

Participatory Design of Knowledge Management in a Virtual Learning Environment

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ABSTRACT

In this paper, we describe our near-future research at the Open University of the Netherlands for the investigation and implementation of knowledge management in a virtual learn-work environment, using methods of participatory design on different levels. The students learning and working in this environment can perform parts of this research and implementation.

Categories and Subject Descriptors

K.3.1 [Computer Uses in Education]: *Collaborative learning, Distance learning*, K.4.3 [Organizational impacts]: *Computer-supported collaborative work*

General Terms

Design.

Keywords

Collaborative learning, virtual business learning, knowledge management, participatory design.

1. INTRODUCTION

In order to meet today's learning needs of the bachelor students in computer science at the Open University of the Netherlands (OUNL) we implemented for the course 'Design Project' an open learn-work environment 'OTO' as a virtual business. OTO presents itself as a consultancy in ICT. It has its own staff with a director, a human resource manager, a project manager and coaches, all members of the OUNL organization. Students perform in OTO the role of members of project teams.

We, as OTO staff, are responsible for making OTO ready and for the exploitation of OTO. The course is an example of computer-supported collaborative learning (CSCL). Students in this course (re) design a solution for a real-world company's problem in the domain of computer science. They collaborate in teams and are guided in respect to their organizational and social competencies. In this way OUNL tries to meet the needs of ICT-industries for employees with up-to-date domain expertise together with academic team competencies. The workload for students in this course is generally 15 hours a week during half a year. They use a

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bundle of communication and collaboration tools such as teleconferencing, a virtual workspace with additional functionality like electronic discussions, version control, access control and design and development tools. Regular face-to-face meetings on the initiative of the students appear to be indispensable for this kind of collaboration.

Students succeed in this course if they show sufficient involvement, participation and responsibility in designing the learn and work process of themselves, of their team and of OTO. The domain-specific quality of their ICT-products is not leading but we expect it to be of a sufficient level.

The name 'Design Project' refers to several design-aspects associated with this course. In OTO, built on social constructivist principles, students are defied to design ('to construct') their own learn process and work process. They design their learn process on an individual level by critical reflection on their competencies, roles and tasks to be performed in this course and, as a spin-off, in their daily work. Team members negotiate their individual goals and (re) design their learn processes at an early stage on a team level in order to come to the best expectancy on learning and working for the team as a whole. Here a high degree of participation of all team members is necessary and this leads to mutual responsibility for their learning processes. The design process of our students stretches even further to an organizational level. Each team is responsible to attribute to the design of OTO in the form of a team-reflection on what is learned during the course. This must lead to knowledge about used methods, practices and experiences in OTO. In other words OTO itself is a learning organization.

Apart from designing their learn process students design their work process according to the requirements and the hectic of the ICT-project at hand. In fact this is a continuous team process based on the individual competencies and participation. Here students design e.g. procedures for communication, for decision-making and for their division of labor. An important part of the design of their work process is the design of participation of their client and future users of their product. This participation is always situated and depends on the culture of the client organization. Students therefore investigate and apply methods of participatory design (PD) in this course.

Students reflect on their work process in order to contribute on team level to the overall knowledge of OTO. This reflection requires participation of all team members and knowledge of other teams is taken into account.

Since OTO started in 2001 five teams have been active in OTO and have succeeded in this course. The products vary from the design for a new business-process for an electronic university library to a design for a sophisticated software product to be used by consultants in human resource management.

We, as OTO staff, made ready major parts of the learn and work environment. On individual level we first provide students with extensive information about all aspects of this course in the form of a website and we ask the students to organize a kick-off meeting with the OTO staff. This meeting in fact is the start of the team building process. During the course we support the design of their learn process with assessments and coaching on their competencies. OTO's human resource manager uses electronic assessment tools from an external company with expertise in the field of workers in the ICT-industry. The assessments are held in the form of individual, 180-degrees (student-coach) and 360-degrees (peer-to-peer) assessments. Reflection on competencies and tasks is supported by using template documents that are updated and discussed with the student's personal coach on a regular basis.

On team level the learn process is not explicitly supported by us as it follows from the individual support and mutual negotiation within the teams. On the other hand the work process on this level is continuously supported by the OTO project manager and occasionally by external experts.

We only globally structured the work process in an acquisition phase (about 1,5 months) and a project phase (about 4,5 months). Students are responsible for detailed design of this process.

In [1] is given a detailed overview as well as the first experiences of the actual implementation of OTO.

