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KP-LAB

Knowledge Practices Laboratory

Integrated Project

Information Society Technologies

D10.1 Synthetic report of research and development of professional knowledge practices

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Contributor(s):	Hanna Toiviainen, Mikko Höynälänmaa, Jiri Lallimo, Anne Moen, Ole Smørdal, Anders Mørch, Seppo Toikka
Editor(s):	Anna Aminoff
Partner(s):	PÖYRY, UH, UIO,
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Abstract

This deliverable has been produced in the context of the Knowledge-Practice Laboratory (KP-Lab) project, which is aimed at facilitating innovative practices of working with knowledge in higher education, teacher training, and professional networks. This delverable is a synopsis of the first experiences encountered during the first 6 months of the work in WP10. WP10 focused on tools and practices where elicitation, capturing and creating knowledge in different representational modes aims to making them available for problem solving and collaborative knowledge advancement in professional networks.

During the first 6 months the emphasis of work has been on the state-of-the-art research, organizing and negotiating the empirical cases with professional organizations and on the co-evolutionary process of defining the requirements of KP-Lab tools and practices. State-of-the-art research has concentrated on how

In WP 10 we have started to refine the research approaches as there were no ready made approaches available to us. Drawing on previous experiences we will continue to elaborate and develop Change Laboratory® approach and Participatory Change Process approach.

To do so, we have negotiated access to and secured collaboration with several empirical partners. The cases allow for exploring current tools and practices – embrace complexity, and engage domain experts - from health care, software company, global forest industry consulting. Lastly, our work has led to some initial requirements of the KP-Lab tools and practices and support for capturing, eliciting, reusing and suggesting new tools and practices.

Contents

Summary - Lessons learned and Challenges ahead

This is a synopsis of the first experiences encountered during the first 6 months of the work in WP10. A characteristic of the KP-Lab project is its *dynamic and integrative view of tools and practices*. This view holds that tools and practices are interdependent and co-evolve in the course of social activity. This perspective has direct impact when exploring new tools and practices to situate them in a larger context of purposeful human activity. WP10 focuses on tools and practices where elicitation, capturing and creating knowledge in different representational modes aims to making them available for problem solving and collaborative knowledge advancement in professional networks.

We have started to trace knowledge development and knowing in organizations, and found a shift from emphasis on how to optimize production processes and decision making towards organizations as knowledge systems and knowing in practice. In this regard we will continue to explore the notion of tool-mediation and knowledge management. To gain understanding of how to bridge and integrate technological artefacts, their use and working practices our review suggests to combine the following streams of Knowledge management; 1) from mapping and managing individual skills and competencies to support for collective practices, and 2) from managing information and knowledge as a technical entity of codify-storage-reuse to co-operation and co-creation of tools and practices in evolving social practices.

In WP 10 we have started to refine the research approaches as there were no ready made approaches available to us. Drawing on previous experiences we will continue to elaborate and develop Change Laboratory® approach and Participatory Change Process approach.
To do so, we have negotiated access to and secured collaboration with several empirical partners. The cases allow for exploring current tools and practices – embrace complexity, and engage domain experts - from health care, software company, global forest industry consulting. This work will enhance and ground participation in the KP-Lab co-evolutionary process to elaborate common concepts where the scenarios serve as mediating artefacts. In the work to come, it is important to inform, modify and broaden the research methods and co-evolutionary approach to better support exploration, capturing and explicating different modes of knowledge in the knowledge practices we are studying empirically.

Lastly, this has led to some initial requirements of the KP-Lab tools and practices and support for capturing, eliciting, reusing and suggesting new tools and practices. As we work to refine, explicate and test requirements for Change Laboratory® tools, Profiling services, knowledge practices analyzing tools, shared space for managing and facilitating knowledge creation artefacts and Map-IT tool, the work of WP10 will contribute to informing and clarifying the KP-Lab design principles. In particular we will focus, first, on challenges arising when investigating activity around shared objects, creation of flexible tools and practices for mediation and interaction at individual and collective level, and, second, on how to investigate long term processes of knowledge advancement in professional networks.

1 Introduction

This deliverable has been produced in the context of the Knowledge-Practice Laboratory (KP-Lab) project, which is aimed at facilitating innovative practices of working with knowledge in higher education, teacher training, and professional networks. The purpose of this deliverable is to summarize the work and the major results of WP10 during first six months of the KP-Lab project as described in Description of Work and it provides a first synthetic report on research and development of professional knowledge practices.

