the recipients when sending the message. Instead, the sender gave only the group name, and the computer then sent the message to all the members of the group. Such a function is available in most electronic mail systems. The result of this investigation is shown in Figure the figure below.



Personally addressed messages

Group messages

46 % Within departments    18 %

54 % Out of departments    82 %
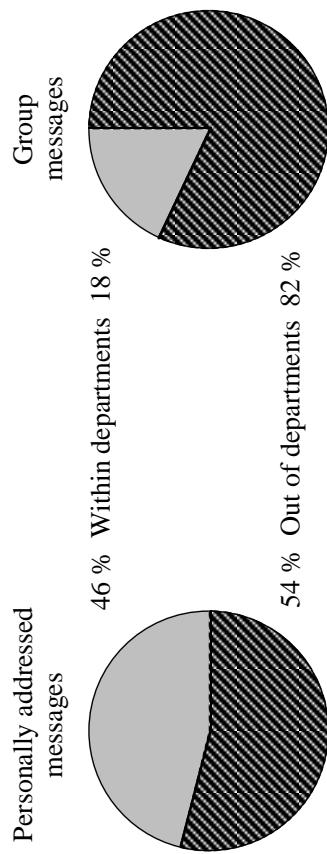
**Use of e-mail to communicate to people who are close or far away.**

This figure shows an important effect of electronic mail: increased communication between people who are distant geographically or organizationally. Without CMC, [4] finds that a surprisingly large percentage of the contacts of company employees are with other people less than a 100 feet away. Other investigations [2] have shown similar results and also found that electronic mail increases the contacts which do not follow the hierarchical organizational charts, that is, contacts between people other than coworkers and between bosses and their subordinates. The change may not always be as radical as shown in the figure below, which shows the tendencies of change in an organization when electronic mail is introduced.

9

Hierarchical organization        Network organization
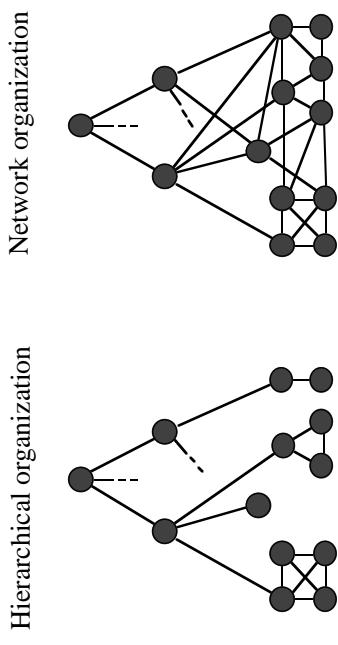


**Organizational effects of electronic mail.**

As an example [3] tells the story of a large American company, where an employee had an idea for a new product and told other people in an electronic communication group about it. Other employees in different locations jumped at the idea, and a smaller group of people with a special interest in the idea was formed to discuss the design of the new product. If you analyze this example, you will see that it only took a few days from the idea to the formation of a group of experts, with members from different parts of the company, to the development of the product. If the company had used traditional communication patterns, several months would have passed before the new idea had filtered up and down through the organization and caused such a geographically distributed group of experts to be formed.

**4.3    WILL ELECTRONIC MAIL IMPROVE COMPANIES?**

Are these changes to organizations good or bad? A complete answer to this question cannot be given, but some investigations, for example [4], show that those development groups that had many geographically diverse contacts, were more successful than groups whose contacts were mostly within one area. The explanation for this is believed to be that small, closed groups tend to be conservative, and continue to do things in the same old ways. They have difficulty coping with change and accepting new ideas. Such adaptation is necessary if an organization is to succeed in a changing world.

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## 4.4 EXCHANGE OF EXPERIENCE USING ELECTRONIC MAIL

One large area of electronic mail is the exchange of experience between experts in different places, within one organization or between different organizations. Examples include:

- Users of the same computer product;
- Researchers in the same area;
- Lawyers specializing in a particular legal field; and
- Doctors specializing in a certain area of medicine.

This has become a common application for electronic mail because it simply was not possible with any other medium to have contact every day for a reasonable cost between a geographically distributed group of experts. (See Section 5.5 Comparison with Face-to-Face Meetings.) The cost with other media would have been prohibitive; electronic mail has a particularly low cost when compared to alternative media.

## 4.5 THE CHANGING ROLES OF SUPERVISORS AND MANAGERS

Experience at one e-mail user group [1] was that communication within the system was as common for supervisors as for nonsupervisory personnel, and was a little more common for people who were less than 40 years old. At ordinary, face-to-face meetings with participants from different departments, supervisors and people older than 40 were strongly overrepresented. Thus electronic mail also gave young employees and nonsupervisors an opportunity which before had been available only to older employees and supervisors. See, for example, the figure below



*With electronic mail*

15 % of all employees were supervisors
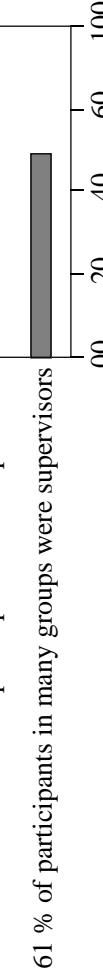
18 % of all e-mail users were supervisors

13 % of very active e-mail users were supervisors

*At face-to-face meetings*

37 % of all participants were supervisors

61 % of participants in many groups were supervisors

**Percentage supervisors in e-mail as compared to face-to-face meetings in a large research agency [1].**

These results are due to the fact that electronic mail systems usually are designed to give equal control over the communication to all users. In this way, electronic mail is similar to phone and postal mail, which also are egalitarian. If, instead, an electronic mail system is designed primarily to support the communication needs of the supervisors, then the result will be different. At the GMD organization in Germany, an electronic mail system, COMEX, was specially designed to fit into the hierarchical organization of the company. As a result, the system benefited supervisors the most.

The changes in the workings of an organization described above will also influence the role of supervisors. One role of a supervisor is to move information along the traditional channels of communication in an organization, for example, between subordinates and supervisors. Another role is to find the right person to perform a certain task. These roles are, to some extent, taken over by the computer when electronic mail is used.

Different supervisors have different reactions to the introduction of electronic mail. Many experience positive effects

- Supervisors are freed from mundane work, since the computer system will perform some tasks that they previously had to perform themselves. (Supervisors are often overwhelmed by such tasks.)
- Supervisors can use the computer to encourage discussion of an issue and collect the ideas of many employees, reducing the risk that some important aspect of the issue is forgotten.
- The computer helps supervisors monitor what is happening in his organization.

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11

Other supervisors react negatively to the introduction of electronic mail. They feel their position of control threatened. They are afraid that employees will use the system to push the organization in unsuitable directions. They may also be afraid that the computer system will make it easier for employees to confront them and raise questions they would rather not respond to.

## 4.6  GROUP SIZE AND THE CRITICAL-MASS HYPOTHESIS
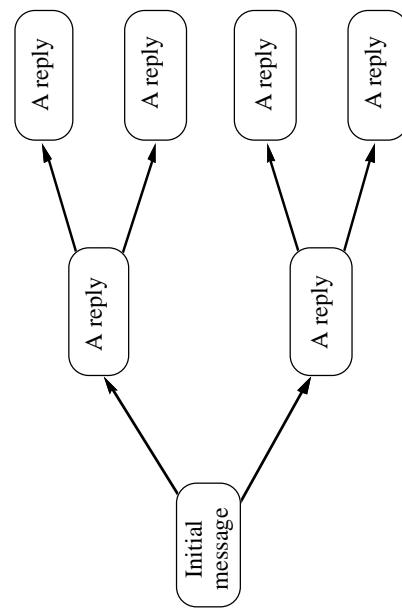
**Chain reaction of group discussions in electronic mail.**

Electronic mail commonly uses either distribution lists or computer conferencing systems/bulletin board systems for group communication. The lower size limit for a successful group for the exchange of experience is usually between 20 and 50 active participants. (Groups for other tasks than experience exchange can be successful with much smaller group sizes.) This is probably because the activity in these groups is a kind of chain reaction. Much of what is written is a response to a previous message. Assume, hypothetically, that the probability for each group participant to reply to a message is 0.05. With $N$ participants in the group, each message will on average generate $0.05 \times (N-1)$ new messages. If the group size is 21 participants, then this figure will make 1. Thus, with fewer than 21 participants in the group, on average, each message will generate less than 1 new message, so that the chain reaction is subcritical. If the group size is larger than 21 participants, each message will, on average, generate more than one message, and we get a sustained chain reaction. Of course, the real figures are not always exactly 0.05 and 21, but the principle still

applies: group size must be above a certain threshold if activity within the group is to be sustained.

The figure above shows how a chain reaction of messages can arise if each message on average causes more than one replying message.

The effects of group communication on group size is discussed further in Section

5.5  Comparison with Face-to-Face Meetings.

## 4.7  EXAMPLES OF OBSERVED EFFECTS OF E-MAIL/CMC

This section provides some examples of observed effects of CMC (e-mail with group communication support) on organizations. Most of the examples here and in Section

4.8  Coordination and Decision-Making are taken from [5].

A salesman wants to sell the product ABC to a customer in the XYZ branch. He uses the CMC networks in his company to inquire about other customers in the XYZ branch who have bought the ABC product. This example shows how CMC networks are used to find information available in other parts of the company. Note that the information to be found was not found in a computer data base. The search was not done on information in the computer, but in the knowledge of other employees connected to the network.

As an alternative, the company could have a data base with this kind of information. However, this can be very costly compared to the usage of the data base. CMC networks can thus be more efficient than preestablished data bases when a company's information needs cannot be well defined in advance, such as to improve the capacity of the organization to cope with new, unanticipated problems.

In another example [6 as quoted in 5] Tandem computers installed a network of 8,000 personal computers for a large company. A serious problem occurred during the installation, a problem which could have stopped the whole installation process. Through use of CMC networks, it was easy to find a Tandem employee who could solve the problem, and it was resolved within 24 hours.

Unexpected problems often occur in routine work, and CMC is a valuable tool to quickly assemble the information needed to solve such problems. Note that this is very different from the communication provided by company newsletters. Such newsletters give the same information to everyone and only contain a small collection of all possible information. CMC networks, on the other hand, let people ask for information specific to their needs, which means that they get the information relevant to their problems when the information is needed.

## 4.8 COORDINATION AND DECISION-MAKING

In preparing for decisions, it is important to assemble all facts, ideas, alternatives, and consequences before making the decision. CMC has been found to be more efficient than face-to-face meetings in assembling information, because more people can be reached more quickly and at reasonable costs [7]. CMC has also been found to be more efficient for at coordinating the work done at different places in an organization [8]. Traditional media, like travel, face-to-face meetings, courses, inventories, and company regulations, are not always very efficient in coping with such coordination problems. Travel may be too expensive. The main advantage of CMC is that it goes on all the time in parallel with other activities. Whenever you have a problem, you can immediately reach a group of people who can help you.

