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# Support for Decisions by E-mail

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Abstract: Research on the use of e-mail for decisions shows that e-mail has some important advantages, compared to face-to-face meetings. But e-mail also has particular problems for use in decision-making, probably caused by the lack of body language, facial expressions and voice inflection. These problems show themselves in too longwinded discussions and difficulty to reach a decision. This paper discusses these problems, and proposes that new computer-supported tools might alleviate the problems. Examples of such tools are methods to find out the opinion in a group, continuously during its deliberations, and methods to structure the message flow with links between messages like “Solution-To”, “Argument-Against”, etc. These links would be an extension to the existing links “In-Reply-To”, “References” and “Supersedes” giving more flexibility in structuring the information flow.

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# 1 Advantages with Decisions by E-mail

As more and more of the communication between people is done using e-mail (and other non-simultaneous messaging systems, often named Computer Mediated Communication, CMC), it is natural that e-mail is also used for decisions.

In preparing for decisions, it is important to assemble all facts, ideas, alternatives, and consequences before making the decision. E-mail 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 [4]. E-mail has also been found to be more efficient at coordinating the work done at different places in an organization [6]. Traditional media, like travel, face-to-face meetings, courses, inventories, and company regulations, are not always very efficient in coping with such coordination problems. The main advantage of e-mail 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.

With e-mail, as compared to face-to-face meetings:

- The costs and time for travel to meet face-to-face is reduced. This is, of course, especially important for people who live at different geographical locations.
- You can raise an issue, discuss it, and often reach a decision, without having to wait for the next scheduled face-to-face meeting.
- You have more time to think about the issues. In a face-to-face meeting, if an issue is raised, you have to reply immediately, or postpone the decision to a later meeting. In e-mailed discussions, you can think about an issue over night, look up facts, and come with your new ideas the next day.
- E-mail can be less time consuming, because you can decide yourself, how much time you spend on reading messages. You can rapidly skip less important messages, but read carefully those which are more important. If the number of participants in a group is more than about five people, e-mail also saves times because people write slower than they speak, but read faster than they speak (see Figure 1 from [16]).

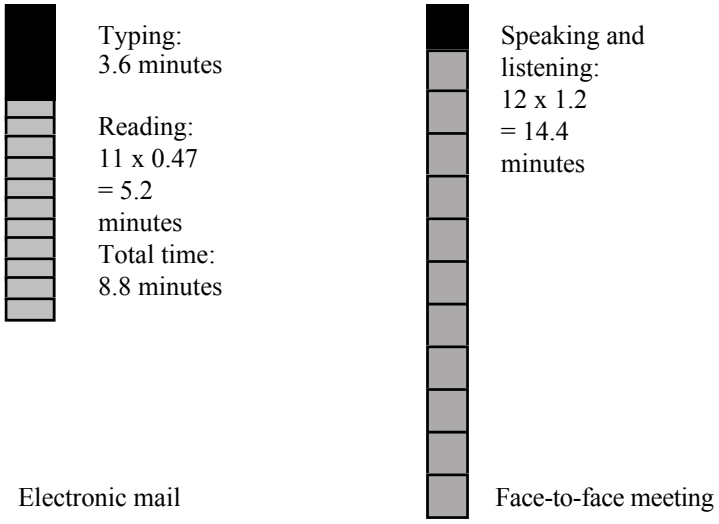


**Figure 1**: **Comparison of the time spent giving and receiving information in written versus spoken communication in a group with 12 participants.**

E-mail can increase feelings of "togetherness" and understanding with other people in an organization. Without e-mail, 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, e-mail can integrate geographically distributed people more integrated into the activities of their company [5]. E-mail usage increases the loyalty and positive feelings to the whole company [7].

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 [19] reports that connecting all the employees to a common e-mail network was an important tool in this process.

Investigations show that e-mail 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 [20].

E-mail also increases the contacts with people outside a company [18], [9], [1]. 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 [2], [19].

Because of these advantages, some organisations, for example IETF (Internet Engineering Task Force), have decided that decisions should preferably be done through e-mail, even though IETF has face-to-face meetings three times a year.

