

## **Fifty ways to leave your system**

### **Three Years of Electronic Communication and Cooperation in a Virtual Organization**

Markus Rittenbruch, Helge Kahler and Bettina Törpel  
Institute for Computer Science III, University of Bonn  
Research Group HCI & CSCW (ProSEC),  
e-mail mr@cs.uni-bonn.de / kahler@cs.uni-bonn.de / beetee@cs.uni-bonn.de

## **Introduction**

Within the last years a growing number of "new" concepts of organizations has emerged. One of them which is currently discussed a lot is the virtual organization (VO) / virtual enterprise. In our InKoNetz project we are investigating a concrete VO (a collection of project oriented groups of persons) and are aiming to improve the design, introduction, adaption, and usage of groupware for the specific organizational needs and the organizational setting for an efficient use of groupware.

## **Electronic Communication and Cooperation in a Virtual Organization**

Sigma (name changed) is a service provider which is geographically distributed over Germany. The main areas of Sigmas activities are training e.g. for software packages and consulting. Sigma is a Germany-wide distributed network of about 200 mainly freelancing consultants and trainers who build small or large teams to work on projects. The distributed organization members usually working in their "Home Offices", i.e. using some part of their homes for their office equipment like telephone, fax or computer. In this way Sigma is a Virtual Organization. Sigma is using a groupware which shall be called SigSys here. SigSys is an online-offline e-mail and bulletin board system that can be accessed by any project member that is granted permission by the Sigma management. Currently about 190 persons have access. With SigSys people can exchange mails within SigSys or to and from the Internet and access Sigma intern newsgroups dealing with issues of certain projects or regional groups. SigSys has a comparatively simple functionality but has some advantages compared to an ordinary Internet access via a provider, particularly being a medium for the internal usage within Sigma with the respective access restrictions and possibilities for regulation and being easier to install. SigSys was introduced into Sigma when we started to work with Sigma in the end of 1996.

## **Flexibility within rigidity**

We are currently engaged with Sigma doing both research on their organization and technology and participating in a work group on their organizational culture. Part of our research has been to analyze the usage of SigSys. In the end of 1997 we conducted 16 interviews with Sigma organization members with different functions, background and involvement in Sigma. Since the end of 1996 we took part in a work group on Sigmas internal communication and cooperation technology where we are involved in an ongoing discussion with Sigmas Central Information Officer and the CEO of the small software company providing SigSys. Investigating Sigma over the last few years we have identified several interesting phenomena causing evolvments as well of the organization as of the technology used. The main point is that the use of a rigid groupware has ambiguous consequences. Rigid software has shown to be both a hindrance and a promoter of change.

Thesis 1: ***Rigid software can be a promoter of change:*** Although the company itself has to be very flexible to react to market changes and deal with its partially fuzzy structure, the commonly used groupware SigSys is more or less rigid: the system is maintained centrally, all changes or bug-fixing has to be done at the office of the software-provider, there is no local support for quick non-bureaucratic help; adaptation and tailoring of the system can not be done by the users themselves, even smaller changes will only be done by the maintenance personnel at the providers site. However, Sigma has developed strategies to deal with this situation and to create the technological and organizational infrastructure that is needed to maintain and increase the organization's flexibility. These strategies are a sum of all activities of the organization's members performed by themselves independently or on the level of teams or regional branches. People have adopted several communication media that seemed to be appropriate for them. Therefore, SigSys was not any longer the

only communication technology within Sigma but a multitude of communication media was used. On the one hand the classical communication media like telephone and fax gained importance. On the other hand lots of different technologies were introduced at the regional branches of Sigma (e.g. e-mail by different providers, Lotus Notes, etc.). We see two main reasons for this development. First, there was a need for interaction and cooperation between organization members which could not be satisfied by the SigSys. Due to the complexity of organization wide negotiations regarding a reasonable IT-infrastructure people tended to solve their problems regionally by introducing directly accessible software. Second, Sigma as a service provider depends crucially on its relationships to customers who have no access to SigSys. Thus, the lack of a technology that is appropriate for the highly flexible demands of Sigma leads to a situation that is promoting the use of different technologies. We believe that this phenomenon may be related to the rigidity of SigSys even if it may not be directly caused by it. However, the organizational ability to act flexibly seemed to be promoted by this.

**Thesis 2: *Organizational strategies can hinder the development of a groupware tool.*** The same organizational strategies had an influence on the development of the system. Since the number of participants was rather large, including people which are situated more at the border of Sigma than in the center, the board of managers decided not to put any kind of confidential information into the system. This provoked, that the system was not completely accepted by its users and was found to be partially uninteresting because important information was not included. Vice versa this effect was partially caused by the system itself because it lacked possibilities to set fine-grained access rights.

**Thesis 3: *Technologically soft borders must be combined with a solid nucleus.*** Although SigSys was shown to be rigid it was still important for the company. SigSys was tangent to the tradeoff between contingency and standardization. In a networked or virtual organization there has to be a balance between the need for forces which guarantee the inner cohesion of the organization and the forces which enable flexibility and fast restructuring of an organization's structure. After all, SigSys was and is *the* medium by which (almost) everybody in Sigma can be reached. However, we found that within a very dynamic environment there is a need for a liable communication medium that guarantees access for and to everybody.

While we have identified several phenomena where a rigid system might have a positive effect we are not arguing for rigid software. The question, however, how much of flexibility and standardization is needed still remains unanswered. The issue has to be decided from time to time depending as well on the respective conditions as on the respective needs of organizational parts / members.

## Is evolution supportable?

As far as we can see now the positive aspects described above have not been caused by the rigidity of SigSys but rather by its liable use. The liability of the system is due to the organization wide convention to use it as a standard tool for organization wide communication. On the one hand the process of keeping the organization flexible regarding the use of technology should be supported even more intensively. Experiences with the usage of different tools should be considered as an increase of knowledge about the process of the flexible introduction and use of groupware and should be spread over the whole organization. On the other hand the system that is used organization wide should not only be liable by convention but should even allow the discussion and negotiation of conventions which can then be established organization-wide. Since we believe in the mutual dependence of organization and technology and in the situatedness of all work a Sigma-wide system should be flexible e.g. by tailoring mechanisms.

We are currently participating in the redesign of SigSys. This will be accomplished together with SigSys's developers and, more importantly, with participating members of Sigma. To involve those freelancers in the participation will be a challenge. We expect the workshop to clarify how the theories mentioned in the workshop call relate to our work.

## Biography of Authors

Markus Rittenbruch, Helge Kahler and Bettina Törpel are working at the Institute for Applied Computer Science at the University of Bonn in the Research Group HCI & CSCW (ProSEC - <http://www.cs.uni-bonn.de/~prosec/>). They were engaged in several research projects and are now working in the InKoNetz project dealing with network organizations. Markus has studied computer science and psychology and is working on his Ph.D. thesis about contexts and awareness in groupware. Helge has studied mathematics, sociology and business administration and is working on his Ph.D. thesis about tailorability in groupware. Bettina has studied psychology and computer science and is working on her Ph.D. thesis about participatory design and introduction of groupware. They are authors of about twenty papers for conferences, journals and workshops.