The lack of body language, voice inflection, etc. increases the risk of misunderstandings. Locked situations will more easily occur in CMC, where people stick with their initial opinions and are unable to agree. CMC may need to be combined with face-to-face or phone communication in such cases.

To reach an agreement, or at least to make a decision in order to go forward, it is important to get a feeling about the general view of the participants. This is not only a matter of the majority view, a strongly held minority view may succeed against a less strongly held majority view. Most messaging systems do not provide tools to get such a feeling of the general view, and this can seriously restrain progress. In most messaging systems, you only see the opinions of those who actively write messages, while in face-to-face meetings, also the opinions of other participants are felt by a good chairman through body language.

In face-to-face meetings, the limited time and desires of the participants to get results will often stop a discussion on an item when nothing more important is said and the discussion starts to repeat itself. In most messaging systems, there is no such tool to stop discussion, and this can cause discussions to be too longwinded. Experienced chairpersons in messaging groups have developed tools to at least partially alleviate these problems, by forcefully saying "no more discussion on this" and by trying to summarize the opinions.

Many messaging-based groups (mailing lists, newsgroups, bulletin boards, etc.) allow anyone to participate. Sometimes this causes serious clashes between different groups of people who want to discuss different things, and often the only resolution is to split the group or to exclude certain members from further participation. In face-to-face meetings, less drastic measures are often available.

Possible, future development of CSCW techniques will develop computerized tools which will help to solve these problems and be able to replace the face-to-face cues. But such tools are not commonly in use yet. Certainly, chairmen of messaging based groups need to learn new skills in order for the new medium to work well.

Some researchers [5] claim that electronic mail tends to favor something called "flaming", by which is meant stormy debates of uncontrolled outbursts of anger. Other

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researchers do not agree that flaming is more common in e-mail than in other human communications media or not. The word "flaming" is also sometimes meant to refer to sudden intensive bursts of lot of messages in e-mail distribution lists and conference systems, often on small specialised issues and with much repetition and long-worded contributions. The difficulty of reaching consensus in e-mail may be one reason why such flame bursts sometimes tend to be more long-lived than in other human discourse. Another reason is that there is usually no time limitations in e-mail as in face-to-face meetings. Sometimes ethical rules for e-mail try to discourage flaming by recommending that "if a message makes you angry, wait a day until your anger dies down before writing a reply".

CMC can increase feelings of "togetherness" and understanding with other people in an organization. Without CMC, people tend to extend such feelings to only a few people with whom they interact daily. While employees are generally more loyal to their own branch office than to the whole company, CMC can integrate geographically distributed people more integrated into the activities of their company [9]. CMC usage increases the loyalty and positive feelings to the whole company [10].

For a merger between companies to be a success, it is important to integrate the employees into the whole new company, while preserving their individual knowledge and experience. Reference [5] reports that connecting all the employees to a common e-mail network was an important tool in this process.

Investigations show that CMC allows a person to participate simultaneously in more parallel group processes and have a more flexible range of contacts. Increasing the number of parallel group processes in this way has even been shown to increase the mental health [11].

CMC also increases the contacts with people outside a company [1, 2, 12]. This is important because people are surprisingly willing to help each other even if they work in different organizations. Such cooperation patterns make companies more able to follow trends and avoid getting stuck in old and inadequate ways of solving problems [4, 5].

CMC has also been found to be a useful tool for distance education [13-16].

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# Chapter 5

# Cost/efficiency Analysis

## 5.1  HOW COST/EFFICIENCY ANALYSIS CAN BE USED

There are several reasons for making a cost/efficiency analysis of electronic mail. The analysis can be a basis for decisions on
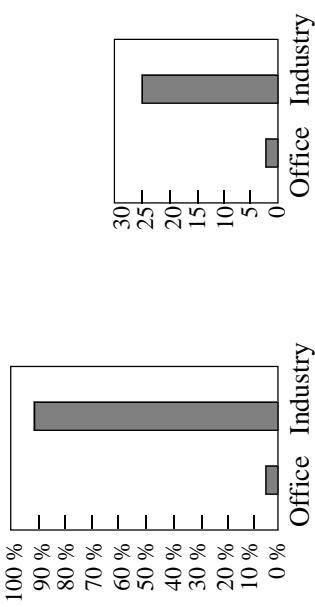
- Whether and how to introduce electronic mail into a company;
- What kind of system to obtain;
- How to use an electronic mail system; and
- Changes in the organization of work as a result of the introduction of electronic mail.

## 5.2  CAN THE PRODUCTIVITY OF OFFICE WORK INCREASE?

*Bair, JamesBair, JamesBair, James*When techniques for word processing, electronic mail, etc., first began to be used, James Bair [1] analyzed the potential for improvement in the efficiency of office work. He noted that, during a ten-year period, productivity had risen much faster in industrial production than in office work, as shown in the figure below. He then looked at the possible gains in starting to use word processing systems, which today is still the most common computer application. He looked at how much of the time is actually spent writing text. His results are shown in the figures below.
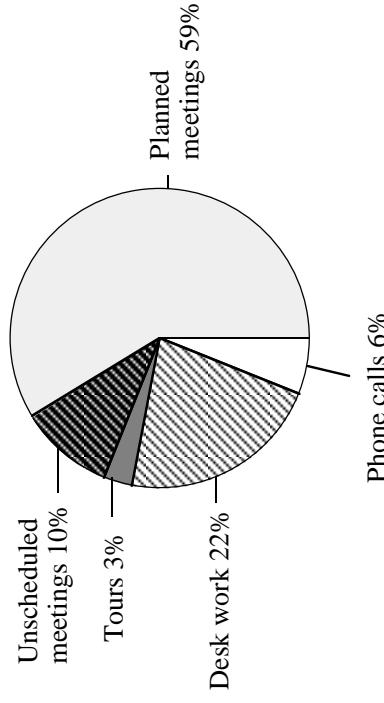
people typing their own texts instead of using a typist, we might say that Bair's reasoning is faulty. He only looked at the possible improvement within an existing organization of work and did not take into account the improvements possible by changing the organization of work—having people typing who did not type before.

Still, Bair's reasoning is interesting, since he also looks at where real efficiency gains are possible. What kind of office work is so common, that improvements would really result in large savings? The work time of supervisors and administrators is distributed as shown in the figures below.



Pie chart: Planned meetings 59%, Unscheduled meetings 10%, Tours 3%, Desk work 22%, Phone calls 6%

**Fraction of the working time managers spend on different activities. Source [1]**

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Ten-year increase in productivity in U.S. industry (Office, Industry)
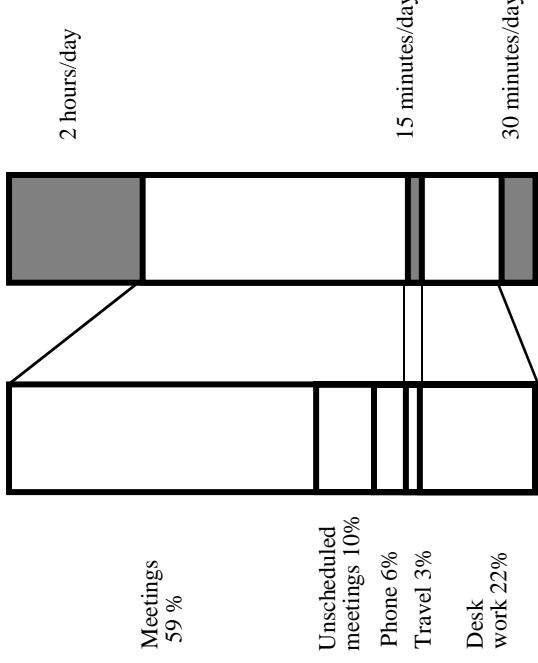
Capital investment per employee (thousands of dollars) (Office, Industry)

**Comparison of productivity increase for clerical and industrial work. Source: [1].**



Managers and administrators 26%
Professional and technical 40%
Clerical 28%
Secretaries and typists 6%

Face-to-face talk 6%
Phone call 8%
Clerical work 13%
Making copies 20%
Coffee and personal 2%
Waiting for work 18%
Handling mail 4%
Dictation 2%
Miscellaneous 5%
Typing 20%

**Percentage of personnel costs for different activities in office work. Source [1].**

The figure above shows that typing was only 20 percent of the working time for 6 % of the personnel. In total, Bair said that typing represented 2 percent of the wage sum in an office. Bair concludes that the benefit from word processing systems is very low. Today, knowing how word processing has changed office organization, with

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**Comparison of productivity increase for clerical and industrial work. Source [1].**

2 hours/day

Meetings 59 %

Unscheduled meetings 10%

Phone 6%

Travel 3%

Desk work 22%

15 minutes/day

30 minutes/day

Bair also says that a supervisor might improve his efficiency as shown in the figure above..One can see that the largest improvements in efficiency in the figure is for meetings of various kinds. This is the basis for the current interest in groupware. For electronic mail, the largest gain will occur when it is used for group communication. Thus, according to Bair, offices should obtain qualified electronic mail systems with good support for group communication, rather than word-processing systems.

Bair's analysis shows the potential for improving office work, it does not measure how this potential can be realised. A restriction of Bair's method is that it only looks at cost savings for existing work patterns and does not show the gains from new organizations of work made possible by the new media. The introduction of word-processing systems connected to common data bases has, for example, made possible a new way of working with texts that Bair's method cannot measure. But Bair's results are still interesting, however, and give us something to think about, even 15 years later.

