

Virtual Organizations as a Challenge for UCD

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Abstract

Virtual organizations in their different forms are becoming more and more common. In this position paper we present the case of a virtual organization consisting of 200 Germany-wide distributed freelancers. The fact that the virtual organization does not have a geographical center, that the work and the local structures of parts of the organization are very heterogeneous and that the freelancers have to put in "their own" time for e.g. participatory design poses numerous challenges to UCD.

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. Within this new type of organization different considerations about the role of the organizational setting for the process of software design have to be made. Especially for the user centered design (UCD) new questions are arising. Organizations which are more flexible, less hierarchical, existing without a central control, working geographically distributed and depending on self organized team structures, just to name a few qualities, seem to have different requirements to the design, introduction and use of software. Since our understanding of UCD includes a major contribution of participants the question arises how a software can be designed participatorily, usable and appropriate in consideration of the organizational setting of a VO. Note that there are several types of VOs that must be distinguished ranging from project oriented groups of persons through regional unions of factories to large enterprises which outsource parts of their value chain with which they keep cooperating (cf. Rittenbruch/Kahler 1998 for a longer discussion of these).

Our workshop paper will touch upon a few of these issues. In our current research projects we are investigating a concrete VO (a collection of project oriented groups of persons) and are aiming to improve both the introduction, adaption, and usage of groupware for the specific organizational needs and the organizational setting for an efficient use of groupware. We are particularly considering groupware although most of our considerations can be transferred to the usage of interactive systems in general.

UCD in a virtual organization

We want to give a short overview of our field of investigation. 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. Along with the

growth of Sigma recently eight regional branches were established in different parts of Germany. The goal of the establishment of the branches was to structure Sigma's coordination of activities better which had become much more difficult with the growth of Sigma and at the same time relate to the fact that personal acquaintance and relationships play a very important role for the organization. This importance is also expressed by Sigma's equivalent to classical personnel management which consists in a network of trust where a project leader just approaches personal acquaintances when looking for people to join a new project. If this is not successful the project leader asks other Sigma people if they can recommend her someone for the job. The hierarchies are flat and consisting of 3 levels, top-management, management of the local branch and consultant / trainer where hierarchy basically means involvement with Sigma but not authority to issue directives. Furthermore project managers can be established for training and consulting projects (for further description cf. (Rittenbruch/Kahler 1998)).

Sigma is using a groupware which shall be called SigSys here. SigSys is an off-line mailbox system that can be accessed by any project member that is granted permission by the Sigma management. Currently about 150 persons have access. SigSys can be operated via modem or ISDN, a digital network for telephoning and data exchange. With SigSys people can exchange mails within SigSys or to and from the Internet and access Sigma intern mailing lists dealing with issues of certain projects or regional groups. The access to these mailing lists is restricted. Moreover, SigSys permits the sending and receiving of binary data like text documents or overhead presentations that are often exchanged between members of a project team. Considering this, 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 and cheaper.

SigSys has been introduced before the start of our research project. In a first step we are trying to improve the existing system in cooperation with the developers. In a second step a new groupware which fits the needs of the users and reflects the special organizational settings will be realized. For that we performed different empirical investigations like interviews, group discussions and observer studies which focus on different aspects of the organizational setting like communication, decisions, power, organizational culture as well as the use of the SigSys-system. Based on our empirical work and theoretical investigations on VOs we came across the following problems for the use of groupware in VOs. We are differentiating two categories of problems:

1. *Problems in the process of participation*
2. *Problems in systems use*

These categories only relate to problems evoked by the particular organizational circumstances in VOs. Furthermore we identified a lot of usability problems regarding the use of SigSys that we think are of less interest here. Most of them are caused by lacking user participation and a not up to date technical basis and all of them are particular problems of the SigSys-system. For that in the following we are going to concentrate more on general problems of UCD in the particular context of VOs.

Problems in the process of participation

Talking to the users is vitally for UCD. A lot of different methods for participatory design (PD) can be distinguished. For design in the context of VOs of a special type we have to ask which methods fit best and what are the general problems with PD in those VOs. The following issues will describe a selection of problems that we found to be universal problems of participation processes in VOs of the Sigma type.

- ***Availability of time and money:*** Classical methods of PD take for granted that the participants are released from work for a period of time. Normally this is realized by managerial decision or free decision of employees which are permanent workers. In a network of self-responsible

freelancers it is much more difficult to manage the process of PD. When everyone is responsible for his income and has a self-conception to be an independent contractor it seems to be difficult to find free personnel resources for PD. The problem appears within all activities which are related to the network as a whole. It remains unresolved until now.