Participants of WP10 are University of Helsinki, University of Oslo and Pöyry Forest Industry and they represent both researchers and practitioners. The partners have prepared this report in collaboration.

The goal of exploring knowledge practices in professional networks (WP10) is to develop and test tool and practices for capturing and creating knowledge in different representational modes, and make them available for subsequent problem-solving and collaborative knowledge advancement.

During the first 6 months the emphasis of work has been on the state-of-the-art research, organizing and negotiating the empirical cases with organizations and on the co-evolutionary process of defining the requirements of KP-Lab tools and practices. State-of-the-art research has concentrated on how have the knowledge practices in professional networks been approached in the literature, what are the major findings, i.e., what themes and perspectives are promising, problematic or absent.

Empirical cases have a strong emphasis in WP10, and empirical cases and theory are closely linked together. The research approach of WP10 is based on collaborative approaches to learning and working, emphasizing joint problem solving in heterogeneous and often ill-defined contexts. The methodology typically means that we work in close collaboration with organizations and workers to explore and understand user-perspectives, with emphasis on collectiveness and developmental aspects, e.g., longitudinal trajectories, and development of agency, related to the phenomena under study.

WP10 members are involved on the project level in defining the initial requirements of KP-Lab tools, with special focus on requirements for knowledge practices in professional organizations. WP10 is represented in all design teams of KP-Lab.

This document is organized as follows:

- Section 2 gives an overview of initial state of the art with regard to organizational and inter-organizational learning.
- Section 3 discusses the research approaches of WP10
- Section 4 presents the negotiated empirical cases where we will study aspects of knowledge practices in professional networks.
- Section 5 gives an overview of initial requirements of KP-Lab tools and practices.
- We end the report with identifying some directions for further work.

2 State of the Art: Knowledge practices in professional networks

This section of the deliverable addresses questions at heart of the WP10: How have knowledge practices in professional networks been approached in the literature? What are the findings thus far regarding themes and perspectives identified as promising, problematic, weakly presented or absent? What are the main challenges of our research and what could KP-Lab contribute to this research arena?

A characteristic of the KP-Lab project is its *dynamic and integrative view of tools and practices*. This view holds that tools and practices are interdependent and evolve in the course of social activity, which has a direct impact when new tools and practices are situated in a larger context of purposeful human activity.

In WP10 we are focusing on tools and practices where eliciting, capturing and creating knowledge in different representational modes aims to making them available for problem solving and collaborative knowledge advancement. Drawing from the literature, the wide range of organizational studies and (inter)organizational learning on the one hand and social studies of technology at work on the other hand provide two salient points of departure to explore the interplay of knowledge creation processes and the perspectives on the cultural-historical activity theory and other socio-cultural approaches.

Knowledge development and knowing in organizations can be traced in the literature as evolving from emphasis on how to optimize production processes and decision making towards organizations as knowledge systems and knowing in practice. The evolving perspectives on knowledge and expertise can be categorized as follows;

1. Knowledge resides in the heads of persons, and that is appropriated, transmitted and stored by means of mentalistic processes (body-mind dichotomy). The knowledge-carrying individual is the unit of analysis and knowledge defined in terms of discrete skills that can be codified and measured.
2. Functionalist view of knowledge, based on some fixity of structure and control of form. Knowledge is embedded and becomes constructed in collective practices, as the object and challenge of activity is to support generation of new knowledge and competencies. Concreteness of knowledge enables routinization, and enables an organization to 'know' independently of its members, leading to notion of 'knowledge as a strategic asset' or commodity with intentional and deliberate control, located in the head of the organization, i.e. management.
3. Perspectives from practice where learning is a social and participative activity rather than merely a cognitive activity. Practice is viewed as a process and as an outcome of the process. Knowledge could be articulated both in its spatiality and in its fabrication, acknowledging that we know more than we know we know, e.g., tacit knowledge in the practice of skills.

Organizations analyzed as knowledge-based systems allows for explorations to 1) distinguish types of knowledge, e.g. experiential, embedded, tacit as well as explicit and 2) importance of relationships and emergent nature of collective competency. IT-innovations largely shape knowledge practices in professional networks. It seems that the *notion of the tools-mediation* is explored empirically, e.g., in Human-Computer Interaction (HCI), Computer-Supported Collaborative Work (CSCW) and Computer-Supported Collaborative Learning (CSCL) but the theoretical implications that these might bring to the knowledge practices are still vaguely discussed. Researcher may point out that users are not inherently innovative and, therefore, learning-by-doing and learning-by-using do not as such guarantee the successful development