## 2 Problems with Decisions by E-mail

Using e-mail for decisions is, however, not without problems [17].

- 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.
- It is more difficult to conduct a formal decision process through electronic mail.

The lack of body language, facial expressions, voice inflection, etc. increases the risk of misunderstandings. Locked situations will more easily occur in e-mail, where people stick with their initial opinions and are unable to agree. E-mail 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 opinion among the participants. 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, for example 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 [19] claim that electronic mail tends to favor something called "flaming", by which is meant stormy debates of uncontrolled outbursts of anger. Other 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 etchical 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".

## 3 Can Decisions through E-mail be made more Efficient?

Some people make the conclusion that e-mail should not be used for decisions, at least not for the most crucial and controversy-solving phases of decision-making. Other people, however, believe that tools can be developed to make e-mail more efficient for decision-making [21].

Which tools, then, can make e-mail more efficient for decision-making? In order to answer this question, one should analyse the problems which occur in use of e-mail for decisions.

**Problem:** The lack of body language, facial expressions and voice inflection makes it more difficult to get across your feelings on issues being discussed.

**Solution:** This problem might be alleviated with the inclusion of so-called emotives or smileys, additions to e-mail which clarifies the emotion behind what you write. The most common emotive is the character sequence ":-)" (which, turned 90 degrees, looks like a smiling face). This emotive is used to mark things which are jokes or irony, and are not meant to be taken at face value. With the increasing use of graphics in e-mail [14], more expressive emotives can be designed and used, for example  and  .

**Problem:** The lack of body language, facial expressions and voice inflection means that you cannot see or feel the opinions of other people, unless they explicity write messages to state their views. This is probably a reason why e-mailed discussions sometimes tend to be lengthy and repetitive.

**Solution:** Provide tools to collect the opinion in an e-mailed group, without forcing everyone to write and read messages to every other member. This has some similarity to voting. However, by voting we usually mean a procedure to make a formal decision, where the computer tallies the votes and pronounces the winning decision. It has, however, been proved, that it is difficult to design good such algorithms. In fact, no algorithm will find the best solution in every decision case [13].

A simplified example to explain the problem with voting algorithms. Assume that 33 % of the people in a city are pedestrians, 33 % are bike-riders and 33 % are car riders. Assume that a decision is to be made on whether to build a new bridge over the railway, and if so what kind of bridge. The pedestrians might vote *yes* to a pedestrain bridge, but *no* to a bike and car bridge. The bike-riders might vote *yes* to a bike bridge, but *no* to a pedestrain and motorcar bridge. The car owners might vote *yes* to a motorcar bridge, but *no* to a pedestrian and bike bridge. So for all three kinds of bridges, there will be 33 % for and 66 % against, so no decision is made to build any bridge at all. But the optimal decision to make people satisfied might be the opposite, to build a bridge for all three groups of people.

Voting in a democratic society usually means equal votes. But equal votes may not always get the right decision, because everyone may not know enough about every issue, and because some people may have hidden agendas controlling their voting. As an example, a common voting procedure at IETF face-to-face meetings is as follows:

(1) The chairman asks: How many of those present have read the draft document?

(2) Then the chairman asks: How many of those who have read the draft document votes for solution A and for solution B.

What the chairman is actually saying with this voting procedure is: Only those who know the issue enough to have read the draft are allowed to vote!

In IETF, the opinions of people who have actually implemented a protocol and the opinions of people known to be competent, sound and knowledgeable, have larger strength than votes from other people. This is usually not specified in writing, but it is nevertheless unwritten rules that in reality govern the decision making in IETF, under the designation “rough consensus”.

**Problem:** Interaction time (the time from a statement to a response) is in e-mail usually 6-48 hours, while the interaction time in face to face meetings is usually seconds or minutes only. This means that processes, which require many interactions, will take longer time through e-mail. In a face-to-face meetings, people can keep their attention

on the same issue during the whole discussion, while in e-mail, they will do other things inbetween.