- **Indistinct responsibilities:** In organizations with distinct hierarchies managerial decisions are obliging in general. Organization with little or no hierarchies seem to have a strong need for discussion and consensus. Although this may be seen as a nice democratic approach we found this to be a hindrance for organization-wide processes like the participation in the design of a groupware. At Sigma we found that a round table aiming at the improvement of information- and communication-flow within Sigma people were mutually shifting the responsibility for this to others, so the round table was lacking essential contributors. This was caused by unclear responsibilities as well as time problems.

Problems in system use

While practicing UCD a lot of motivational factors have to be considered regarding the use of the system. We have identified some hindrances for the system use and are important factors for the UCD-process in the context of VO.

- **Motivational factor: political acceptance:** Regarding to the use of the system different “political” opinions can emerge within the staff whether a system is adequate and usable. This can lead to a situation that the introduced system is rejected by a group of organization members. Within our field of investigation a group of computer professionals rejected the SigSys-system. The introduction of the system essentially did not occur participatorily. Therefore a group of computer specialists within Sigma could not contribute their conceptions of an appropriate system. Until today this group has not accepted SigSys due to the introduction process and other conceptions of quality and suitability of the system. A further group, consisting essentially of managers, is considered to be expressed supporters of the system. They do accept the strategic decision of the top management for the introduction of the system and make an effort to support the use of the system within Sigma. We do not think that the phenomena of “political acceptance” is crucial for VO exclusively. However, we assume that the specific management of VO leads to a higher degree of different political opinions related to the employment of a particular system.
- **Motivational factor: subjective system relevance:** Our results suggest that there is an inter-individual difference in the necessity to use the system. In the context of our exploration we could identify two causal factors of subjective relevance:

Informedness: Different individuals within Sigma are “informed” differently. The informedness of an employee reflects his knowledge about the organizational coherence and indicates if the right persons to turn to in order to get relevant information are known to him. In the context of our exploration we discovered that some persons were so well informed that they frequently already possessed information before it appeared in SigSys. Other individuals depended to a great extent on the information presented in the system. Aspects like being new to the network and spatial or personal marginalization complicate access to information.

Cooperation-Necessity: Due to individuals' different roles within Sigma the necessity to cooperate with other people or groups differs. The necessity to cooperate also influences the necessity for the use of the system. With individuals with small necessity to cooperate we found that these used the system only for short periods of time (*frequency of the use*) and participated little in forums (*intensity of use*).

The subjective relevance of system use has to be taken into account while tailoring the system for the particular needs of users. Furthermore classical design issues like the “critical mass of user” and “disparity in work and benefit” (Grudin 1994) are highly related to this phenomena.

- **Heterogeneity of use:** Within Sigma we identified problems which were due to the very heterogeneous use of the SigSys-system. On a short term inquiry for trainers to build up a team, addressed to a SigSys panel, too few trainers responded. The initiator of the inquiry could not differentiate whether the trainers a) were not interested, b) were busy or c) had not read the message at all. Complex negotiations by telephone followed, which should have been avoided by the application of the system. We found that SigSys is used very differently. Concerning the *frequency*, the use differs between several times daily and almost never. Concerning the *intensity of use*, we identified differences between the regular participation in all panels up to the use of selected partial aspects of the system. The heterogeneity seems to be caused among other things by lacking arrangements about the use of the system.

Open questions and challenges for UCD

The aspects of UCD that apply to Sigma are by no means new in the discussion or unique to VOs of a special type. We do, however, believe that the specific requirements of VOs seem to intensify some of the problems. We think while practicing UCD in a VO its necessary to take into account the specific environmental setting rather than wondering later why e.g. the participation process fails.

As a generalization we can ask three open main questions:

1. *How can UCD deal with particularly divergent user needs and incoherent organizational requirements ?*
2. *How can participation be realized in the processes of system-development and -introduction taking the mentioned problems into consideration ?*
3. *Supposing that the use of groupware is vital for success of a networked organization and that a critical mass of users is needed to succeed what has UCD take into account to foster motivational aspects ?*

In the light of our insights depicted above we believe that designing groupware for Sigma and other virtual organizations that are highly flexible poses many challenges to UCD. Only if these can be mastered the potential of virtual organizations to fully use their flexibility for their benefit can be unfolded.

References

Markus Rittenbruch and Helge Kahler (1998). *Supporting Cooperation in a Virtual Organization*. Proceedings of the Nineteenth annual conference on information systems (ICIS), Helsinki, Finland (in print).

Jonathan Grudin (1994). "Groupware and social dynamics: eight challenges for developers." Communications of the ACM 37(1): 92-105.

Biography of Authors

Markus Rittenbruch and Helge Kahler 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 are engaged in several research projects. Markus has studied computer science and psychology and is working on his PhD thesis about awareness in groupware. Helge has studied mathematics, sociology and business administration and is working on his PhD thesis about tailorability in groupware.