of tools and practices. From the WP10 point of view, introducing object orientation and tool-mediation challenges the traditional notion of Knowledge Management and implies a shift from '*Controlling knowledge assets, competencies and designing generic knowledge-managing tools*' to '*Managing knowledge as trialogical knowledge practices*'. This shift motivates to and aims at identifying, creating and explicating new knowledge and capabilities, and to gain understanding of how to bridge and integrate tools (e.g., technological artefacts), their use and working practices. Therefore, our review suggests combining the following streams of Knowledge management; 1) from mapping and managing individual skills and competencies to support of collective practices, and 2) from managing information and knowledge as a technical entity of codify-storage-reuse to co-operation and co-creation of tools and practices in evolving professional practices.

In addition, we like to put forward the idea that managing and particularly coordinating everyday practices of creating new knowledge takes place both top-down and bottom-up, i.e., management layers' and worker layers' knowledge and experiences influence each others in bidirectional way. This will be further explored and elaborated in the future discussions and analysis of the empirical cases and assist the users and communities to capture, present, develop and reuse knowledge in different representational modes. Our initial literature review has directed attention to several themes that will be incorporated in further discussions. The themes identified so far are:

1. Top-down management perspective *versus* bottom-up user perspective on knowledge practices, where the interaction and co-evolution of competencies in innovative knowledge practices may be reflected
2. Intra-organizational *versus* inter-organizational perspective on knowledge practices, where boundary crossing and networked expertise needs attention
3. Knowledge as an asset of firm *versus* knowledge as (embedded in) knowledge practices of professional networks where symmetric and asymmetric knowledge advancement needs further exploration
4. Interpersonal networks *versus* object-oriented professional networks that explore transition from social networks that locate knowledge in individuals to socio-material networks of production including the object orientedness and collective aspects.
5. Development of knowledge tools *versus* development of knowledge practices where careful analyses beyond how new technology changes work incorporate the broader historical and socio-cultural transformation of the given work in society.

The themes represent developmental tensions arising from previous research, which act as a springboard to outlining our own research program and contribution to understanding evolving and emerging knowledge practices in professional networks. To provide direction, guidelines or criteria of elaborating the themes in our future research of the knowledge practices in professional networks, we will emphasize object orientation, historical perspective, identification and analysis of contradictions, and collaborative developmental processes, participatory interventions as well as long-term follow-up of learning processes and collective learning mediated by tools and practices.

In collaboration with WP3, Theoretical foundations for KP-Lab, we will continue to expand the scope of the review to even earlier innovation studies analyzing the relationship between the technological tools and the social practices. Transformation of practices is an open-ended process, which can neither be completely specified in advance nor controlled during the unfolding process. In addition, engaging in exploring knowledge practices in professional networks takes place in close collaboration with external partners, and might introduce

additional constraints, which needs to be fed into and better represented in the scenario-based co-evolutionary model requiring also collaboration with WP2.

3 Research approach

The research approach of WP10 is based on collaborative approaches to joint problem solving of authentic problems. The unit of analysis is the object-oriented collective activity, which applies to the analysis of both individuals and communities. The methodology typically means that we work in collaboration to explore and understand user-perspectives, with emphasis on collectiveness and developmental aspects related to the phenomena under study.

The research methods draw from the recent developments in the activity-theory-based studies, knowledge creation and ethnography of work allowing us to use participatory approaches and following up longer trajectories of development of a given professional network. We use qualitative interview methods, videotaping and shadowing as well as developmental interventions. We also focus on material tools and environment and collect "artifactual" data. Professionals' work documentation is another source of data, which allows us to combine qualitative and quantitative data and records representing the work. The research approaches in WP10 are partly due to the cultural-historical context of each professional practice, like health care and forest industry, and partly to the research traditions of the partners in the universities of Helsinki and Oslo.

3.1 Change Laboratory approach

Change Laboratory® is a method for developing work practices by the practitioners together with the interventionist-researchers. The idea is to bring work redesign closer to the daily shopfloor practice while still keeping it analytical, which means dialectics of close embeddedness in and reflective distance from work. The method supports expansive learning, which involves major transformations of the work activity within and across work units and organizations.

In the KP-Lab, we will address a whole setting of the learning tools employed in the Change Laboratory method for developing work. Typically, these tools are brought in a collaborative space at the work place to facilitate the on-going shifts from work to learning activity and back. However, as work is more and more done in networks and global companies also the learning tools should be developed to enhance the collaborative analysis and development of distributed work. Our project will gather the researchers, the designers as well as the participants from the partnering professional organizations together to design and experiment with "virtual" Change Laboratory tools. The focus of interest will be in following and analyzing how the participants of learning activities take the tools into use and develop them, and whether the new tools will change the collaboration and learning. Ultimately the tools are evaluated by scrutinizing to what extent they enable participants to change and expand their work activity and reconceptualize what they are actually doing and striving for through collaboration.

