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# Towards a self-organized knowledge infrastructure in a health insurance company

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**Abstract.** CSCL at the workplace is subject to the special characteristics of a situation where learning is not the primary task of the learners. The gap between the goal to work efficiently and the need to increase qualification and skills is even wider in organizations which operate in knowledge-intensive markets and where responsibility and autonomy characterize the work style of geographically distributed workers (“Virtual Organizations”). Classical learning methods have to be complemented by a lightweight knowledge-sharing infrastructure (“knowledge logistics”). In this contribution we describe a method of introduction of knowledge logistics which reflects that gap and offers support for self-organized settings for learning at work. We present our approach by describing the case of the field service of a German health insurance company.

**Keywords.** CSCL, knowledge management, organizational learning, virtual organizations, self-organization

# 1 Introduction

The increasing number of computers connected to a common network is one of the prerequisites for the success story of CSCL. The same dynamics that offered new options for computer support for learning processes and that coined a new research area (Koschmann 1995) have also been responsible for the evolution of new forms of organizations. Virtual organizations (Mowshowitz 1997, Dawidow and Malone 1992, Rittenbruch et al. 1998), as organizations whose members typically are geographically distributed and whose cooperation practice strongly relies on modern information and communication technology, seem to be able to draw ideas and innovations from that new research area more than any other form of organization. But there are also dynamics which complicate the adaptation of CSCL approaches in virtual organizations. Learning at work always competes with other, more “productive” work tasks, and the higher degree of autonomy of the actors can disturb learning cooperation. Consequently, it is still current learning practice that the learners in such organizations explicitly leave the work context for learning. In most cases, the learners visit workshops for several days. The drawbacks here are that learners usually do not build longer lasting “strategic” learning partnerships, and that the social aspects of learning are limited to the time spent together in the workshop.

This is the setting our approach addresses. Complementing classical training methods like workshops, we aim at enabling learners to interact with co-learners and trainers beyond the actual workshop event. By describing the case of a German health insurance company (GEHICO) we show our way to introduce such “knowledge logistics” into a virtual organization.

CSCW research informed us on how difficult it can be to introduce collaborative systems (e.g. Grudin 1988, Karsten and Jones 1998, Pipek and Wulf 1999) into an organization. The introduction of a collaborative system is not part of the primary work task of the users, therefore aspects of motivation and priorities have a large impact on the success of the change process. The high level of autonomy of the actors makes us consider aspects of self-organization as very important for the concept. Research on organizational learning (Argyris and Schön 1996, Senge 1991) gave advice on establishing communication culture and on the connection between individual and group-oriented learning.

We tried to combine all that to answer our key question: How to introduce and maintain self-organized knowledge logistics in a virtual organization.

## 1.1 Organizational Learning Challenges for a Health Insurance Company

The German Health Insurance Company (GEHICO) is one of the top ten health insurance companies in Germany with a turnover of more than 800 million dollars. Health insurance policies are currently an interesting market segment in Germany, because public social security organizations have to cut their expenses and more and more Germans rely on (additional) health insurance policies offered by the private sector. As usual, high margins produce a high level of competition, and so GEHICO is constantly reorganizing in order to adjust to its market and competitors.

GEHICO has about 2.000 employees distributed all over Germany with the head quarter in one of Germany's larger cities. About half of the employees work in the field service. They are the "client interface" of the company they are responsible for selling contracts as well as for supporting customer communication in case of the insured event or any other problems. A group of around 100 persons, covering all regions of Germany, is specialized on the contact management with free health insurance agencies (agency field service - AFS). Most of them are experienced insurance agents and work with GEHICO as freelancers.

Each AFS agent is associated with its GEHICO regional office. They have a desk there, but usually they spend most of their time traveling around between (potential) clients. They use laptops and mobile phones to manage their work. Each AFS agent is responsible for one German region (in very populated areas several agents work in one region), which is why AFS agents rarely meet each other. A special challenge at work is the diversity of knowledge needed; agency support goes far beyond just clarifying the advantages of the GEHICO policies, it may also cover services usually offered by business consultants (developing finance plans, marketing concepts, etc.).