## 5.3   COMPARISON WITH TELEPHONE CALLS

According to Bair, only every fourth phone call reaches the intended person: there are three unsuccessful attempts for each successful call. The total working time for the caller, the callee, and all other involved people (exchange operators, people

taking messages, people answering coworkers phones) is shown in the figure below. The time cost for each successful phone call is 20 minutes, compared to 4.7 minutes for an electronic mail message [1 and 2]. If four electronic mail messages can produce the same result as one phone call, then the electronic mail system is only slightly more efficient. If the task can be completed with less than four messages, then electronic mail is certainly more efficient. If more than five messages are necessary, then the phone will usually be more efficient. All this assumes that you only want to reach one single person. Since the high costs are for people, not for equipment, the comparison is not particularly sensitive to the technical costs of computers and phone calls.
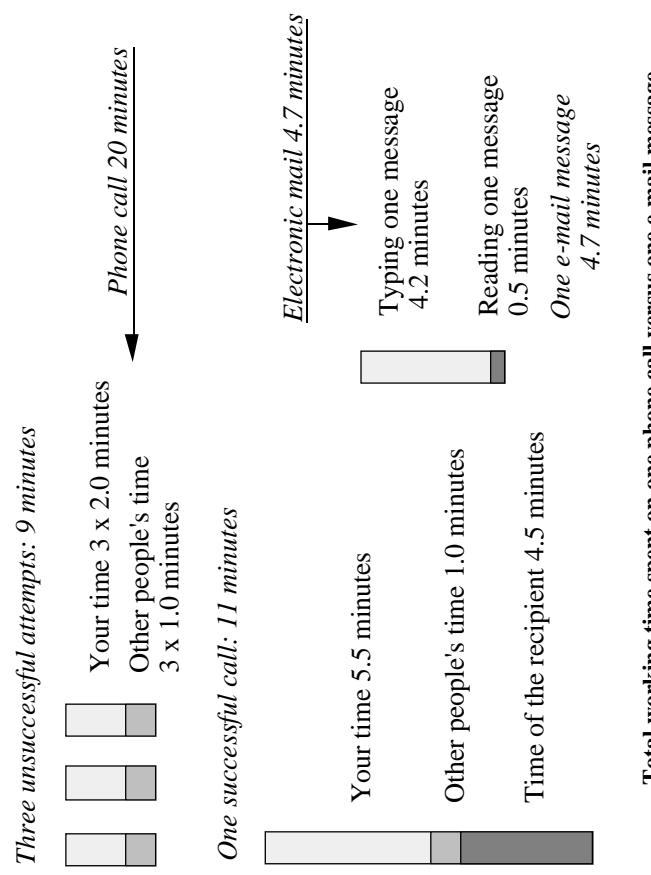
*Phone call 20 minutes*

*Electronic mail 4.7 minutes*

Typing one message 4.2 minutes

Reading one message 0.5 minutes

*One e-mail message 4.7 minutes*

*Three unsuccessful attempts: 9 minutes*

Your time 3 x 2.0 minutes

Other people's time 3 x 1.0 minutes

*One successful call: 11 minutes*

Your time 5.5 minutes

Other people's time 1.0 minutes

Time of the recipient 4.5 minutes

**Total working time spent on one phone call versus one e-mail message.**

**Comparison of the cost of phone calls versus electronic mail.**

The figure above shows when phone calls or electronic mail are most efficient, assuming that each electronic mail message, taking 4.2 minutes to write and 0.5 minutes to read, replaces 1.2 minutes of the time for phone calls. The figure shows that phone calls are hardly ever the most efficient way to reach more than one person. Theoretically, two phone call might be more efficient than electronic mail if each phone call lasted more than one hour, but you very seldom want to discuss the same topic by phone for more than an hour each with two different people.

One can thus conclude that electronic mail is almost *always* more efficient in terms of time spent if you reach *more than one person*, or, when you only need to reach *only one person*, if the task can be completed with less than four or five messages.

## 5.4 COMPARISON WITH POSTAL MAIL, POST-IT NOTES, TELEX AND FAX

On average, it takes four minutes to write a message in an electronic mail system and half a minute to read it [1]. These short times are possible because the computer supports the writing and reading. For example, you do not have to supply your name or the date of the letter. With some systems, filing and archiving of outgoing and incoming messages is also automatic. You need not print the letter on paper and put it in an envelope. Often, you need not even supply the name of the recipient, since most electronic mail messages are replies to earlier messages, and the recipient names are

then copied automatically. During typing, the computer supports simple ways for you to correct typing errors. Some systems even supply automatic spelling and grammar correction. The result will look neat with little effort.

Compared to an average of four minutes to write an electronic mail message, the average time to produce a postal letter is half an hour. Scraps of paper with messages on them are faster to produce, but still more time-consuming than electronic mail messages. This does not mean that electronic mail is always more efficient. Postal letters are used for formal communication with high demands on correctness and neatness, and this will, of course, be more costly to produce. Electronic mail is used for more informal communication, and it is in fact more of a replacement for phoning than for postal mail. An electronic message is also usually sent faster to the recipient only a few seconds or minutes after they were entered.

The cost of sending electronic mail is for short messages roughly similar to the cost of sending postal messages. Most electronic mail messages are short: the average length of a message in a system was about six lines (not including the message heading) [1].

Telex and fax functions similarly to, but faster than postal mail. They are as costly to produce as postal mail, except with some systems which support the sending of fax messages in a manner similar to electronic mail systems.

Telex and fax are also much less efficient than electronic mail when communicating with groups of people. Another advantage of electronic mail is that you can easily insert data produced by a computer, and the recipient can easily use this data on his computer. An advantage of fax is that you can send pictures and existing paper documents. Most electronic mail systems today do not yet support this. Most existing systems for electronic mail do not support the signing of letters as well as postal mail and fax do.

The large difference in quality between electronic mail, postal mail, and fax means that in reality they are not competitive systems. The choice of medium is usually obvious, and the different media support different communication needs.

## 5.5 COMPARISON WITH FACE-TO-FACE MEETINGS

Much of the communication in electronic mail systems is group communication. Most electronic mail systems have some built-in support for group communication), ranging from simple distribution lists to advanced computer conferencing systems. Even in those systems that do not support group communication, there is almost always a command to write a reply to a multirecipient message, such that the reply is sent to all recipients of the previous message. Thus you do not need to input the names of all the recipients again. This means that the previous message is in fact used as a kind of

Speaking and listening:
12 x 1.2
= 14.4 minutes

Typing:
3.6 minutes

Reading:
11 x 0.47
= 5.2 minutes

Total time:
8.8 minutes

Ordinary meeting

Electronic mail

**Comparison of the time spent giving and receiving information in written versus spoken communication in a group with 12 participants.**

implicit distribution list. Even this simple aid supports and is often used for group communication.

Electronic mail is used so often for group communication because it is particularly efficient for many types of group communication; this will be explained further below.

Group communication using electronic mail is very different from ordinary meetings. Even audio and video conferencing and group phone calls are more similar to face-to-face meetings than to electronic mail. The important difference is that, in ordinary meetings, all communication is concentrated to a short time period (usually one or two hours). All communication must be done in this short period, or it will have to wait for the next scheduled meeting, which might be a week or a month later. If you forget one aspect of an issue, have to look up a fact, or get an idea the next day, then it has to wait until the next meeting. With electronic mail, the process is not concentrated in a fixed meeting period. Participants enter the system when they have time, read what others have written, give their own views, and connect again at a later time.

Electronic mail is more efficient for some kinds of group communication for the following reasons

- You save the cost and effort of travelling and gathering everyone in the same place at the same time.
- Each participant has greater control over his own communication: what to read, when to read it, what to read carefully, what to skip, and when to write his own comments. If you prefer, you can think about an issue and reply the next day.
- Since you write slower but read faster than listening and talking in voice communication, written communication is more efficient if the size of the group is larger than about five people.
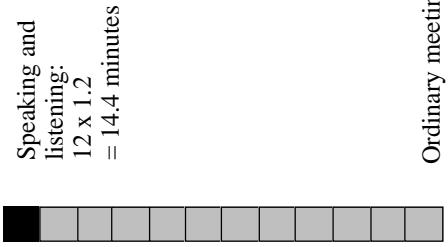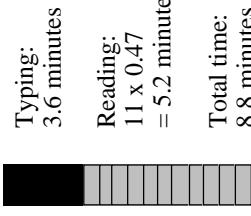
This last point is very important, and is illustrated by the example in the figure above, which compares a meeting of twelve people with the same amount of communication via electronic mail. The figure shows the total spent effort for all the participants of the group to transfer the information given in an average message. As is shown in the figure, much less time is needed for the same communication with electronic mail, if the group size is larger than five participants.

The shorter reading time with electronic mail is caused not only by the fact that you actually read faster than you listen, but also because you have more control over your own reading than over your listening: it is easier to spend less time on less-important texts and to read carefully what is most important to you.

The results described above are not only a matter of efficient use of time, they are also important psychologically. Everyone knows that it is difficult for face-to-face meetings to work well if the number of participants is larger than about 5 to 8 people. Typical problems of meetings with many participants are:

- The meeting takes more time than planned;
- Everyone does not have time to say what they want;
- There is not enough time to cover all items on the agenda as fully as needed; and
- Many people feel that too much of their time is spent in meetings, and within these meetings on discussion of issues they already know or are not interested in.

There are psychological advantages to face-to-face meetings too, especially for certain kinds of issues.

This result can also be understood by comparing the additional cost of including one more person in the communication process with electronic mail. This additional cost is less than half of the corresponding cost at a face-to-face meeting. Thus, with electronic mail, you can choose to include more people, at more reasonable additional cost than with face-to-face meetings.

The figure below only covers the time the participants actually participate in the meeting. Other costs (gathering everyone at the same time and place, travel, computer, etc.) are usually higher for face-to-face meetings than for electronic mail. The technical costs for simultaneous audio conferences are comparable to those of electronic mail, while video conferences are much more expensive.
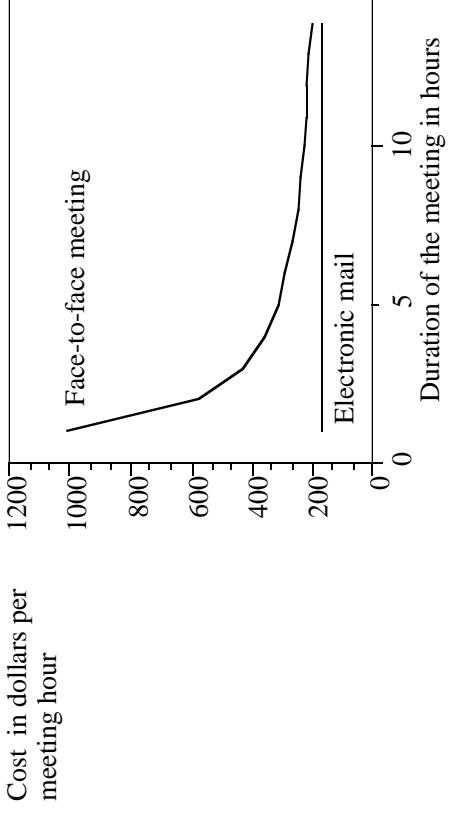
Note, however, that the travel cost per meeting minute is smaller the longer a meeting lasts, for face-to-face meetings. As an example, I have estimated the cost of a meeting assuming that two-thirds of the participants do not have to travel and that one-third must travel 150 kilometres. The estimate includes working time, computer time and travel costs. If more or fewer people have to travel, if the travel distances are larger or smaller, or if you use other prices, the result will differ. The result, with given assumptions, are shown in the figure below.
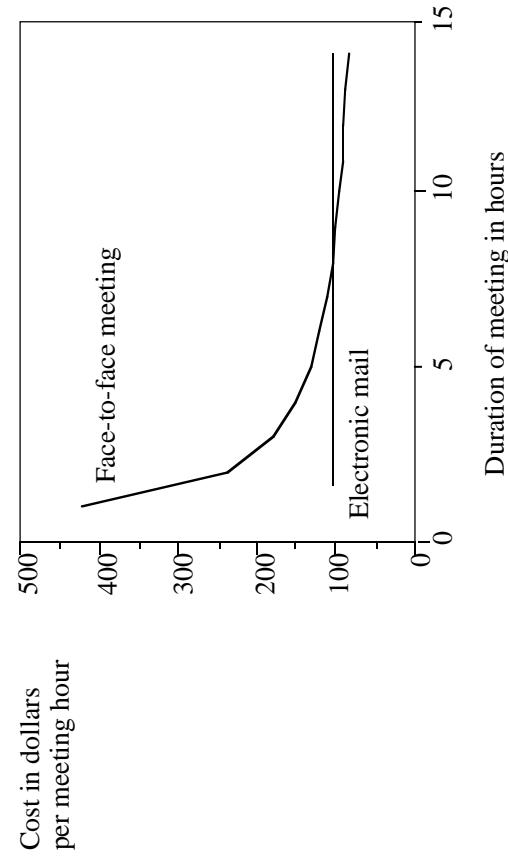