The theoretical foundations of the CL development intervention are summarized in power point presentations 1-3 and descriptions of three old cases of the CL implementation. These documents can be found in the KP-Lab intranet.

(http://www.kp-lab.org/intranet/design-teams/dt2/background-materials/,

http://www.kp-lab.org/intranet/design-teams/dt2/generic-scenario-2)
We will use the evolving processes and experiences from the different cases to develop the Change Laboratory tools (see also section 5.2).

3.2 Participatory Change Process (PCP) approach

Inspiration to develop and systematize this approach comes from the Scandinavian tradition of Participatory Design (Bjerkenes & Bratteteig, 1995), and participation in previous projects, for example "Learning and Knowledge Building at Work" (http//:www.intermedia.uio.no/projects/research-projects-1/lap/).

The purpose of the PCP approach is to go beyond focus on technology as the tool to implement a specific, desired or defined practice. PD techniques are used to planning and evolutionary prototyping in design, development and implementations phases of a case. The PCP approach acknowledges and seeks to capitalize on processes that allow for artifacts to evolve along numerous paths, and there may be design variations related to convenience, necessity or opportunities related to specific goals, or complexity and variation. As such, design activities takes place in settings characterized by the co-existence of 1) traditional and new technological tools, 2) multiple knowledge schemes and information seeking strategies, and 3) established and emerging practices as a result of tools and practices being introduced into the organization (Mørch, Engen, & Åsand, 2004).

The approach takes into account the complexity of interdependencies and interactions of *technology*, e.g., infrastructure, services, user-interface, delivery mode, *pedagogical approaches*, e.g., local practices, work place learning, master-apprentice, and *organizational patterns*, e.g., decision making, sharing of knowledge, change, participation and exchange within and across entities. This opens for inclusion and exploration of collaborative and individual aspects and to expand the unit of analysis beyond the use of individual technological tools to explore interacting purposeful human activities in social practice.

4 Empirical cases

The empirical cases are strongly emphasized in the work of WP10. We have now started to work with three cases:

- ChronICT case is in health care sector and it is collaboration with an interdisciplinary, national competency centre, Center of Rare Diagnosis, Rikshospitalet University Hospital, Oslo, Norway.
- KIKK is a case in Collaboration with Safran Software Solutions, who develops software solutions for project planning and management, with consulting and customizing these services for large, complex projects, primarily in the offshore industry.
- Pöyry is a globally operating consultant and engineering company in the field of forest industry with a challenge to move from locally operating company to global network company.

All of these cases have interesting challenges of knowledge practices in professional networks. The cases are from different sectors and have diverse aspects in knowledge practices. This diversity both in lines of businesses as well as in knowledge practices is an added value and allows us to develop practices for diverse settings. In addition, similarities between cases may help us to identify common practices in knowledge work.
An interesting aspect is that we have a possibility to pilot the KP-lab tools in these cases, such as Change Laboratory-tools, video annotation tools and Map-It tools in Pöyry-case.

4.1 ChronICT

As health care migrates from professional practices and organized care settings, e.g., hospitals, outpatient clinics, care-centres or doctor's offices to the home dwelling, new practices emerge, and create demands for timely access to health related knowledge in different representational modes arise. Traditionally, patients and their family's contributions

to and responsibilities for self-care activities have been largely *under-articulated*, and considered invisible work (Strauss, Fagerhaugh, Suczek, & Weiner, 1985). To develop tools and practices that support access to different modes of knowledge and information in feasible ways becomes important.

This case study will be carried out in collaboration with an interdisciplinary, national competency centre, Center of Rare Diagnosis, Rikshospitalet University Hospital, Oslo, Norway. They like to explore use of virtual environments as part of their consulting services and interaction with users.

The clinical case for ChronICT is to explore and gain insight into living with a rare physical, congenital malformation; *anorectal anomaly*. To the individual, the malformation(s) represent different degree(s) of severity and challenges to daily living, and there are different treatment options available. However, all of them face lifelong challenges to physical functioning, and psychosocial and emotional wellbeing of the individual with the condition as well as their family (Diseth, Egeland, & Emblem, 1998). The ChronICT case aims to explore and assist in the challenges of "living well" and support self-care and symptom management activities for learning and coping with a congenital condition with life-long challenges.