The usual way for becoming an AFS agent is the participation in the corresponding training program after working several years as an "ordinary" insurance agent in the field service. The training program covers the typical legal forms of agencies and their typical problems and how GEHICO is prepared to support the agencies; but also soft skills like establishing and maintaining contact, detecting support opportunities, estimating market positions of new clients, etc. The training is organized as a series of workshops with around five to eight participants. The training is independent of the work usually the trainees already work in the job for a short time when attending the "initial" training. The training itself is much oriented at the trainees work practice; where possible, examples from the work practice of the attending trainees themselves are being discussed.

GEHICO has about 15 trainers responsible for the qualification of the field service. Besides training services for becoming an insurance agent or an AFS agent, they also offer free skill trainings like negotiation, rethorics, etc. There are

also workshops related to new products or new legal issues important for the health sector. Some of the trainers are employees, some are freelancers. They also have (shared) desks at the GEHICO head quarter, but usually they work at home or they are traveling around in Germany to conduct workshops.

## 1.2 Developing a methodology for introducing self-organized knowledge logistics

The described setting given, measures to improve organizational learning (continuous, faster learning cycles) in the field service of GEHICO mainly aim at:

- Complementing the classical learning measures and the associated communication patterns with decentralized, computer-based measures and communication. A shift away from workshop-focused concepts towards computer-based collaborative learning concepts is also intended.
- Shifting the learning practice from a “managed”, prescriptive learning organization to a more self-organized, demand-oriented practice.

To reach these goals, concrete measures cover:

- introducing tools and establishing practices of continuous expertise sharing related to the trainings attended and the daily work practice,
- reorganizing roles with regard to a more continuous, practice-related qualification concept. ASF agents have to be enabled to self-organize their individual and collaborative learning efforts, and trainers should overcome the “teacher” metaphor and to regard themselves as “qualification consultants”, and
- collecting experiences with collaboration via internet-based media.

We developed a concept for the introduction of such self-organized knowledge logistics which we believe can also be applied to other introduction processes of CSCL concepts. We also report on the first experiences in the case of GEHICO. While the next section covers the relevant State of the Art, the following two sections briefly describe the concept and first experiences with its realization. After relating it to similar research settings we conclude with a summary and an outlook on further work to do.

## 2 State of the Art

In the context of our research and development project the concepts of *self-organized learning* and of *organizational learning* are of central interest. The health insurance company as our field of application, especially the training department, is structured as a *virtual organization unit* and - last but not least - *organizational and technological development* has to be processed interdependent side-by-side. The following sections deal with these basic concepts and terms.

## 2.1 Self-organized learning

Our understanding of self-organized learning is based on an operational definition of self-organization and self-determination, as it is discussed e.g. by Deitering (1995, pp. 66) or Greif (1998). They refer to work psychological action regulation theory (german: Handlungs(regulations-)theorie), which is represented by Hacker (1986) and Volpert (1983). In these theoretical approaches, human action always is determined by both the person and the environment. This dimension of self-determined vs. environment-determined context is underlying our concept of self-organized learning therefore purely self-organized learning is rather unlikely to happen. Learning processes and situations can always be described instead by a *specific degree of self-determination*. This degree of self-determination or self-organization can be measured by the influence learners have got on

- learning aims and hierarchy of aims
- learning methods, didactical approach, and motivation
- learning task design
- media and tools, which are offered and used during the learning process
- learning content
- learning modules, steps and lessons
- learning context: presence, time and space
- controlling and evaluation of the learning process and the results
- offers and usage of support, help, guidance, and feedback.

Corresponding with findings of humanistic psychology and pedagogy (e.g. Lewin et al. 1939, Rogers 1969, Maslow 1962) and the German *Reformpädagogik*-approach of the nineteen-thirties (e.g. Petersen 1930), Greif and Kurtz (1998a) state that a high degree on self-organization of learning processes is increasing motivation and learning results. Therefore, they claim for enabling learners to structure and order the learning process themselves as far as possible (1998b). In our approach we follow this understanding of self-organization in learning processes as the degree of ability to influence the context and the conditions in which learning is situated.

