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## **The Scenarionnaire - Empirical Evaluation of Software-ergonomical Requirements for Groupware**

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### **1 Software-ergonomical requirements for groupware**

We define *groupware* as systems which offer technical support for communication and cooperation. Computer networking is characterized by structures and processes of interaction. When we speak about computer supported or mediated work we suppose that there are always several persons affected by the usage of certain functions in different ways. If someone activates a special function, he is called the *activator*; other persons, for whom the usage of this function means any effect, are called *users affected*. It is obvious that in network interaction regarding the actual usage of specific functions often different and probably conflicting interests will occur. In an explorative study in 1992 we found out that these conflicts of interest often come up with the systems controllability. A person who has got the possibility to choose between several technical options has got *controllability* of his own workspace and instruments. In network system this controllability often affects other users, who have not got any opportunity

- to see, which function was activated and by whom this function was activated
- or even to intervene against it.

In this understanding controllability means a restriction for the autonomy of a user affected, whose environment is technically manipulated by anybody else's usage of a certain groupware function (Herrmann et al. forthcoming).

To reduce these kinds of conflict between users we developed the two following metafunctions, which should be applied to controllability in groupware-systems (Wulf 1993):

- *Visibility of use* gives informations about the behaviour of other active users in the network to the user affected. This metafunction has been developed to enable the users affected to understand what happens to them in a network system. Visibility of use means a restriction in the autonomy of the activator, whose behaviour will become visible for others. Beyond that, it means an increase of *situational control* for the user affected regarding the actual interaction.

- *Negotiability* as a metafunction means even harder restrictions for the autonomy of the activator. Every activation of certain functions which will or could affect other users has to be negotiated between the partners in interaction. Negotiation requires visibility of use. Every user will be informed, if anybody tries to use a specific function, which could possibly affect him as a participant of the network system. This user affected now has got the opportunity to intervene against this usage. The activator has got the opportunity to insist on his need to activate a special function, when he notices the protest of a user affected, e.g. by explaining the reasons or necessity for the usage. The affected user can accept/ deny the planned activation or suggest a modified activation (e.g. of another optional usage). If there is not found any consensus, the system will automatically activate a default option. Thus, negotiability distributes the *situational control* of interactional relationship between the both partners in interaction.

### **2 The scenarionnaire as a method of evaluation**

To evaluate the reported metafunctions, we constructed short scenarios, in which we described the different functional/ metafunctional conditions of computer mediated interaction first in the perspective of an activator and second in the one of the user affected (Rohde 1994). For both roles we constructed six scenarios (a standard situation, controllability, visibility of use and three different versions of negotiability) for two certain areas of application (cut-off function for telephone and access in a workflow system). Thus, we constructed 24 short scenarios in total.

Based on these scenarios we constructed a questionnaire, which offered 12 short scenarios to all interviewees. When we distributed the questionnaire in Spring 1993 in seven companies, we asked the interviewees to judge each of the presented scenarios by five work-psychological dimensions. These dimensions were

- the acceptance,
- the facilitation,
- individual autonomy,
- the mental workload and
- the (subjectively estimated) time needed.

Each dimension was to rate on a scale of four. The interviewees got a block of six scenarios for both areas of application; either the role of the activator or the role of the user affected for each field. Some of the questionnaires presented only one role for both fields, others offered the role of the activator/ user affected in the first field and the other role in the second. Thus, we came to four different *scenarionnaires*. To exclude sequence-effects, we arranged the scenarios at random within each block and used numbers to lable them all the way through. Next we organized the blocks first in ascending and then in descending order. This procedure led us to eight different versions of the scenarionnaire with 12 scenarios in each.

### **3 Empirical results**

We analyzed the data with MANOVA, ANOVA and chi-square-tests (Rohde 1994). Our main results are

- that there are differences in judgement on the different functional options depending on the role of the interviewed users,
- that these differences of interest between activators and users affected dissappear with introduction of the metafunctions visibility of use and negotiability,
- that the sample as a whole prefers the metafunctions in comparison with controllability,
- that the subgroup of activators does not rate higher the metafunctions on the dimensions of workload and time needed,
- that the activators make the highest ratings on visibility of use, while the users affected prefer negotiability.

### **4 Conclusion**

In regard to groupware systems there is a lack of software-ergonomical requirements or design criterias as e.g. the ISO 9241, part 10 offers for single place systems. Based on an exploration of the problems which users identify in their everyday work with network systems, we developed the metafunctions visibility of use and negotiability in order to reduce conflicts of interest between different users by technical means.

These metafunctions were evaluated in a field-study using short scenarios and work psychological rating-scales. The chosen method of a scenarionnaire made it possible to operationalize our metafunctions for both the roles (activator and user affected) and for two different areas of application (telephone cut-off function and access in a workflow system).

We were able to distribute the questionnaire in several organizations/ companies at the same time and to sample data of 89 technically experienced interviewees.

Our results demonstrate, that there are conflicting interests regarding the situational use of groupware functions and that the metafunctions succeed in reducing these role-differences by technical means

Furthermore, the metafunctions seem to cause additional workload and need more time than usual. Therefore visibility of use and negotiability should be realized with respect to the users' specific interests.

### **Literature**

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