ChronICT will be developed in an iterative prototyping process using the PCP approach. Grounded in user-participation (Schuler & Namioka, 1993), ChronICT aims to identify, systematize and actively incorporate different types of knowledge (e.g., professional, lay, experiential, tacit) as examples of experiences related to 1) living with a rare malformation, everyday living, self-care and symptom management 2) information and knowledge sharing, and 3) exploring ICT-resources as infrastructure for access to and creation of relevant and timely information and knowledge.

We have hosted 3 design workshops to explore experiences, concerns and challenges in the everyday living. These workshops were set up as focus group sessions - with persons having the malformation – youth and adults – and family members, health providers and researchers/developers. Findings from these sessions and information already available in paper-based format are included in a wiki-environment to create a material artefact that will be focus of further exploration, development and change. A workshop with end-users, i.e., families where one of the family members has anorectal anomaly is scheduled for August 24th, 2006.

4.2 KIKK

This case, KIKK (Knowledge Management for Internal Communication and Customer support), takes place in collaboration with Safran Software Solutions AS. The company's core business has been development of software solutions for project planning and management, with consulting and customizing these services for large, complex projects to meet requirements primarily in the offshore industry. The company are now offering their applications and services to new market segments, e.g., construction and public management. As one of the initiatives to support company growth and transition to new markets, the company has started to develop a web-portal to improve/support their internal information flow and to systematize collective experience, as well as a resource to improve external information flow and support communication with the company's customers. This could ease introduction to Safran's project portfolio for new employees as well as future customers.

The empirical case, KIKK, builds on experiences from collaboration in other workplace learning projects (e.g., Mørch, Engen, & Åsand, 2004; Skaanes, 2005). The PCP approach will be developed and applied to explore knowledge practices and cooperative information management in this context, and explicate and systematize Safran's expertise in the area of project management software. We will work collaboratively in processes to systematize

knowledge and experiences as their emerging practices develop, and feed these insights into to the ongoing web-portal initiative.

4.3 Pöyry Group and the changing knowledge practices of forest industry business

Pöyry is a globally operating consulting and engineering firm. It has three core areas of expertise: energy, forest industry, and infrastructure and environment. The Group employs personnel of 5700 in 45 countries. This case concentrates on Pöyry's Forest Industry business area, which is ranked a market leader in its sector providing engineering and project implementation services for pulp and paper industry projects worldwide, maintenance engineering and other local services to the mills, consulting on forest industry strategies and operations and investment banking.

There are many changes going on within the Pöyry Group, which expose the inadequacy of the present knowledge practices. The transition from the locally managed Finnish company to a globally distributed network of business units is one of the major challenges. The group has grown mainly through corporate acquisitions, which means that the traditionally held view of the corporate culture has been replaced by the variety of not-so-easily captured cultures and practices. Due to the age structure of the personnel, a significant number of experienced project managers and designing engineers are going to retire in the near future. Most importantly, the entire concept of forest industry consulting and engineering is undergoing a profound change. The proportion of bulk engineering is decreasing in the Western-European units and moving to developing countries, either through corporate acquisitions or partnership contracts. Design work is nowadays carried out in a network. The company's future objective is defined in terms of acting as a knowledge broker in the forest industry rather than only designing pulp and paper mills.

This change gives rise to challenges in the everyday knowledge practices that the participants face individually as well as collectively. The habitual way of working in the locally managed projects contradicts the project work being done in a global network. The knowledge practices of the old firm cannot simply be transferred to the new consortium. The individually possessed experience-based knowledge contradicts the virtual knowledge bases. Instead of being stored in the heads of people, a new way of organizing and sharing knowledge is needed. The on-off design of production plants as the object of activity contradicts the idea of having knowledge as the main object of activity. The old core competence and highly-valued expertise in design does not disappear but it should be more and more shared with and transferred to the manufacturers and customers who run the mills.

Thus there are many questions addressing the knowledge practices of Pöyry. How do we reach shared practices and ways of running projects even when operating in a network? How do we ensure in a systematic way learning from one project to another over time? The company has, for example, developed the Virtual Mill model, which is a professional solution for creating, storing, maintaining and accessing technical information of industrial plant (= knowledge artifacts).

Beyond these operational questions but related to them, there is the more comprehensive and overarching question of organizing the learning processes to support work at Pöyry by creating a new learning system for the company that will meet the concept-level changes of the core business activity. We take this as the starting point when examining the potential of implementing the work development intervention called the Change Laboratory (CL) with Pöyry company.