In constructivist approaches, based e.g. on the work of Bruner (1961), Bateson (1972) and Papert (1980), learning is viewed as an active constructive process. That does not mean transfer of knowledge, but the continuous construction and reconstruction of knowledge based on life experience and real life problems (cf. Issing 1999, Arnold and Schüßler 1999). In this approaches, learning is self-organized *per se*, because of the individual cognitive effort it takes to actually learn. Those constructivistic theories of learning influence the recent development of computer mediated forms of learning (cf. Jonassen and Mandl 1990, Duffy and Jonassen 1992, Spiro et al. 1992, Koschman 1995).

However, these approaches concentrate mainly on *individual* learning, but we focus on *collaborative* learning processes, as they have been studied e.g. by Lave and Wenger in their "communities of practice" or by authors like Peter Senge

(1991) or Argyris and Schön (1978, 1996) in their work on organizational learning.

## 2.2 Collaborative learning in Learning Organizations and Communities of practice

In the past decade, Chris Argyris and Donald A. Schön as well as Peter M. Senge published their latest approaches of "learning organizations" (Argyris and Schön 1996, Senge 1991). Based on action research methodology and practical experiences in organization development projects, the authors focused on the question how organization and teams as collective entities can learn new strategies and develop new structures and cultures.

Influenced by the organization development approach and contemporary studies on the Japanese *kaizen* practice, Argyris/Schön and Senge describe learning organizations as self-reflective, continuously changing and self-organizing companies, which cope with dynamic situations and changing environmental conditions that way. Organizational learning, therefore, is understood as an evolutionary, self-organized and reflective learning process of collective entities, workgroups and departments, and at last of the company or organization as a whole.

With their concepts of organizational learning, they address the development of organizational structures which determine the whole perception, strategy development, and activity of an organization. These structures include

- communication channels, official and unofficial patterns of interaction
- information systems, media, and communication technologies
- treatments and methods of organizational (self-)reflection and research
- relevant environmental context of organizational reality (cf. Argyris and Schön 1978).

Another approach of collective learning theories is based on empirical ethnological findings and social-cultural theories of learning, as e.g. Vygotsky (1962) represents. Learning is a collective process situated in special contexts of actions. Knowledge is generated in interactive processes of creation of meaning by *communities of practice*, which are determined by practice, language, usage of tools and methods, and at least values and ethical standards (cf. Lave and Wenger 1991). Learning is a process of inclusion in these communities and their practice (cf. Collins et al. 1989, Wenger 1998).

In our work, we combine these approaches of collective and organizational learning with the concepts of self-organized and self-determined learning.

## 2.3 Virtual Organizations

The work of trainers and trainees in our field of application takes place in towns all over Germany. Contrary to the rest of the company, the AFS and their trainers

carry the characteristics of a virtual organization. The implementation of home offices and the introduction of networked information and communication technology as well as the integration of external trainers increased the flexibility of the organization enormously.

A virtual organization (Mowshowitz 1997, Kemmer and Gillessen 1999, Mertens et al. 1998, Picot et al. 1996), which is described by

- different geographical locations of work,
- flexibility of cooperation structures and processes in time,
- and usage of networked media.

Arnold and Härtling (1995) and Strausak (1998) describe the different definitions and descriptions of virtual companies, strategical alliances, value-adding partnerships, and agile enterprises. It is important to note that one aspect of definitions is not relevant for us: their often claimed temporary nature. We assume that cooperation in an aspect as strategic as organizational learning only happens in longer-lasting business partnerships.

## 2.4 Integrated organization and technology development

We are well aware that our approach involves the development of a technical solution as well as a change of organizational aspects. Organizational structures and practices are the context of development and usage of information technology and define the requirements for technological development. On the other hand, technological developments influence cooperation, practice, and therefore, organizational processes. With our approach, we follow a framework described as “Integrated organization and technology development” (OTD) by Wulf and Rohde (1995). Based on the work in software engineering by Boehm (1988) and Floyd et al. (1989) and ideas from *action research* (cf. e.g. French and Bell 1973, Pieper 1989), they integrate concepts of evolutionary organization development with user-centered software engineering cycles. Technological and organizational interventions drive a change process, where the collection of empirical data and its feedback to the users lead to a participatory design process.