2. ENCOUNTERED PROBLEMS

Recent evaluation of OTO by us and by the students of the first five teams in OTO shows a serious problem to solve. Students experience an overload in information on relevant subjects for performing their tasks. They need condensed and reusable information about working in OTO as well as about specific subjects in their work process. They also produce new information for dissemination to team members (and other teams) but only on an adhoc basis. In OTO we have e.g. an electronic library with facilities for storing discussions about the publications. But the mere existence of these technical facilities alone is no guarantee that new knowledge is constructed, stored and eventually reused. So OTO is lacking structural support to make OTO a learning organization.

Figure 1 shows, according to [2], a knowledge construction process in a project based work environment. OTO is such an environment and we concentrate on the oval marked "OTO problem": mainly the construction and documentation of knowledge. We believe KM is crucial for OTO students and for OTO itself because here the learn process and the work process of students integrate to lead to real products, persistent and up-to-date reusable knowledge and experience. Performing KM is also a means for students to 'show' themselves to the OTO staff in order to succeed in this course. By making OTO ready for KM and so offering students the possibilities for construction, documentation

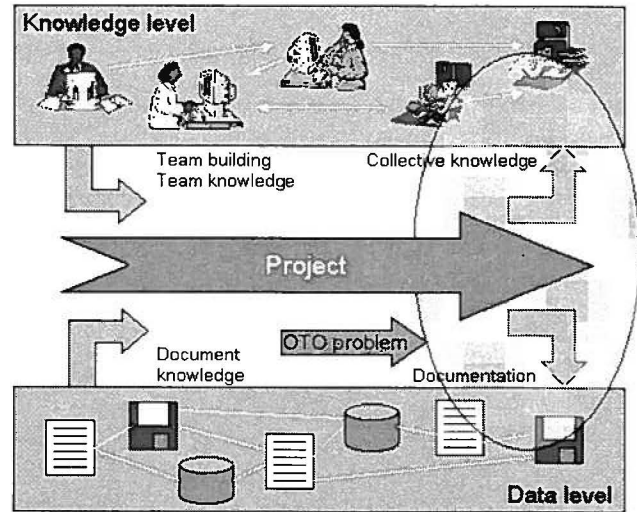


Figure 1. Situation of OTO's KM problem in the knowledge construction process in a project based work environment.

and reuse of knowledge, KM must become a part of the students' habit in OTO. This goes beyond the mere offering of procedures and tools.

Successful KM in OTO depends highly on the acceptance by all OTO members. Making KM ready therefore needs strong participation of all involved and using methods of Participatory Design (PD) must guarantee that we meet our goals. We expect to go through an iterative process where several student-teams and the OTO-staff are involved in the design of KM and in the application and testing of the intermediate results of our design.

Our students in OTO can also perform parts of this design. In this way they learn to investigate and perform PD-methods to design their own learn environment on a meta-level.

We first have to analyze what types of knowledge play a role in our environment and develop a detailed view on what we see as our goals of KM. This analysis will be accompanied by some workshops with OTO-members.

According to the classification in [2] we expect relatively easy to support 'explicit knowledge' and its transition from the individual to the team and company level with simple tools and procedures, this in contrast to 'tacit knowledge'. Tacit experiential knowledge is very meaningful in practical applications but on the other hand it is very hard to transfer. We have to design a strategy for dealing with this type of knowledge. All designs will be criticized by OTO-members in separate meetings and adapted until a final general agreement on the implementation.

Our objective is to introduce and implement KM in OTO according to a 'culture-driven' approach [2], characterized by a high degree of voluntary action. This leads to an environment in which sharing knowledge and actively sharing knowledge is considered second nature. Also the 'targeted, methodical' [2] approach comes into view. This concentrates on KM on the company-level.

3. OUR GOALS

Our general goals on the company level are an on-going process of organizational learning supported by effective procedures and tools as shown in Figure 1. On the student level we hope to change the habit of students to contribute to KM not only occasionally but as a part of a fundamental process to come to better results. We consider this as one of the main academic competencies to be developed in OTO. On the level of our course we hope to develop OTO to a complete environment for optimal learning and experimenting for our students.

4. REFERENCES

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- [2] *An illustrated Guide to Knowledge Management* Wissensmanagement Forum (Eds.), Graz. (available on http://www.wm-forum.org/files/Handbuch/An_Illustrated%20Guid_to_Knowledge_Management.pdf)