The planning of the CL will start by specifying the organizational unit with which the piloting process may be implemented, focused at the analysis and development of the business

concept and the learning activity. The representatives of customers and other stakeholders will be invited to participate, at least acting as a mirror for Pöyry's activity. The case will present an opportunity to pilot first versions of KP-Lab tools, such as Change Laboratory-tools and video annotation tools.

5 Initial requirements for KP-lab tools and practices

This chapter presents the initial requirements of KP-Lab tools and practices from the viewpoint of professional organizations and networks. These requirements will be revised and complemented throughout the project. In addition, the empirical cases described above will be major contributors to further development, refinement and evolution of requirements to KP-Lab tools and practices.

In KP-Lab, the design teams act as the forum for interaction between researchers and technology developers, thus the work in design teams has been the major instrument for developing initial requirements for KP-lab tools. Participants of WP 10 have been very active in co-evolutionary work in design teams. Members of WP10 have been chairing two design teams (DT2 and DT15) and co-chairing one design team (DT4). The co-evolutionary process is described in deliverable 2.1 *Guidelines and models implementing design principles of KP-Lab, application scenarios and best practices v. 1.*

5.1 Change Laboratory tools

The Change Laboratory (CL) is a well established method that aims at promoting reflective approaches to knowledge practices. Conducting change laboratory sessions requires a specific technical set up. KP-LAB aims at producing an innovative environment and services that make a change laboratory session more efficient. As the object of design in KP-Lab, CL offers many possibilities to develop a constellation of tools facilitating development work, collaboration and learning both locally and virtually (Figure 5.1.1).

The collaborative design work for the initial requirements has taken place in the Design Team 2 by the participants UH, Pöyry, Silogic and INPT. This deliverable presents the results of DT2 from the WP10 point of view.

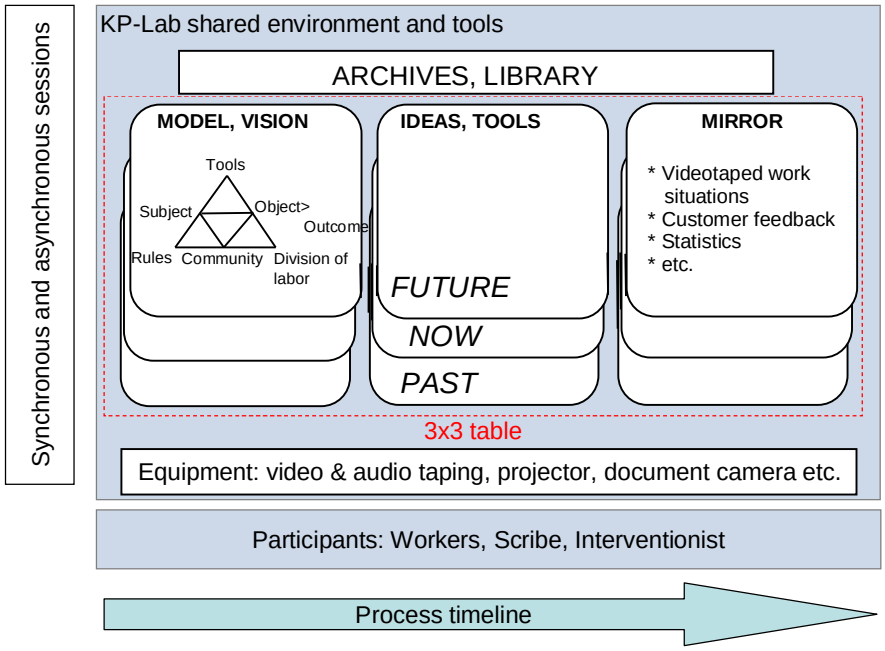

Figure 5.1.1. The proto-typical setting of the Change Laboratory.

After charting the present needs of CL users and developers and present available technological tools, the 3x3 table of the CL setting was selected as the core of the design for the initial requirements (Month 6). See Figure 5.1.1.

The core solution provides the following functionalities:

- collection and storing of multiple formats of digital material that cumulates during the CL process
- allows contribution to the material by all CL participants
- allows for easy assignment and management of the intermediate tasks and homework of the participants
- visual presentation of the stepwise historical analysis of work and allowing participants to add material and linkages to the analysis
- visual presentation of the 3x3 table, allowing easy transitions from one table to another, for example: historical material gathered in the "Mirror"table can be transferred to the "Triangle Model of Activity/Past"-table
- allowing rich representation of *relationships* between the 3x3 tables
- allows nominating different roles for the users (Interventionist, Scribe, Worker)
- Database and the shared 3x3 table are accessible from remote PC's in real-time

Other KP-Lab tools (for instance video annotation tools, see e.g. section 5.3) will be also used in Change Laboratory setting.
The design of the above mentioned requirements are further specified and validated in the certain contexts in which the pilots will be carried out. The next step will be choosing the unit of the pilot organization and starting to analyze its situation, as described in the Pöyry – case above.