## 3 A concept to introduce self-organized knowledge logistics

What we call self-organized knowledge logistics is a conglomerate of technical systems and organizational practices and conventions which allow for of a high degree of flexibility and easy ways of re-negotiating and reorganizing collaborative structures. Along with Lees (1997) and Shum (1997) we believe that knowledge work is inherently self-organized, and that concepts supporting knowledge work should consider this. In a study of self-organization regarding



the desks of co-workers, Malone (1983) found that there are shared practices of organization which might also help in a collaborative setting.

For the technical system for *self-organized* knowledge logistics two points are of importance: availability and flexibility. Availability means it should be easy to connect to the system wherever the user is. Flexibility means that the content should be easily restructurable by users. It also means that users should be able to set appropriate access rights easily to build restricted or private areas. The technical system of our knowledge logistics was programmed on the basis of the web-based groupware BSCW.

Our concept of the process which should lead to working knowledge logistics refers to the OTD approach of Wulf and Rohde (1995, see above) and to the combination of experiences of Participatory Design (Greenbaum and Kyng 1991, Henderson and Kyng, 1991, Schuler and Namioka 1993) and from Knowledge Management (e.g. Shum 1997). It is also inspired by the work of Kafai (1991) and Pedersen (1930) who developed methods where higher-grade kids taught lower-grade kids. The interesting aspect for our context is that all “teachers” were “students” *in exactly the same learning setting* before. They do not only have the necessary knowledge with regard to the learning goal, but they also have experience in *how to learn in the setting given*. Therefore, they are also able to transmit a culture of learning. We believe that this aspect is crucial when introducing new settings for learning into an organization.

From experiences with groupware introduction (resp. introducing a new *work setting*) it is clear that in the beginning of the process it is not possible to foresee all aspects which are relevant for a successful introduction. We combined the idea to work with a pilot group of users with the thoughts above and tried to find a “multiplier group” which would also be able to transmit a culture of learning. In a second phase this multiplier group helps introducing the knowledge logistics to the real “target group” of users. Our concept has an outer and an inner procedure. The outer procedure follows the pattern described (the actor is a kind of a change management group):

- *Gathering the needs of the target group*: Detection of system requirements, analyzing the work setting in which learning takes place, analysis of current training practice.
- *Introduction of self-organized knowledge logistics to a multiplier group*: Choosing an appropriate multiplier group involves assessing them as sufficiently similar to the target group especially according to work style and organizational setting. We believe that the trainers at GEHICO fulfil that requirement.
- *Introduction of self-organized knowledge logistics to the target group*: Collaborating with the multiplier group for a successful introduction.

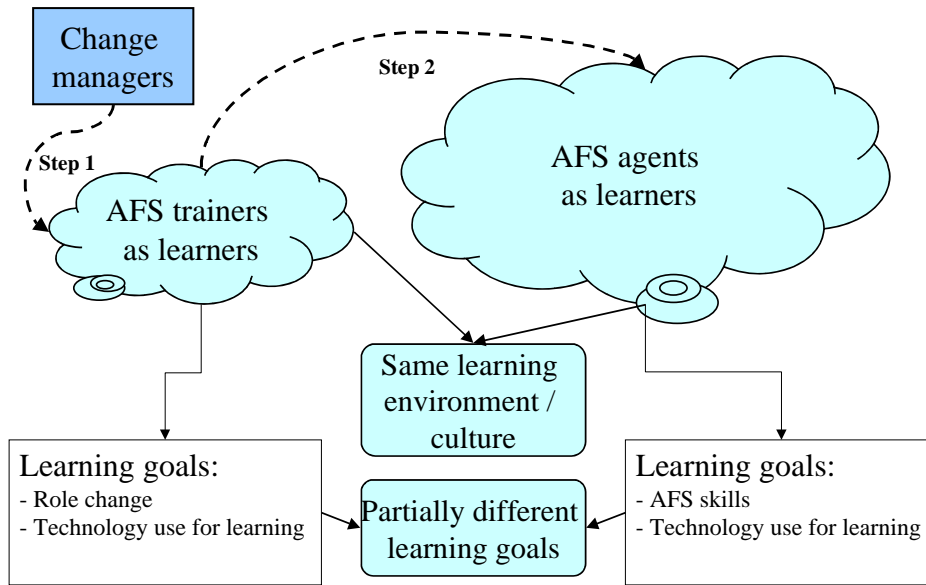


Figure 1: Introducing a knowledge logistics system

Figure 1 shows how this outer procedure works in the case of GEHICO. The learning goal of “technology use” is inherent to the method and dominates the other learning goals in the beginning. Learning goals are only weakly described they mainly influence the material which is being put into the technical system. The inner procedure is the introduction itself which worked according to the following pattern:

- *Choosing the field of application:* As described above first of all we have to analyze the field of application. The results help us here to decide which user group we had to select as “multiplier group”.
- *Design of an initial system and presentation:* The next step is to design an intranet software solution which should serve as knowledge base. According to our requirements the system is not well-structured as the users are to build up their own logistic structures within the field study. Thus, we only introduce very basic structures and present this system to the users during a workshop. The presentation is driven by the idea that not the functionality but the useful integration of the system into daily work scenarios should be in the spotlight.
- *Exploration phase:* After that we start a short exploration phase. The idea here is to give the users the opportunity to gain first experiences. In our case, at first the users looked around and used existing documents, but after a short time they started to arrange their own workspaces and placed their own documents.

- *Instruction*: The next step is to do well-organized training. As in the first presentation of the system we depict daily work scenarios and show in which context the knowledge logistics system can be used. The training will be held by project members (which are experienced BSCW users) and one experienced trainer (which form altogether the “change management group”). For the sake of more powerful and more appropriate work scenarios we will train all users in small groups (3-5 persons each).
- *Continuous evaluation and redesign*: After the training session the actual use phase starts. Evaluation is being done by observation and free interviews. Also, logs of all server accesses will be made, and we will hold workshops with the users of the system. There we will discuss work scenarios, problems and change requirements.

In the last phase, the learning goal shifts away from technology use to the question, how the knowledge logistics may change the work, but also the role of the trainers. Although we anticipate that they will be less “teachers” and more “qualification consultants”, “moderators” and “coaches”, we do not exactly know about the nature of their role shift. To find out about this, is the learning goal of the trainers now.

The same process should happen with the “target group”, the AFS agents. We also expect that they have to learn about their new learning environment, and that they have to reflect on how their work and their learning are affected by the change.

We should stress that the existing training concept (mainly workshops) will be integrated in this method. We expect that it is necessary that there are opportunities to meet for a learning group which uses the knowledge logistics. The existing trainings will initiate as well as complement the online learning groups.

The most important question in this context is whether our concept works and if we can manage to change the learning in the way described above. It is also interesting for us to see how the role concept of the “classical” trainers will change during the process of becoming moderators of a new style of learning. At last we have to observe the use of our BSCW-based knowledge logistics system. Here the main question is how systems generally have to be designed to support self-organized continuing training processes. Due to this question we will conduct feedback workshops regularly which can be used to identify change requirements. In the following section the technical basis of our knowledge logistics system is described in more detail.

## 4 Empirical, design, and Implementation aspects

The coarse concept developed at the beginning of the project was refined into different steps. We started with an analysis of different Computer-based Learning Environments (CLEs) and identified an appropriate groupware. Then we configured the socio-technical solution we called the GEHICO-Knowledge-Exchange, which is a web-based groupware to enable knowledge sharing. After that the implementation concept was developed which aimed at augmenting the communication processes of and shared repository functions for the trainers. We held our kick-off-meeting with the trainers June, 1<sup>st</sup>. 2001. The trainers use the digital knowledge exchange platform to access to information like documents or forms and to coordinate their work.

### 4.1 The underlying technical system

It was part of our work to analyze different existing communication and coordination platforms and to identify the appropriate solution. We did this partially on basis of the written descriptions and partially by testing the systems. As the result we decided to choose a groupware system which was developed by GMD.FIT. The BSCW (Basic Support for Cooperative Work) Shared Workspace system was developed within the last six years with the goal to transform the Web from a primarily passive information repository to an active cooperation medium (Bentley et al. 1997). The BSCW system is an application which extends the browsing and information download features of the Web with more sophisticated features for document upload, version management, member and group administration and more, to provide a set of features for more collaborative information sharing accessible using standard Web browsers. Since Web technology supports primarily asynchronous cooperation – people communicate and cooperate at different points in time – it can be used most rapidly for the construction of so-called virtual workspaces: information repositories for groups where they deposit any kind of information for their co-operation tasks and which they visit on a regular basis to retrieve the necessary information they need for fulfilling their tasks.