**Comparison of cost for e-mail versus face-to-face meeting with five participants.**
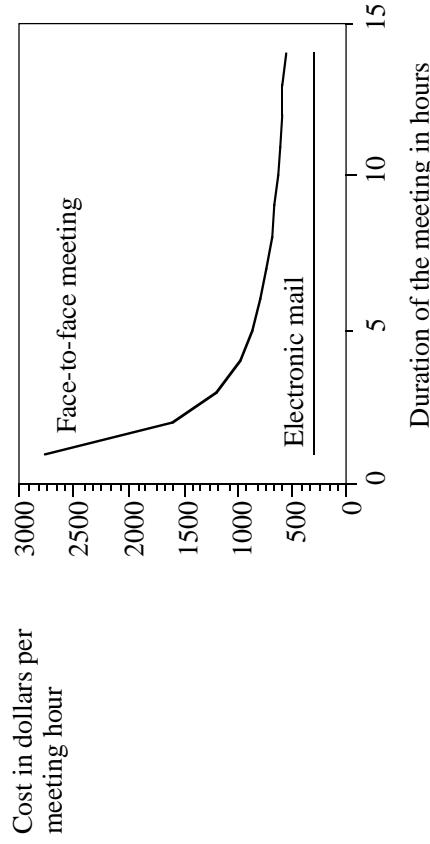
The figure above shows that a face-to-face meeting will cost more than electronic mail if the duration of the meeting is less than a whole day. This is, of course, the

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reason why face-to-face meetings where participants have to travel usually are held at large time intervals, and last for a longer time. It is obviously a disadvantage if you can only meet a few times a year. With electronic mail, an issue that needs 15 or 30 minutes of discussion can be taken up immediately, and there is no need to wait for the next scheduled meeting.



**Comparison of cost for e-mail versus face-to-face meeting with twelve participants.**

The figure above shows that, with twelve participants, electronic mail will be less expensive even if the duration of the meeting is two full days.
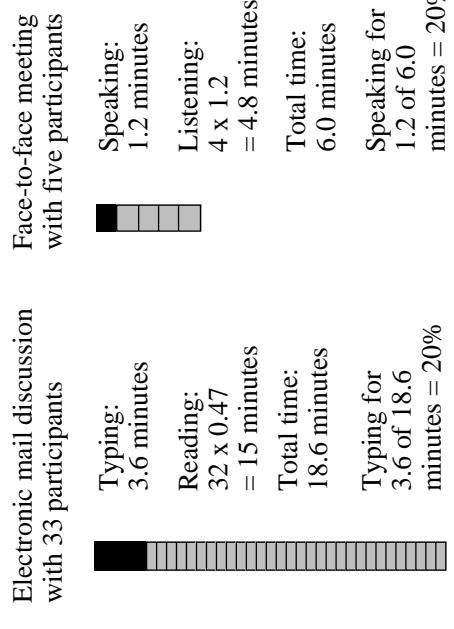
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Electronic mail discussion with 33 participants

Typing: 3.6 minutes

Reading: 32 x 0.47 = 15 minutes

Total time: 18.6 minutes

Typing for 3.6 of 18.6 minutes = 20%

Face-to-face meeting with five participants

Speaking: 1.2 minutes

Listening: 4 x 1.2 = 4.8 minutes

Total time: 6.0 minutes

Speaking for 1.2 of 6.0 minutes = 20%

**Number of participants to get roughly 20 percent giving and 80 percent receiving per participant.**

Maybe human communication (with equal speaker rights) works best psychologically if the participants can be active and give information at least 20 percent of the time. This could be the reason why face-to-face meetings seem to be most efficient with group sizes of about 3-7 people, while group communication using electronic mail or computer conferencing systems seems to be efficient in groups of 20-100 people or more.

### 5.6 COMPARISON WITH AUDIO AND VIDEO CONFERENCING AND VOICE MAIL SYSTEMS

The communication in audio conferencing (group phone calls) and video conferencing is spoken, just like at face-to-face meetings. Also like face-to-face meetings, everyone has to participate at the same time. However, participants need not be at the same place, as with ordinary face-to-face meetings. This means that much of what is written above on comparing electronic mail to face-to-face meetings is also valid for audio and video conferencing.

Research on these media [4] shows that the difference in efficiency between audio and video conferencing is rather small. The much higher cost for video conferencing seldom gives a corresponding improvement in the quality of the communication. According to [4], audio conferencing is a suitable medium for routine meetings held to solve simple tasks.

Voice mail systems are functionally similar to electronic mail and are sometimes

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Cost in dollars per meeting hour

Face-to-face meeting

Electronic mail

Duration of the meeting in hours

**Comparison of cost for e-mail versus face-to-face meeting with 33 participants.**

The figure above shows that, with 33 participants, face-to-face meetings will be so expensive that such meetings in fact are very seldom organized. Symposia, lectures, conferences, etc., are of course exceptions. My assumptions are not valid for such meetings, however, since I have assumed that all participants have roughly equal rights to speak. At symposia and lectures, this rule does not hold: the speakers have more opportunities to talk than the other participants. In this way, higher efficiency is achieved for larger group sizes. This is an important difference between electronic mail and face-to-face meetings: discussion with equal rights to "talk" is possible through CMC even with 33 or more participants.

Some may object that this is irrelevant, since large face-to-face meetings with equal speaking rights are seldom held, but the reason such meetings are so seldom held is that before electronic mail, there was no efficient medium for them. If electronic mail provides an efficient medium for large meetings, the result will be opportunities that simply could not be realised otherwise. The more people can participate in a discussion, the more people can be kept informed, the more people get a chance to have their say, the less is the risk of forgetting some important factor. A survey of users of an e-mail and computer conference system showed that a large majority of its users agreed with these statements [3].

An interesting factor to note is that, in a face-to-face meeting with 5 participants, each participant is allowed to talk for an average of 20 percent of the time. In an electronic mail meeting with 33 participants, each participant also spends 20 percent of the time giving information, writing messages.

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combined with electronic mail. Existing voice mail systems, however, do not usually provide facilities for organising and structuring information as that are as good as in more advanced electronic mail systems. The cost of storing information is also much higher for voice mail systems. Voice mail also seems psychologically inappropriate except for short messages to a small number of recipients. The advantage of voice mail systems is that they can be used from an ordinary voice phone, so no access to a computer is necessary. This can be of special value for people who travel a lot.

## 5.7 WHEN IS ELECTRONIC MAIL THE BEST MEDIUM?

Considering the discussion earlier in this book, electronic mail is more efficient than other communication media in the following cases

• Electronic mail costs less than a phone call when you have to reach more than one person, or, when you only have to reach one person, if the issue can be concluded with a maximum of four messages averaging 6 lines/message.
• Electronic mail costs less than postal mail and messages on scraps of paper with notes on them, except for very long messages.
• Electronic mail costs less than face-to-face meetings for large groups, or if some participants have to travel to the meeting and the duration of the meeting is less than a full day.

The smaller the issue is, and the more people who have to be reached, the more efficient electronic mail will be. If you are a member of a geographically distributed group, who need to spend a few minutes every day exchanging information and resolving small, simple issues, then electronic mail may be the only viable medium.

Practical experience with the use of electronic mail shows that it is mostly used for resolving small, simple issues and for group communication. This shows that users have an intuitive understanding of when electronic mail is the most suitable medium, even though they have not made a formal comparisons this chapter has.

In addition to these conclusions, electronic mail is usually more efficient if the message is partly recipient processes the information in a computer, especially if the message is partly formatted with fixed fields (like a bill or a travel expense statement), which will be handled by a computer at the receiving end.

Much of this chapter has examined monetary and temporal costs of using electronic mail and other media. Of course, there is more to communication than money and time. However, as mentioned above, the amount of time a user spends using various media has important psychological impact on their social interactions. In addition, it is obvious that different media have different qualitative aspects. The difference between electronic mail and face-to-face meetings have been investigated in several studies [3, 5, 6]. These and other studies show that electronic mail has

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advantages and disadvantages compared to other media

+ You can give and take information when you have time. You do not have to interrupt other people as you do when calling. You can participate more easily in communication when you otherwise cannot be easily reached, as when you are travelling, on holiday, etc.
+ It is easier to give precise factual information.
+ The recipient gets the information in a written format which can be reused or archived.
+ Equality between people increases, more people are allowed to have their say, there is less risk of one single person dominating.

and disadvantages

– It is more difficult to persuade others, and thus to reach consensus. With e-mail, difficult and controversial issues will more often lead to a war of positions which can only be resolved in a face-to-face meeting. The lack of body language, voice inflections and facial expressions help explain this effect. Thus, negotiations can be difficult to conduct via electronic mail.
– It is more difficult to conduct a formal decision process through electronic mail.
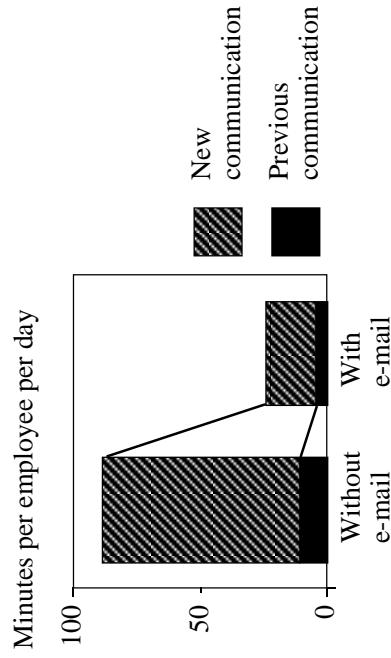
A project often consists of three phases:

(1) Preparation: Collecting ideas, solutions and alternatives; examining the consequences;
(2) The decision making process; and
(3) Execution and realisation.