**Solution:** In some cases, this can be solved with a different algorithm. A simple example is the booking of the time for a future meeting. With face-to-face meetings, the usual algorithm is as follows:

(1) Someone proposes at date for the next meeting.

(2) Everyone else checks if this date is acceptable.

(3) If the date is not acceptable to someone, that person proposes a different date.

(4) Back to step 2 until a date is found, which is acceptable to everyone.

With e-mail, this algorithm will not work at all. With 6-48 hours loop time it may take weeks to schedule a time for a meeting. Instead, another algorithms may be used:

(1) One person proposes five alternative dates, and asks everyone to reply to that person personally, indicating which of the dates are acceptable to them.

(2) The proposing person collects the responses, checks which dates suites the largest number of people, and schedules the meeting for that date.

(3) If none of the suggested dates are good enough, back to step 1.

The second algorithm is much faster, because usually only one loop is neccessary. Important differences and similarities:

- With both algorithms, the goal is to find a date suitable to all or most of the participants.
- With both algorithms, the actual decision is not made automatically by some computer process. The decision is made by one or several people, aided by data collected by the computer.
- The human decision process in the face-to-face process sometimes can include that someone says “hold the meeting without me” or “well, OK, I will reschedule my other commitment for the proposed date”. With the e-mail variant, such additional factors are also taken into account, but sometimes by the chair alone, which decides “we will have to hold the meeting without Johnson this time”.

**Problem:** E-mailed discussions tend to collect a large amount of valuable ideas, but these ideas are not structured in a way which clarifies the issues.

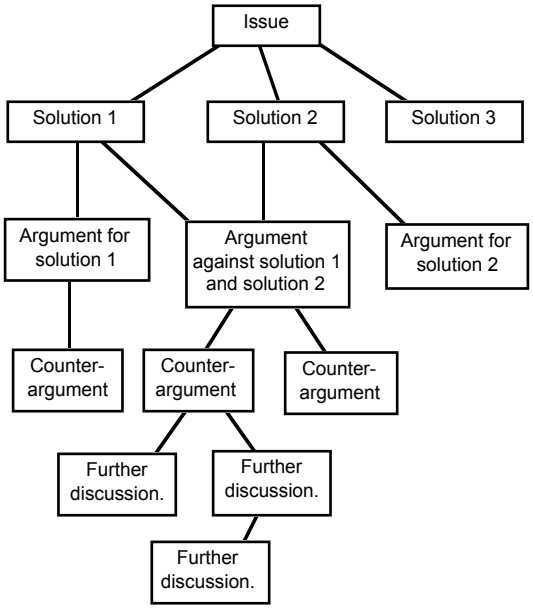


**Figure 2 Example of structuring of a discussion and its results**

**Solution:** This might be solved with better support for threads (relations between messages). In addition to the thread links in existing e-mail standards (In-Reply-To and References) and the additional link "Supersedes" sometimes used in Usenet News, one might add several more link (see Figure 2) types to help structure the message flow, for example "Solution-To", "Consequence-Of", "Argument-For", "Argument-Against", etc. Such structuring will probably not work if every person has to assign such links from their messages when they write them. Instead, it should be necessary to allow addition of such links after a message has been written, and that someone else than the author of a message can add the link.

# 4 Practical implementation

Part of what is suggested in this paper exists in some systems to some extent. There are several net-based voting systems [3], [12], [22], and some systems [8], [21], for example the well-known and controversial system "The Coordinator" [10] uses some additional thread structuring.

At our department, we have started implementing an e-mail query service especially oriented towards group decisions in organisations like IETF [15]. Figure 3 shows part of the planned user interface. Our system uses queries, where a number of choices is given, and each respondent can indicate, for every choice, whether it is "Very bad", "Bad",

"Maybe", "Good" or "Very good". This method gives more flexibility than simply asking people which of the choices is best. The results are to be listed with names of the respondents. During the query period, participants can change their choices. In this way, the system can be used to see how the opinions in a group changes during a discussion. One might add to the system a facility where a person can indicate his own perceived competence, or how sure he is in his response.