The requirements for the technical system consisted of different aspects:

- The availability of all working materials and results like timetables, forms etc;
- The transparency of the trainers' actions to offer an orientation frame and social context;
- The awareness about the history of documents;
- The immediacy to communicate one-to-one, one-to-many, or many-to-many;

- The ubiquitous access independent from a prescribed place – office, home, mobile.

The BSCW Shared Workspace system is an extension of a standard Web server through the server CGI Application Programming Interface. A BSCW server (Web server with the BSCW extension) manages a number of shared workspaces, i.e. repositories for shared information, accessible to members of a group using a simple user name and password scheme. In general, a BSCW server will manage workspaces for different groups, and users may be members of several workspaces. A shared workspace can contain different kinds of information such as documents, pictures, URL links to other Web pages, threaded discussions, member contact information and more. The contents of each workspace are represented as information objects arranged in a folder hierarchy. In addition to the normal download of information from a Web site, users can also upload information from their local file system into a BSCW workspace. For example, a trainer may upload training material into a workspace. Other trainers download them onto their computers and later upload the revised and specified materials back into a workspace for their clients. The main features of the system are: Authentication; Awareness information; Version management; Discussion forums; Access rights; Search facilities; Document format conversion; Interface to synchronous communication and Customization.

## 4.2 The socio-technical solution

From the technical point of view the system supports the main features of a groupware system: coordination, cooperation, synchronous and asynchronous communication, os-independent communication and the allocation and distribution of distributed digital knowledge. The access is possible via the Internet from the enterprise office, home office or mobile from a hotel room. A modem is required and a valid IP address to use the system.

As mentioned above the underlying technical solution should support the meta-communication of the trainers and not the training resp. learning process itself. It followed the guiding vision of a situative learning process enabling a technical network between the trainers for the discourse about the training process, the trainees, and the training materials. To assist this we used the metaphor of the stock exchange assuming that there are vendors and buyers of knowledge who meet on equal levels to exchange their goods for mutual benefits.

In design team (equivalent to the “change management group” from Figure 1) meetings we designed the interface to the GEHICO-Knowledge Exchange using the look and feel of the given layout of the insurance company. During the complete process of design we integrated one of the trainers to give us input who to design the interface and the functionalities according to the trainers needs. This trainer worked in the role of a user advocate (Mambrey, Mark, Pankoke-Babatz 1998) advising us about the working practice of the trainers. Approaches to

Participatory Design dealt with the problem of lacking visions for a future socio-technical reality by potential users. Recognizing this we decided from the early beginning to integrate a single future user as the advocate of all into the project team. Later on after the implementation and use of the GEHICO-Knowledge Exchange by all users we then intend to redesign the system according to the results and requirements experienced in the field test. In small workshops where users and designers will reflect upon the socio-technical system in practice new requirements will be defined to optimize the fit of the system to the work practice.

The GEHICO-Portal is open to the public. After the authorization the trainers enter the Intranet and can have access to the different aspects which the GEHICO-Knowledge Exchange provides.

The aspects available are: dates and administration, information services, presentation material, training material, interesting links, folders for specialized group work, a personal folder, miscellaneous, FAQs and assistance to use the system.

The organization of the Knowledge-Exchange is threefold: The public folders are accessible for all trainers, everybody has the right to read and change, and everybody sees the actions performed by others using the awareness service. This provides transparency for all users. The working group folders are only accessible for those actively invited in the folders. The personal folder is protected and only available to the owner. Other persons even do not see this folder on the screen.