Electronic mail is more suitable in phases (1) and (3) than in phase (2), since an important aspect of decision making is to reach consensus about a decision which all parties are expected to support in the execution phase.

## 5.8 THE VALUE OF CHANGED COMMUNICATION PATTERNS

I have shown above that electronic mail is often used for new communication, not as replacement for old communication. This makes it more difficult to estimate the benefits of electronic mail. The situation is illustrated by the figure below [7]: It is based on real data from the use of electronic mail in a computer-intensive company. Even though this company used electronic mail to a large extent, all the potential benefits of electronic mail were not realized at the time of the study, since many of the organizations with which the company worked did not use electronic mail. The gains

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More people can get information and give their ideas, issues will be more fully examined, and the risk of forgetting some important aspect will be reduced.

- Employees in different parts of the organization can work with each other more easily and feel more in solidarity with the common goal.
- A more decentralized organization of the company is possible. Everyone need not work at the same place in order to work together.
- Increased contact with the outside world makes it easier to accept new ideas and disseminate one's own views. The organisation is less likely to act on old, outmoded views and methods.

It is difficult to put a monetary value on these kinds of changes, but at the same time, they are the largest and most important advantages of electronic mail.

The above discussion is based on the assumption that the employees of a company will intuitively choose to use the best medium in an optimal fashion. My experience is that electronic-mail users quickly learn when the new medium is suitable and use it appropriately. However, this may be based on what is best for the individual employee, rather than what is good for the company as a whole. For example, individual employees may put higher value on increasing their own competence than their employers do.

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from electronic mail thus can be asumed to be larger when the use of electronic mail is more widely used.



Minutes per employee per day

New communication

Previous communication

Without e-mail    With e-mail

**Comparison of time used for communication using e-mail and previous media.**

The black bar in the figure above shows how much a previous communication could be done faster via electronic mail. Previously, this communication took 10 minutes a day, and it can now be done in 4 minutes, a saving of 6 minutes per employee per day. The lined part of the bar shows the new communication which took place only after electronic mail was introduced. An average employee spent 20 minutes per day on such communication, but if this communication had existed before then it would have taken 78 minutes. Thus, the left lined bar is hypothetical; it is the time that employees would have needed without electronic mail.

Assuming the organization and its employees choose to use media in an optimal way, the benefits for the organization by using electronic mail will at least be the time savings over older forms of communication, that is, 6 minutes per employee and day. The benefit of the new communication is less than the reduction of 78 minutes of work to 20 minutes, since if this communication had been worth 78 minutes, then it also would have occurred without electronic mail. This is the upper and a lower limit to the gain due to electronic mail—a gain of 64 minutes per employee per day and a gain of 6 minutes per employee per day, respectively. The difference is large, because most of the potential gain from electronic mail from new communication and from changed communication patterns, not simply using a new medium for old communication. The value of this new communication is more difficult to quantify.

The new communication may have the following kinds of benefits for the organization:

# Chapter 6
# Law and Order

An earlier version of this chapter has previously been published in [9].

## 10.1 ETHICS AND ETIQUETTE

### 10.1.1 Is There a Need for Electronic Mail Ethics?

As in other areas of human interchange, there is a need in electronic mail for:

- Ethics, principles for suitable and unsuitable uses of the medium; and
- Etiquette, forms for handling communication so that users know that certain types of communication are handled in certain ways.

Ethics and etiquette often consist of unwritten rules. Sometimes, people try to write them down in more or less formal collections. Breaking these rules is usually sanctioned by social pressure—if someone breaks the rules, other people complain, which often gets the person to change his behavior. More formal organizational forms for sanctions, include ethics boards and rules that, for example, close the account for those who regularly break the rules.

There are few laws, specifically controlling electronic mail. When the use of electronic mail is more widespread there may be more control of the medium through legislation. It is dangerous , however, to try to make laws controlling a technology under development—the laws will easily be antiquated and can even cause more harm than benefit.

Not everyone agrees on the proper ethics and etiquette in electronic mail. One community of users may have ethical rules which are in direct contradiction with those in another community. As an example, some electronic communities (for example

EARN) forbid political discussions, while the constitution of many countries, allow unrestricted discussions of political issues.

When two communities with different written or unwritten views on ethics and etiquette are connected, cultural collisions sometimes occur. People from one community may then find that these people are, for example, nasty, ill-mannered, ruthless, arrogant, lofty, stupidly careless, muddled, and vague. Strong emotional reactions and serious misunderstandings sometimes occur. Each group may try to use social pressure to get the other group to change their behavior.

New users of electronic mail will often begin by trying to apply ethics and etiquette learned in other communication media like postal mail, telephone, or face-to-face meetings. The need for special ethical rules for electronic mail is especially important in cases where such ordinary ethics and etiquette are *not* suitable. The principles common to all human communication are often felt to be so obvious that they need not be included in the ethics of electronic mail.

The reason why different kinds of ethics and etiquette may be needed for electronic mail is that it works differently than other media, and this causes different kinds of communication problems. Important differences between electronic mail and other media are that electronic mail makes it so easy, fast, and relatively inexpensive to distribute information to many recipients and that this information can be saved and forwarded in more ways than is possible with voice communication. Because of this, many ethical rules for electronic mail are primarily concerned with the use of electronic mail for group communication.

Different electronic mail systems are designed in different *ways*, and this influences the need for ethical rules. As an example, a common rule of etiquette is that you should not send the same message to more than one mailing list or newsgroup (even in cases where the message is appropriate for more than one list/group). This rule is needed, because otherwise people who are members of several lists will get the same message several times. However, good mail and news clients are capable of recognizing such duplicates so that their users will only see one of the duplicate messages, even though they get the messages via different routes. In such systems, it may sometimes be suitable to send a message to more than one group.

Another example is that some systems have a rule that says that you should delay sending a message, to see if someone else has already sent a message with similar content. Some systems even have a rule that you should not reply to everyone on a list, but only to the author of a message (this author is then expected to summarize the replies he gets for the whole list). These rules arise partly because of by delays in the distribution of messages, so that you cannot always be sure that you have seen all comments already written on an issue when you write your own entry. With shorter delays in the nets, these problems become less serious.

When you read collections of ethical rules for electronic mail, you sometimes wonder if these problems could not be solved by better design of the systems instead

groups.

## 10.1.2 Some Common Ethical Rules

This collection is based on ethical rules for Usenet News [1, 8], for CSNET [2], for EARN [3], for KOM [4], and a collection made by Anne-Marie Eklund [5].

One property of electronic mail is that it is so easy to disseminate a message to so many people. Many ethical rules try to avoid the problems which this may cause. Such rules say that you should *think* before you write, *keep to the topic* of a group discussion, *begin with the most important thing* you have to say (so that those not interested can skip the rest), *never write a message when you are angry*, etc. The fact that you can wait a few hours to calm down before you write a message is an advantage electronic mail compared to face-to-face meetings.

The more work an author puts into his message, the more time is saved for the recipients. This means that there is reason to spend more time writing a message if it is to be read by many people. Most people intuitively understand this principle. A problem with electronic mail is that you are not always aware of how many people are going to read what you write. A function which tells the authors of messages how many people will see their message might be useful. A person who writes a message usually sits alone in front of a computer screen. This intimate environment may tempt one to write something suitable for a group that is smaller than the group that will actually read the message. These kinds of experiences lead to ethical rules that personal assessments of other people should not be sent via electronic mail, or at least only to a very small closed group.

Electronic mail is more often used as a replacement for spoken than for written communication. An important difference is, however, that you do not have the same fast and direct interaction with electronic mail. This means that behavior patterns which are suitable in spoken communication may not work in electronic mail. An example of this is *booking time for a meeting*. People new to electronic mail try to do this the way you normally do in a face-to-face situation: you propose one possible time, and if this is not acceptable, you propose another possible time until you have found a time acceptable to everyone. This method is not always suitable in electronic mail. A better method in electronic mail is to begin by indicating a series of possible times, and asking each participant which time they prefer. The participants then say which times are not suitable for each of them, so that a time suitable to all can be found.

General courtesy rules of *friendliness* and *consideration* may be more important in electronic mail than in face-to-face communication, since you cannot, for example, immediately see a negative reaction and correct and clarify what you mean.

A question can be answered by a message to the author only or to everyone who got the question. As an example, a question sent to a group of people asking at which

of by regulating their users. A rule saying that people should not write long messages can be avoided if the system makes it easy for recipients to easily skip reading the rest of one message. A rule, that discussions should not branch off outside their initial topic may be avoided if it is easy for participants to unsubscribe only from the branch of a discussion which they are not interested in.

Some people try to write ethical rules into the computer software, by designing electronic mail programs so that they stop users from behaving in ways the program designer finds unethical. Doing this, however, can be dangerous. It is difficult to teach a computer to judge correctly whether certain behavior is ethical or unethical. A behavior which in some cases may be unsuitable, may in other circumstances be necessary and suitable. It might be better to let the computer recommend and guide users towards good behavior but not to make it impossible for the users to knowingly break rules when necessary.

Another form of control is to have one or more people whose task is similar to the chairman at a meeting. Their special task is to control what is written in a computerized group discussion. Some systems are designed so that these moderators must read every contribution, before it is sent to the group (*premoderation*). In other systems, the moderators have the power to remove entries which are not suitable to the topic of a group, move them to another group, or start a new subgroup (*postmoderation*). If a system gives the moderator such facilities, it is important that moving an entry automatically moves the whole branch of the discussion tree to which the entry belongs—including future, not yet written entries. The administrator of a server also often has the right to delete any message in his server, this is needed in order to remove illegal messages which the administrator according to the laws in some countries may otherwise become legally responsible for.

Premoderated groups, which require the moderator to read all messages before they are sent out, give the strongest control but slow down the interaction in the group. While the typical time between an entry and a reply is normally less than a day in groups which are not premoderated, it is usually about a week in premoderated groups.