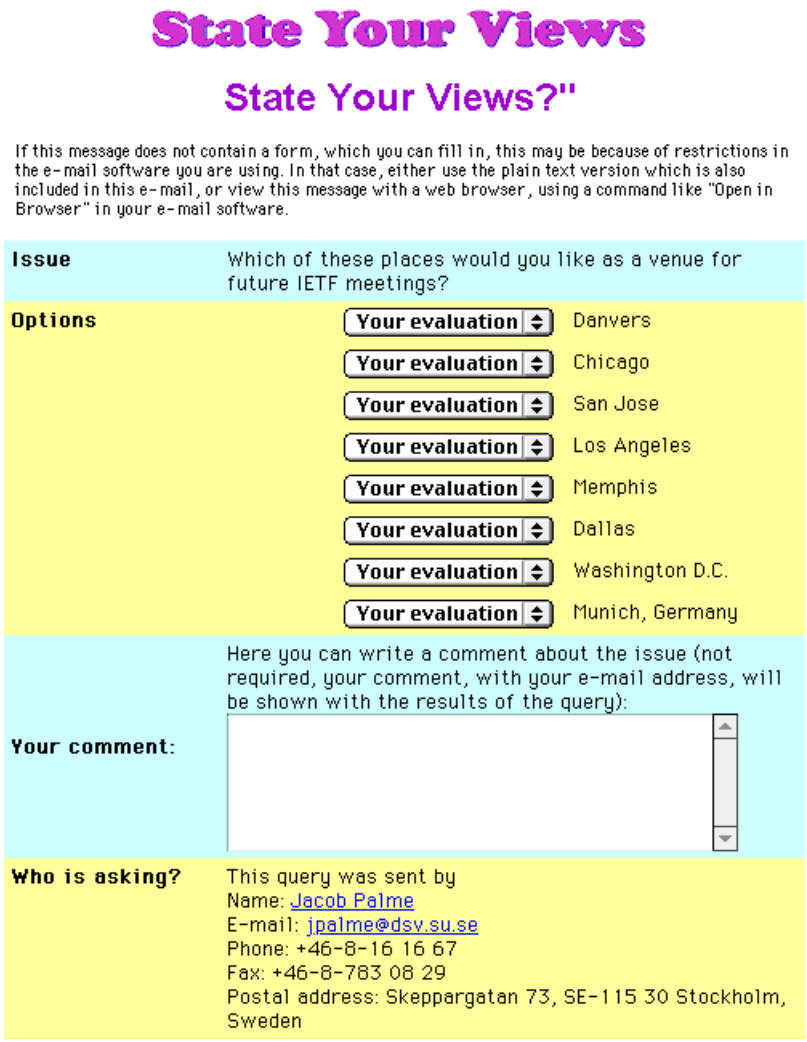


**Figure 3: Part of the user interface of system proposed in this paper.**

An important problem with this kind of queries is a good statement of the query. Such a good statement must include all choices and list them in a reasonably impartial manner. Sometimes, discussion in the group about the correct query formulation should precede the actual collection of opinions.

We will also send in a project proposal to the EU Fifth Framework for future development of this kind of support.

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# 6 Vitae

**Figure 4: Picture of Jacob Palme**

Jacob Palme is professor at the department of Computer and Systems Sciences at Stockholm University and KTH Technical University.

He has written five textbooks, spoken 22 times at international scientific conferences and published 38 papers in scientic journals. He has been invited speaker at 15 scientific conferences. His last book was entitled "Electronic Mail" and published in 1995 by Artech House.

He has done research in thearea of military weapons simulations, artificial intelligence and human-computer interaction. Since 1978, his main interested has been Computer Mediated Communicaation (CMC) and he has done research both on user effects and technical methods for such software. He has also participated in ISO and IETF work on developing standards in the CMC area.

He has participated in several EU-funded research project: GILT, AMIGO and Web4Groups and is currently active in the EU-funded research projects Senior Online and SELECT.