5.2 Profiling services

The idea of profiling services is to go beyond traditional Competence management systems, which conceive people as individual actors with certain competencies. The intention of KP-Lab Profiling services is to broaden this view to cover workers' activity, which is embedded in groups, having intra- and inter-organizational links, and embedded in the use of different artifacts. Combining these elements will give us new insight into how expertise is embedded in Networked expertise.

KP-Lab Profiling services has been elaborated at a conceptual level, leading to an initial set of requirements. As general requirements, in order to be flexible and reusable, the KP-Lab profiling services should handle information about users' profiles, about specific groups, and their use of different artifacts. So far, profiling services comply with the following initial requirements:

- *Gathering of basic information* such as logs of events, activities, and tasks of users should be gathered, structured and stored. Questions to be answered are: Which data to collect? Who collects it? Where to store it?
- *Analysis* deals with the transformation of basic data to retrieve semantic information when necessary. Some of the information can be used straightforward (e.g. GUI customization parameters). Other data requires mining techniques to generate clues about hidden phenomena
- *By storing the profiles* are stored for reuse. Questions to be answered are: Where? Which format?
- *Sharing:* profiles are created to be used to customize or adapt content for the user or the task. Format to exchange profiles should be defined.

- *Management:* An end user application to manually create, modify, delete, browse profiles is required.

For extensive descriptions of the initial requirements:
http://www.kp-lab.org/intranet/work-packages/wp7/wp7-global-use-case-model/profiling-framework-package/
In the context of WP 10, the requirements to Profiling services will be further explored related to how the tools and practices allows and facilitates dynamic presentation of knowledge resources, i.e., aspects of Just-in-Time (JiT) – Just-in-Case (JiC) dimensions. The "just-in-time" provided information is tailored according to understanding of knowledge requirements to the situation at hand, and "just-in-case" denotes available knowledge in general. The relevancy of these requirements will tested in the first field trials of Fall 2006 / Spring 2007, and which will give deeper understanding of the requirements of the KP-Lab technological tools

5.3 Knowledge practices analyzing tools

In the first stage of KP-Lab a concept and a first version of Video annotation tool has been developed for the needs of WP10 by WP7. Video annotation tool will serve:

- Various activities within the KP-LAB environment use video material to communicate and reflect on knowledge practices. Three types of utilizations of Video tools (called VideoLab) are distinguished at this stage:
    - synchronous communication using life video
    - collaboration activity mediated by video documents
    - reflective activity analyzing records of human activities.

The first category of activities requires video conferencing services. The second category needs recording, storing, sharing, and annotating video documents. In addition to these requirements, the third category (such as the Change Laboratory) requires more complex video processing.

During the first six months, the general requirements of the KPLAB services (called VideoLab) for these three categories have been established. The work for Video annotation tools will fully exploit the results of the first field trials of Fall 2006 / Spring 2007.

5.4 Managing and Facilitating Knowledge Creation Processes and Creating and Re-using Knowledge Artefacts

One of the challenges in WP10 is how to combine the ideas of reusing and creating knowledge artefacts, and knowledge creation processes. This challenge is been dealt in the work of Design team 15. http://www.kp-lab.org/intranet/design-teams/dt15-processes-and-artefacts/

From the point of WP10, the object of DT 15 has been and will be to:

- Develop Generic scenario taking into consideration the Knowledge creation processes and how Knowledge artefacts are created and re-used.
- Develop professional scenarios emphasizing the concreteness concerning KP-Lab practices and tools
- Develop Use cases for concretizing the requirements of Kp-Lab practices and tools.

WP10's concern in DT15 is how professional organizations, groups of workers and individual workers can store, distribute, find, and build knowledge though a Shared space. This work has been carried out during Months 1-6 by specifying professional work scenarios, which have

been elaborated as concrete User story descriptions how the working practices take place through Shared space.

KP-Lab shared space: http://www.kp-lab.org/intranet/work-packages/wp6
The KP-Lab Shared space will be in the core of KP-Lab tools. For example, Change Laboratory tools, and Boundary crossing mobile applications, Profiling tools will use KP-Lab shared space as a platform.