There are several reasons why organizers make certain groups premoderated. The first is that you can avoid messages which have no relevance to the subjects which the group is to discuss. The second is that you can avoid duplicates, where the same idea is put forward by different people. The third reason occurs when recipients get the messages via distribution lists, which send the messages to the personal mailboxes of the recipients. With the premoderated lists, the moderator collects all messages on a certain topic once or twice a week, so that the recipients get these messages together and not mixed up with other messages. This problem does not occur with good systems, since such systems will automatically sort incoming messages by topic so that the recipient can read messages by topic. This is another example of how human rules can circumvent technical shortcomings in the design of some message systems.

My experience is that premoderation seems to be necessary for very large groups, with hundreds of participants, while postmoderation is more suitable for smaller

time their flight will arrive is usually best answered personally to the author only. It is valuable if the electronic mail system allows the author to indicate where replies should be sent. However, many systems have a *reply-to* field but do not clarify what is meant by this field. It might mean:

- Always reply to this address,
- Use this address for personal replies to the author, or
- Use this address for replies meant for all who read the answered message.

Because of this, such reply-to fields often cause more problems than they solve. The general agreement in the Internet, however, seems to be that such reply-to fields are to be used only as substitutes for the originator, not as substitute for the group. Not all software is designed in that way, however. Usenet News has another field, called , that indicates where group replies are to be sent. This field, however, is not available in ordinary electronic mail.

In some messaging communities, there is more-or-less a rule that if someone asks a question to a group of people, the reply should be sent to the author, and the author is then expected to *summarize the answers* to the whole group, if he feels that they are of general interest. This is of special importance in nets with long time delays, because otherwise there is a risk that several people, independently of each other, will write the same reply.

Some systems even allow the recipient of a message to choose whether to see all replies to a question or only the summary of the replies composed by the author of the original question.

Now and then, it happens that a message written to a small group is forwarded without permission from the author to a much larger group. Sometimes, the author of the message does not like this. Because of this, a common ethical rule is that you *should not resend texts to larger and more open groups without permission from the author*. This, like most ethical rules, should not be absolute. It is easy to see that in a particular case, the forwarding of a message will not be controversial: or that there may be a large common interest in something which has occurred in a small group that should be known by a larger group. Copying texts written by others is also controlled by copyright laws.

The rules on *advertising* in electronic mail vary between nets. American nets usually have stronger restrictions against advertising than European nets, something which sometimes causes clashes when the two are connected. However, both European and American nets find it valuable that people representing hardware and software suppliers can participate in technical meetings on their product, and the border between desirable technical information and undesirable advertising is not always easy to define. One solution may be to have separate discussion groups and distribution lists for information from the suppliers and for general discussion of hardware and software products.

By *spams* is meant obviously inappropriate message, usually of an advertising kind, sent to multiple mailing lists or as personal mail. Spams became more used around 1995-1996, and many mailing list software contain methods to recognize spams (by recognizing the same message sent to many lists, and by recognizing certain elements in spams, like faked senders. A similar function is the cancelbots in Usenet News. Legal control to restrict spamming can be expected, since otherwise the recipients are forced to pay the cost of advertising they receive.

It is important that recipients should be allowed to control what lists they subscribe to, and be allowed to unsubscribe to lists when they want. This can be compared to the laws in some countries, that allow recipients to ask that their names be removed from direct-mail address lists.

## 10.1.3   Ethics and Language

Face-to-face communication involves body language, facial inflections, and nuances of voice. Such tools give important emotional signals in association with what you are explicitly saying—for example, to clarify that you were ironic. Because written communication lacks these tools, serious misunderstandings can occur. To avoid this, special punctuation (so-called "smileys") is sometimes used in electronic mail to indicate that what you are saying is not to be interpreted at face value. Common punctuation is, for example, ":-)" (which looks like a smiling face if you turn it 90 degrees: " ;-) ").

There are also other special syntactical conventions used in electronic mail. Many electronic mail networks are not capable of forwarding underscored, **bold**, or *italic* text. Because of this, a common convention is to write one or more asterisks around a word you want to stress. Another common convention is to put ">" in front of quotations, usually at the beginning of a line. For example,

```
Andersen writes something very **important**:
> Body language can sometimes be replaced by special symbols,
> but sometimes people may overstep the mark.
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Some e-mail communities also adopt a modified language for use in e-mail. Such language can, of course, be a barrier to new e-mail users. Here are some examples of special terms in such a modified language:

| | |
|---|---|
| BTW | by the way |
| IOW | in other words |
| FYI | for your information |
| IMHO | in my humble opinion |
| RSN | real soon now (which may be a long time coming) |

FAQ     frequently asked question

OBO     our best offer

2     "to." For example, "F2F" or "face2face" as abbreviations for "face to face"

:-)     this is a joke, not to be taken seriously

:-(     I am unhappy

;-)     winking, teasing, flirting

Several books have been published with collections of such acronyms and smileys [6, 7]. You can also easily find more complete lists in the World Wide Web.

## 10.1.4 Private Usage of Office Mail Systems

One controversial issue is whether employees in companies and government departments should be allowed to use the electronic mail system for private messages, and if not, how to stop this. The problem can be compared to using your office phone for private phone calls or talking to your coworkers during office hours about personal problems. For some reason, perhaps because it is a new medium, some people are more troubled by such behavior in the case of electronic mail than in the case of phone and face-to-face misuse of office resources.

It is important to be aware that the borderline between private and official usage of electronic mail is not always easy to define. An important usage of electronic mail is to exchange information and learn. The borderline between what you are learning privately and what you are learning to be able to do your job better is also not easy to define. For example: if an employee of the defense research institute discusses computer security or nuclear power security, is this private communication or part of his job? Even if the employee is not at that moment working on security issues in these areas, knowledge in such areas are important in defense planning.

There are not many statistics available on the extent of private usage of electronic mail. In the KOM system, I found that about 10 percent of the usage was obviously private, like Bridge playing or computer games.

These issues might be easier to solve if they are split into issues of *economics, ethics,* and *power/influence.*

• From an *economic* viewpoint, the benefits of electronic mail are so large, that even if 10 percent of the usage of the system is private, it still benefits the employer. This is even more so if you take into account that phone and face-to-face communication in the office are sometimes used for private purposes.

One should also note that computers, like electricity, cost very little during low usage times of day. Because of this, some companies have issued rules that their employees may use the electronic mail system privately, but only outside office hours.

• From a *moral* and *ethical* point of view, many people feel that private usage of an office electronic mail system is to be condemned even though the costs to the employer are not large.

• From a *power/influence* point of view, management may sometimes feel that the introduction of electronic mail reduces their ability to control what is happening in their company. They sometime try to rectify this by instituting ethical rules against private usage of the system.

## 10.1.5 Anonymous Messages

It is not surprising that the ability to send anonymous messages causes ethical problems. Some people claim that such messages should not be allowed, because the misuse this facility can produce like slander, defamatory statements, and libel or other illegal communication. Other people say that anonymity is valuable since it allows people to make public valuable information which they dare not divulge otherwise because of pressure from powerful people.

The real fact is however that anonymity exists, whether we like it or not and will continue to be available unless very stringent measures are used to stop it. Anyone, in any country, who believes in anonymity can set up an anonymous server, and stopping people from using such servers is not easy.

If an anonymous server was used to propagate information that was illegal according to the laws of the country in which the server resides, then police could probably be able to use legal means to break anonymity. No one can totally rely on being anonymous, because there are known ways of breaking the security of anonymous servers.

From an ethical viewpoint, an important facility of anonymous servers is that you can send messages to the person who wrote particular anonymous messages. Thus, it is possible to use social pressure on people who misuse anonymity.

## 10.2 HUMAN RIGHTS ISSUES

The constitutions and laws in many countries contain sections which are applicable to electronic mail. For example, relevant sections say

• that the rights of free speech is important;

- Guidelines on the protection of privacy and the cross-border flow of personal data, established by the organization for economic development (OECD) 23 September 1980.
- Convention of 28 January 1981 for the protection of individuals with regard to automatic processing of personal data, established by the Council of Europe.
- Proposal for a directive concerning the protection of individuals in relation to the processing of personal data, prepared by the European Community in 1990.
- Proposal for a directive concerning the protection of personal data and privacy in the context of public digital telecommunications networks, in particular the integrated services digital network (ISDN) and public digital mobile networks, prepared by the European Community in 1990.

The basic principle of these international agreements and national legislation is that people and organizations should not be allowed to store and process personal data about other people unless they do so according to special rules. Typical of such special rules are the following:

- A supervisory authority can control the use of computers for storing and processing of personal data.