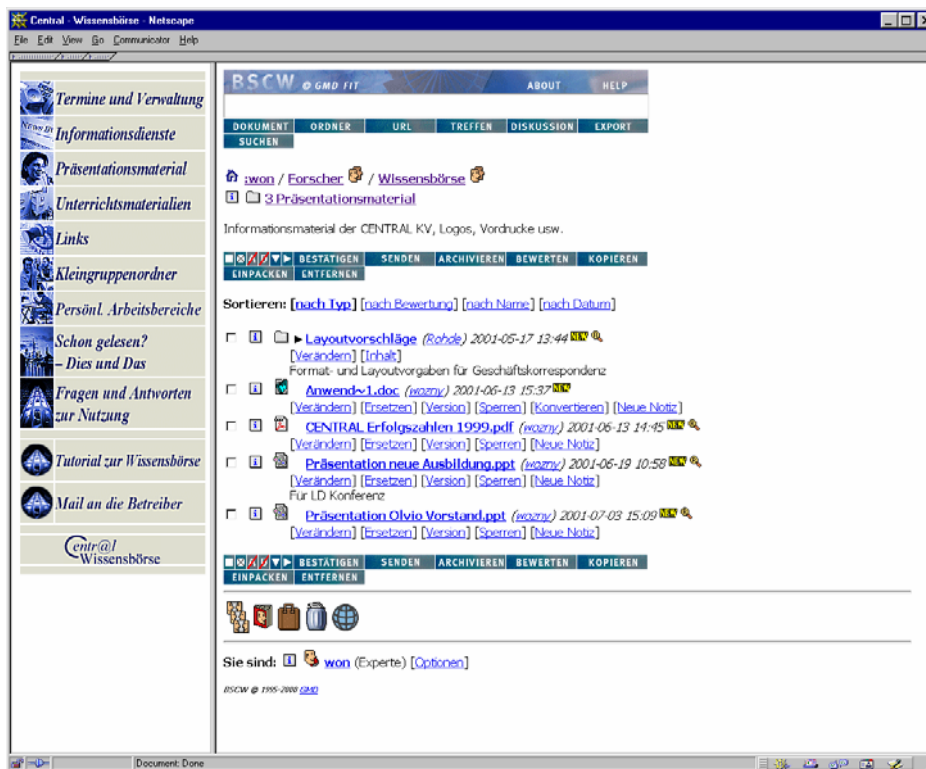


Figure 2: The Knowledge-Exchange System of GEHICO (screenshot will be in English in final version)

### 4.3 Current State of the Process

The system is implemented; currently we are in the “evaluation and redesign” phase of the introduction process for the multiplier group. We explained the use of the system by examples of the work practice. We did not show the complete functionality, and the training did not orient at system functions. We believed that stressing the use of the system instead of presenting the system is more appropriate because this relates to their work.

The trainers are very enthusiastic concerning the new system. We are currently also incorporating the back office of the AFS trainers. The system is under heavy usage, and the first knowledge areas have been structured by the trainers.

## 5 Related Work

Similar to our approach, the psychologist Franz G. Deitering introduced a system to support self-organized learning in a german insurance company under the paradigm of “autonomous self-controlled learning” (Deitering 1995)

Deitering's system tried to increase the identification of individuals with their work, tasks, and organization. It supports the intrinsic motivation, individual learning competences, autonomy and satisfaction. In his concept, Deitering gives the responsibility for the learning process to the learners themselves (1995: 106).

Learning processes are not initialized and organized by the trainers alone, but the aims, contents and evaluation are part of a contract between trainer and trainees (cf. Caffarella and Caffarella 1987). The role of trainers, therefore, changed into a kind of consultant for the learners.

In his system, Deitering supported learning partnerships and learn groups as well (Deitering 1995: 112, see also: Johnson and Johnson 1975). His conclusion is that introduction of self-controlled learning systems will only be successful, if the introduction process is organized in a participative way and understood as a holistic organization development process (124).

## 6 Summary & Outlook

We presented a concept for the introduction of knowledge logistics which allow for a self-organized and collaborative learning setting in a virtual organization. We derived this concept from research and experiences collected in CSCW, Knowledge Management and organizational and individual learning. We described the application of the concept in parts of the field service of GEHICO, a major German Health Insurance company, and the first empirical data we collected in that process.

We are well aware that we address a complex problem. Introducing not only a tool, or a new issue to learn about, but a new setting for learning is a challenging change process. Our first experiences show, that we were able to stimulate the usage of technology as

Another important aspect of future work will be, what aspects of an application field are success factors or failure risks for our methodology. Some aspects we will observe resp. work on are: Will we always be able to find an appropriate multiplier group? How do we control the success of the introduction process? What keeps the knowledge exchange alive?

We believe that our method can at least serve as a first step to systematically deal with the introduction of CSCL systems into organizations and work setting.

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