5.5 Map-it tool

Map-IT tool aims at assisting an interactive process by providing ways of constructing ideas, tracing arguments, and revisiting changes. It is aimed primarily at facilitating easier, cost-effective documentation of audio/video discussions through the net, as well as a more organized and beneficial process of discussion and collaboration. In the Future the tool may also be utilized in face-to-face situations.

The tool will provide the support required prior to, during which, and after the discussion:

1. **Pre-discussion** - participants will be able to prepare themselves for the discussion (creating "user plans"that organize and express ideas using textual and graphical objects, elements of which will be selected for submission during the discussion).
2. **During the discussion** - participants will be able to conduct an audio-visual discussion revolving around mutual objects (inter-linked contributions of text, drawings, audio, video, and annotations) and shared applications. The discussion is envisioned as an iterative process of discussion and collaboration, with each participant contributing opinions and ideas to be shared, edited, linked etc by other members of the groups in their turn. Participants will have the following at their disposal, displayed on the main screen: the agenda of the tele/video-conference, the foreseen list of participants (with name, company, country, etc), user plans filled-in by the participant in advance , ready for use/editing in the TVC (in addition to empty user plans should participants need to add a new agenda item or if one of them had not had time to prepare), access to the current map for viewing and inputting, and additional information on the screen (including interactive features such as turn request).The organizing element of this process will be a "map" - a written/graphical representation of the discussion. The map will serve as a discussion guide, giving the interaction structure, highlighting important elements, etc. In addition, it will serve as a discussion protocol, and as an audio/video recording
3. **Post-discussion** – The map created during the discussion, along with the inter-linked audio/video recordings of the discussion and further auxiliary information will serve as discussion minutes, easily searchable and researchable. Convenient (mostly automatic) handling of common post-meeting tasks: circulation, revision, etc., is thus enabled. Through the application of annotation tools to the map, rule-based deduction may also be possible.

Requirements of Map-it tool have been defined in Design team 6. Pöyry has been member of DT 6 and will pilot the Map it tool in later phase of the project.

6 Summary - Lessons learned and Challenges ahead

This is a synopsis of the first experiences encountered during the first 6 months of the work in WP10. A characteristic of the KP-Lab project is its *dynamic and integrative view of tools and practices*. This view holds that tools and practices are interdependent and co-evolve in the course of social activity. This perspective has direct impact when exploring new tools and

practices to situate them in a larger context of purposeful human activity. WP10 focuses on tools and practices where elicitation, capturing and creating knowledge in different representational modes aims to making them available for problem solving and collaborative knowledge advancement in professional networks.

We have started to trace knowledge development and knowing in organizations, and found a shift from emphasis on how to optimize production processes and decision making towards organizations as knowledge systems and knowing in practice. In this regard we will continue to explore the notion of tool-mediation and knowledge management. To gain understanding of how to bridge and integrate technological artefacts, their use and working practices our review suggests to combine the following streams of Knowledge management; 1) from mapping and managing individual skills and competencies to support for collective practices, and 2) from managing information and knowledge as a technical entity of codify-storage-reuse to co-operation and co-creation of tools and practices in evolving social practices.

In WP 10 we have started to refine the research approaches as there were no ready made approaches available to us. Drawing on previous experiences we will continue to elaborate and develop Change Laboratory® approach and Participatory Change Process approach.
To do so, we have negotiated access to and secured collaboration with several empirical partners. The cases allow for exploring current tools and practices – embrace complexity, and engage domain experts - from health care, software company, global forest industry consulting. This work will enhance and ground participation in the KP-Lab co-evolutionary process to elaborate common concepts where the scenarios serve as mediating artefacts. In the work to come, it is important to inform, modify and broaden the research methods and co-evolutionary approach to better support exploration, capturing and explicating different modes of knowledge in the knowledge practices we are studying empirically.

Lastly, this has led to some initial requirements of the KP-Lab tools and practices and support for capturing, eliciting, reusing and suggesting new tools and practices. As we work to refine, explicate and test requirements for Change Laboratory® tools, Profiling services, knowledge practices analyzing tools, shared space for managing and facilitating knowledge creation artefacts and Map-IT tool, the work of WP10 will contribute to informing and clarifying the KP-Lab design principles. In particular we will focus, first, on challenges arising when investigating activity around shared objects, creation of flexible tools and practices for mediation and interaction at individual and collective level, and, second, on how to investigate long term processes of knowledge advancement in professional networks.