- Those who wish to store or process personal data must either have permission from this supervisory authority or, in some cases, inform this supervisory authority. The authority may then regulate what personal information is to be stored and how it may be processed.
- People, if they have personal information stored in computers, must be notified of this, and/or may request a copy of what is stored about them and then can request that incorrect information be corrected.
- In some cases, for example, individuals may have the right to be excluded from address files used for market research and advertising.
- The legislation often regards the storage of certain information as especially sensitive and as subject to special control. Such information is data revealing ethnic or racial origin, political opinions, religious or philosophical beliefs, trade-union membership, and data concerning health or sexual life.
- Moving personal information from one data base to another may be restricted by special rules.

Such laws may effect electronic mail in several ways

- Electronic mail systems include directories of users and what they have written. These are typical of the kind of personal information for which the computers and privacy legislation was intended, and there is usually no problem in applying the legislation to such information.

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- that the right of every citizen to inform himself of what other people have publicly said is important;
- that the government (and sometimes private persons or organizations) are forbidden from eavesdropping on private mail and phone calls unless special rules are followed (for example, permission by a court for certain police investigations); and
- that the rights of citizens to privacy is safeguarded.

Thus, free speech, the right to communicate, and protection against eavesdropping may be also applicable to electronic mail. . The extent to which such laws are valid for electronic mail may vary from country to country.

## 10.3 FREEDOM OF INFORMATION ACTS

Some countries have laws that require documents produced by government agencies to be available for inspection by any citizen, except when certain secrecy rules are in effect. These laws are normally not applied to phone calls unless they are recorded, but in most cases they are applied to electronic mail, since it is a written and recorded medium. This means that electronic mail communication in government agencies may be open to inspection by the public. This may also mean that the government agencies are not allowed to delete electronic mail messages except as permitted by archiving laws.

## 10.4 PRINTED MATTER

Some countries have special laws controlling printed publications. These laws are usually not applicable to electronic mail, but this can, of course, vary from country to country.

## 10.5 COMPUTERS AND PRIVACY LEGISLATION

Many countries have special legislation controlling computers and privacy. The goal of such legislation is to protect the privacy of individuals in relation to the processing of personal data in data files. Such national legislation is often based on some international agreements in this area:

• Information about electronic mail users, like directory information, and information about messages they are sending and receiving is often moved between different electronic mail systems, and often from country to country. Because of the international nature of electronic mail, this may cause such problems, if, for example, the computers and privacy laws forbid moving such information to countries who have not signed the OECD convention. One might compare this to postal organizations being forbidden to send mail to and from such countries or to phone companies being forbidden to connect phone calls to and from such countries.

• The text in electronic mail messages will, of course, often contain personal information, often contain the kind of information which such rules say should be controlled especially strictly. For example, in electronic mail discussion groups, many messages may contain information about political, religious, and philosophical beliefs and may reveal a person's racial or ethic origin. A love letter may contain data concerning a person's sex life. Personal messages may also, of course, contain information about health: for example, someone sending a message that they cannot come to a meeting because of illness or giving health advice to friends with health problems, etc.

Note that computer and privacy legislation often conflicts with legislation about freedom of speech, which is intended to safeguard the rights of individuals to communicate, and especially to communicate freely, in areas like politics and religion. Many countries (Denmark, Finland, Germany, France, Austria) have exempted computer usage in newspaper offices from the computer and privacy laws. These laws are should apply only to more structured ways of handling personal information. exempted.

This conflict between freedom of speech legislation and computer and privacy legislation is not easy to resolve. Usually, those who have encountered this problem resolve it by saying that storing personal information in word-processing documents, electronic mail messages, etc., should not to be controlled by the computer and privacy laws. These laws are should apply only to more structured ways of handling personal information.

However, there are still difficulties on where to draw the line between what is and is not permitted. Is it, for example, permitted to collect electronic mail messages so that you can easily check what a certain politician has said on a certain issues in those messages or what opinions on a certain issue have been voiced by different people?

Is it permitted to send via electronic mail a list of references to journal articles? Such a list can be seen as a structured data base of personal information and so is probably covered by the computer and privacy laws even if such laws only apply to structured information bases.

As an example, Sweden, which was one of the first countries to establish com-

puter and privacy legislation, has had severe difficulties in trying to solve conflicts in interpreting these laws as they apply to electronic mail systems. This has included forbidding the use of certain electronic mail systems and forbidding the discussion of political issues in certain electronic mail systems! The Swedish supervisory authority has had problems in clarifying how to resolve the conflict between freedom of speech and computers and privacy laws.

## 10.6 COPYRIGHT LAWS

Copyright laws give authors the right to control the use of what they have written. In many countries, such laws can also apply to messages in electronic mail systems. The extent to which such laws are applicable to electronic mail may vary. Some providers of electronic mail services have notices in their contracts with customers that the customers are giving the providers a copyright license to use what the customers have written in the system, according to the normal principles used for distribution of messages in the system.

## 10.7 UNLAWFUL COMMUNICATION

One might believe that in a democratic society, freedom of speech would allow you to say anything you want in electronic mail. This, however, is not true. Below are some examples of messages which may be illegal in many countries.

• Slander,
• Computer viruses,
• Military secret information,
• Privileged information supplied to lawyers, physicians, priests, etc.,
• Personal information not allowed according to privacy legislation,
• Copyrighted material, unless you have permission from the copyright holder,
• Sedition (incitement to rebellion),
• Racial agitation,
• Pornography/obscenity,
• Criminal conspiracy,
• Disloyalty against your employers, and
• Misconduct.

The exact definition of what kinds of speech are allowed and forbidden may vary much between countries, but some kinds, for example, child pornography, are forbidden in most countries.

Electronic mail, like almost any other tool, can be used for various kinds of

illegal acts which may not be specific to the electronic mail medium, just as the telephone and the postal system can be used illegally. Of course, this will become more common with the wider use of electronic mail. A well-known example of this is the electronic mail system in the White House, in which Oliver North and his associates sent messages to each other concerning illegal funding of the Contras in Nicaragua. In that case, the actual messages had been erased, but not all backup copies were erased, and by court order, these backup copies were retrieved and used as evidence against North.

This example shows that a wise criminal would probably not choose to use electronic mail. A wise criminal uses the telephone carefully, since police may be able to find what has been said in electronic mail, although the messages were not tapped when sent. This makes electronic mail even more dangerous than the telephone for the criminal.

In one case in Sweden in 1987, a person was sentenced to pay 15,000 kronor (about $ 2500) in damages for defamation of character. In a computer conferencing system he had distributed messages which implied that another person was a Russian spy. These messages had been read by about 100 people in the conference system. If this person had made the same statements by voice at a meeting, his risk of prosecution would probably have been lower because it would be more difficult to prove exactly what he said. A transcript of what he had written was given to the defamed person by a user of the conference system: this probably would not have been possible if his statement had been made by voice.

## 10.8 AGREEMENTS AND SIGNATURES

Contracts and agreements are very important legal concepts. Contracts and agreements can be formed in many ways, and there is usually no legal requirement that a contract must be written and signed. An exchange of electronic mail messages can thus be regarded as a legal contract. In such a case, when and where a contract is agreed to via electronic mail has been made must be clarified.

It is advantageous in disputes over contracts to be able to prove that a certain exchange of electronic mail messages, that result in a contract has occurred and to be able to prove who wrote the messages. There is thus a need for something corresponding to signatures on postal letters and contracts written on paper. There are also very secure methods for electronic signatures and seals (see Section 7.6.3 Digital Signatures and Digital Seals). An electronic signature is actually more reliable than a signature on paper, since a signature on paper is very easy to forge. In one test, one-third of a group of people were not able to distinguish between their own signature and a forgery. Electronic mail might thus make contracts more secure. The main risk with electronic signatures is that the secret key for a person may be stolen. Advanced algorithms are employed to protect against this risk.

One way of getting even higher security would be to establish electronic archives, into which electronic messages and agreements could be sent and registered. If these archives were run by a third party, such as public notaries, they could provide very high security against falsification or false denials of computerized agreements.

## 10.9 LEGAL RECIPIENTS

It is sometimes important to distinguish between letters sent to an organization, letters sent to a private individual, and letters sent to an individual as employee of an organization. This can, for example, control who is allowed to look at the letter if the indicated recipient is not available and whether an official legal reply to the letter from the organization is expected. Some countries may have other special laws controlling official letters to private or government organizations.

How is this represented in electronic mail? One should first note that there is no rule that says that the recipient of an electronic mail must be a person. Even when a so-called interpersonal mail service is used, it is perfectly legal to address an electronic mail message to an organization, although all organizations may not be able to receive such messages. Many companies have a default mailbox with the name "Postmaster," to which mail to the company that is not addressed to a given individual can be sent. For example, you might send a message to

```
Postmaster@STANFORD.EDU or
Postmaster@SUMEX-AIM.STANFORD.EDU
```

when you want to reach the official organization "Stanford University."

Note that the personal name component is not mandatory in X.400 electronic mail addresses. The following addresses are thus allowed, even though all organizations may not be able to handle incoming mail with such addresses:

```
O=Stockholm University/ADMD=Sunet/C=SE or
OU1=Subscription department/O=Scientific American/A=CompuServe/C=US
```

In the 1988 version of X.400, there is an alternative to the personal name called "common name" which can be used to designate entities other than individual persons.

In ordinary postal mail, you sometimes indicate whether a message is to be delivered to an individual personally or to an individual as an employee of an organization, in the following way:

*Format to indicate a personal letter      Format to indicate a letter to the company*

```
John Smith                 Company XYZ
Company XYZ                 Att: John Smith
Box 1234, Small Town       Box 1234, Small Town
```

There is no directly corresponding facility in current electronic mail standards. However, X.400 has some facilities which might be used to indicate this.

On the P1 envelope, X.400 has a field called a. This indicates whether someone other than the named recipient is allowed to open the message. If this field is not included in a message, you send a message to an alternate recipient. If, for example, you send a message to an individual who is no longer employed at the company, this field indicates that someone else should then open the message.

In the P2 heading, X.400 has a field called with the allowed values *personal*, *private*, and *company-confidential*. The absence of this field means that the message is not sensitive in any of the three ways. The value *private* probably indicates that the message is not intended for the organization itself, but whether the absence of this field should be construed to mean that the message is legally intended for the whole company is not obvious.

## 10.10   WHICH LAW IS APPLICABLE

Since e-mail is such an international medium, it is sometimes difficult to know which country's laws are applicable. This is important since the laws regarding communication vary so much between countries. Suppose a person in a country which forbids pornography receives pornography through e-mail from a country where pornography is permitted, or the reverse. Who is guilty of illegal acts?

When an illegal act causes damage, should the laws in the country of the sender be used? Or the laws of the country where a person was hurt by the illegal act?

## 10.11   WHO IS LEGALLY RESPONSIBLE

In the case of phone and postal mail, we normally place the responsibility for the communication with the users of these services, not on the phone and postal companies. It seems natural to apply the same principle to e-mail. However, there is no sharp border between e-mail and data bases. The courts and lawmakers have not yet clarified this. A general tendency seems to be that police forces and prosecutors want the responsibility to be with the service providers, since it is easier to find and control them than their customers, but that they have not always succeeded in persuading the courts to share this view. The risk of placing the responsibility with the service providers is, of course,

that this may force these providers to control and censor the communication in ways not compatible with freedoms of speech principles.

Who is responsible for illegal messages passed via anonymous servers? Suppose a person in the United States sends a message via an anonymous server in Finland to recipients in the United States, and suppose that the message was illegal according to U.S. laws but not according to Finnish laws?

## 10.12   LAW ENFORCEMENT ACTIONS

Depending on the laws in different countries, law enforcement agencies may or may not be allowed to wiretap electronic mail, search your e-mail records, seize equipment used in the conduct of illegal communication, etc.

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# Language Action Perspective

The main theoretical foundation of our work, the Language Action Perspective (LAP), is introduced in this chapter. The chapter starts with a brief survey of some common LAP approaches and highlights their distinguishing features. The chapter ends with an explanation of how LAP can be useful in e-commerce systems development in general and in the $P^3$ methodology particular.

## 2.1 Speech Act Theory

J. L. Austin [1] proposed the Speech Act Theory in the beginning of the 1960's. He explained that language not only refers to states of affairs in the world but also has the capability to change the world. Utterances of certain language statements constitute acts and he named those statements "performatives" or "speech acts". For example, when someone says "I promise …", "I apologize …", "I name …", the utterance immediately conveys a new psychological or social reality. Furthermore, Austin argued that the generally accepted view of truth and falsity of propositions was not applicable for many of these classes of speech acts.

### 2.1.1 Illocutionary Points and Illocutionary Forces

J. R. Searle [3] further investigated and formalized the classification of speech acts in his work during mid 1970's. He argued that it is senseless to ask whether a statement like "I promise that I meet you tomorrow" is true or false. It is only more or less appropriate in the context in which it is uttered.

Searle classified all speech acts according to one of five fundamental illocutionary points carried by all utterances, not just sentences with explicit performative verbs such as "I apologize" and "I declare". For instance, we may treat a statement like "I will do it" as a speech act promising someone to do a task in a particular context.

The five categories of speech acts with different illocutionary points are according to Searle:

*Assertives:* the purpose of which are to convey information about some state of affairs of the world from one agent, the speaker to another, the hearer. Examples of assertives are "It is raining" and "A lecture is in progress".

*Directives:* where the speaker requests the hearer to carry out some action or to bring about some state of affairs. "Please bring me coffee" and "I order you to leave the class" are examples of directives

*Commissives:* the purpose of which are to commit the speaker to carry out some action or to bring about some state of affairs. Examples of commissives are "I promise to meet you tonight" and "I'll make it for you"

*Expressives:* the purpose of which are to express the speaker's attitude about some state of affairs. Examples of expressive are "I like tea" and "I am satisfied with your service".

*Declaratives:* where the speaker brings about some change of state of affairs by the mere performance of the speech act. "I here by pronounce you husband and wife" and "I hereby baptize you to Samuel" are examples for declaratives.

Searle differentiated between *illocutionary point* of an utterance, its *illocutionary force* and its *propositional content*. A statement "I promise that I meet you tomorrow" can be analyzed to "I promise" as indicator of its illocutionary force and "I meet you tomorrow" as its propositional content. There may be situations where speech acts with the same illocutionary point may differ in their illocutionary force (manner and degree). For instance, a polite question and a demand for information with same directive illocutionary point and same propositional content may differ in their illocutionary forces.

To get much use out of Speech Act Theory in modeling real communication situations, it has to be adapted and put in a modeling framework. A way of adapting the theory is to group elementary speech acts into different complex action patterns. These patterns can then be used to model, for instance, the coordination of actions in organizational settings.

The following sections describe a few different modeling frameworks that use adaptations of Speech Act Theory. Presented in Section 2.3 is the Conversation for Action, in Section 2.4 the Action Workflow Loop, in Section 2.5 the Dynamic Essential Modeling of Organization (DEMO), in Section 2.6 the Business Action Theory (BAT), and finally in Section 2.7 the Layered Transactional Patterns.

## 2.2 Conversation for Action

Conversation for Action is a well known example of an adapted application of Speech Act Theory. It was proposed by T. Winograd and F. Flores [4] in 1986.
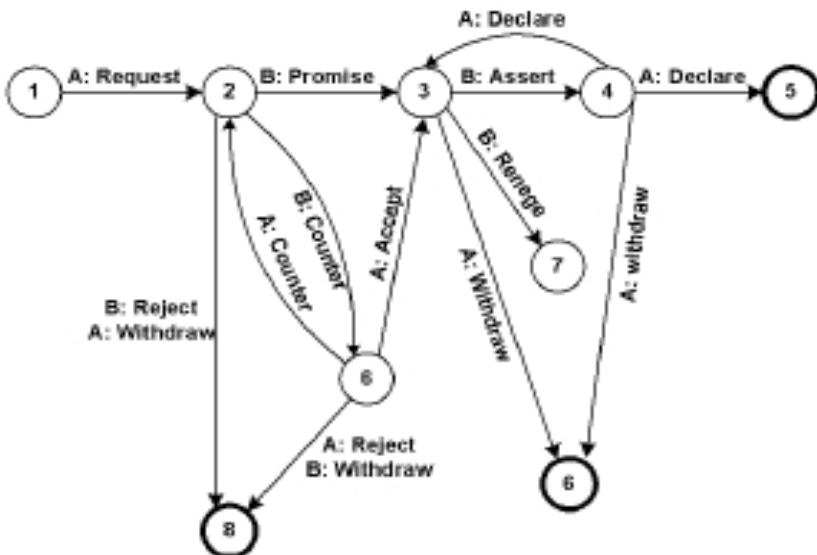
The Conversation for Action is a generic schema where successive speech acts are related to each other forming a network of speech acts like the one in **[Fig. 1]**. Each circle represents a possible state of the conversation and arrows represent transitions accomplished by speech acts. With the request from initial speaker (A) to hearer (B), a transition is made from state 1 to state 2. In the above state transition diagram, there is a finite number of transitions that the conversation can take from a given state.

**Fig. 1.** A State transition Diagram of a Conversation for Action

In the path showing successful completion of a conversation, B assert to A that the conditions of satisfactions have been met (state 4) and if A declares she is satisfied the conversation terminates successfully at the termination state 5. Note that there are also possible conversation failure termination states, for instance when a withdrawal of request from A leads to termination state 8 in the diagram.

### 2.3    Action Workflow Loop

Action Technologies **[5]** developed their speech act based modeling approach within Business Design Language. They extended the Conversation for Action pattern from Section 2.3 to a four-step Action Workflow Loop, which is used as the basic modeling unit.
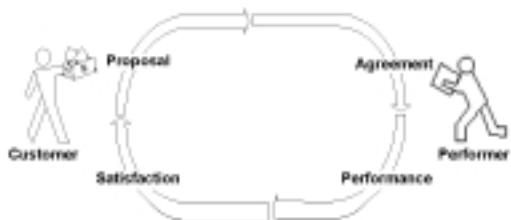


**Fig. 2.** A basic Action Workflow Loop

The above diagram shows the basic sequence of phases in the Action Workflow Loop. There is always an identified customer and a performer for the completion of a task as in **[Fig. 2]**.
The four phases are:
  1. **Proposal**
    The customer requests (or the performer offers) completion of a particular action according to some stated conditions of satisfaction.
  2. **Agreement**
    The two parties come to mutual agreement on the conditions of satisfaction, including the times by which further steps will be taken.
  3. **Performance**

The performer declares that the action is completed.
  4. **Satisfaction**
    The customer declares that the completion is satisfactory.

There are possibilities to model additional actions at any phase of the Action Workflow Loop e.g. to include further negotiations for clarifying satisfaction conditions or changes of participants commitments. A detailed analysis of these further negotiations can be found in [4]. The key difference between traditional workflow approaches and the Action Workflow Loop is the shift from task or information flow oriented action coordination to request and commitment oriented action coordination. That is, business processes are modeled as networks where different Action Workflow Loops are connected by links at different phases of the loops. See [5] for more details of business process modeling with networks of Action Workflow Loops.

The Action Workflow Loop is the main foundation and inspiration of the business process patterns that are proposed in this thesis.

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## Elektroniska media

Telefon
Radio/TV
Telex/Teletex
Telefax
Grupptelefonsamtal
Videokonferenser
Databaser och videotex
Röstbrevlådor
Elektronisk post/Datorpost/Meddelandehantering
Konferenssystem/Bulletin-board-system

## Format

Text i olika teckenstandarder
Ljud
Bild
Multi-media
Hypermedia
Animation

## Kriterier för framgång

Tidigare datorvana
Dataskärm på skrivbordet
Kan nå viktiga personer
Upplever ett personligt reellt behov
Gemenskap och samhörighet med gruppen
Tillräcklig mängd kommunikation

## Kriterier för misslyckande

Andra har fattat beslutet
Införande i alltför liten skala

## Lämplig användning

+ Kan ge och ta information när det passar en
+ Kan ge exaktare faktauppgifter
+ Mottagaren kan spara informationen
+ Fler kan komma till tals

– Svårare komma överens, nå konsensus
– Svårare fatta formellt beslut
– Komplex diskussion svårare

## Två raderingsfilosofier

Användaren raderar explicit alla brev, ofta direkt efter att ha läst dem.

Automatisk radering efter viss tid eller inom ramen för fix brevlådestorlek. Kombineras ofta med möjlighet skydda vissa meddelanden från radering.

## Gruppkommunikation

Meddelande till flera mottagare, och svar på sådana
Personliga distributionslistor
Allmänna distributionslistor
Cirkulationslistor
Första-mottagaren-läser (hjälpbord)
Konferenssystem / Bulletin Board-system:
 Öppna möten
 Slutna möten
 Begränsade möten
 Skrivskyddade möten
 Urvalsmöten

# Vem styr kommunikationen?

| Systemtyp | Avsändaren | Mottagaren | Redaktören |
|---|---|---|---|
| Informa-tionssöknings-system | | | |
| Konferens-system, Bulleton Board-system | | | |
| Personligt adresserad elektronisk post | | | |

# Nyhetskontroll

Lästuppgift för varje meddelande
Linjär läsning, markering eller datum i listan
Läsa baklänges
Kombination av dessa

# Etik och etikett

### Behövs en speciell datoretik?

### Vanliga etikregler:

Tänka sig för
Hålla sig till ämnet
Börja med det viktigaste
Undvik personliga omdömen
Markera ironi och skämt
Vänta med att svara, låt frågaren sammanfatta svaren
Vidaresändning
Reklam, annonsering, politisk diskussion
Privat och tjänsteanvändning
Boka tid för ett möte

# Lagstiftning

Meddelandefrihet
Skydd mot censur och övervakning
Offentlighet och sekretess
Tryckta skrifter
Datalagen
Upphovsrätt
Annan brottslighet

# Lagen och datanäten

Räkna med att alla kan läsa det du skriver.
Polis, åklagare och domstol kan kräva att få se även slutna texter.
Exempel på olaglig information:
Förtal
Spridande av virus
Personregister i strid med PUL
Samkörning i strid med PUL
Piratkopiering
Uppvigling
Hets mot folkgrupp
Yppande av hemlig information
Förberedande av brott
Spridande av barnpornografi och olaglig våldsskildring

# Lagar av speciellt intresse

Meddelandefrihet
Skydd mot censur och övervakning
Offentlighet och sekretess
Tryckta skrifter, radio och TV
Personuppgiftslagen
Lag omupphovsrätt
Lagen om elektroniska anslagstavlor

## USA

1996: Communications decency act passed by congress.
Obscenity and violence not allowed on the Internet.
1997: Voided by Surpreme Court.
Current disputes: Legislation on libraries, schools.

## Mail Spamming

Unsolicited commercial mail
Filters
Circumventing filters
Use of other people's mail agents
Falsified return addresses
Legislation attempts

## Web Spamming

Invisible text
Repeated words and phrases
Cloaking
Link exchange agreements

## Rough Justice; example Usenet News

Spamming of Usenet News
Cancelbots
Cancel of what you dislike
Automatic re-loaders

## Rough justice

Cancel av
  författaren

Spams

Cancelbots

Rogue Cancels –
Scientologerna

Republishers

Aktörer i systemet:
- Författare
- Spammare
- Cancelbotsansvariga
- Rouge cancellers
- Republishers
- Moderators
- Server administrator
- Law makers