Know-how when No Time

Supporting Learning among Knowledge Workers

Maria Magnusson & Pia Stahl-Falck & Lars Svensson
Maria.magnusson@laboratorium.htu.se and Pia.stahl-falck@laboratorium.htu.se and Lars.svensson@udd.htu.se
University of Trollhättan Uddevalla
Laboratorium for Interaction Technology

Abstract

The IT consulting sector is growing rapidly, hand in hand with the innovation and diffusion of new information technology. There is a growing shortage of skilled people to complete an increasing number of complex and unpredictable tasks. The knowledge worker is facing a dynamic situation with potential for exiting challenges as well as stressing demands on performance. In such a climate it is vital for knowledge intensive organizations to design flexible and effective structures to support the employees learning. This paper report from the first phase of an explorative study at a small Scandinavian consulting firm, where the focus is set on designing IT support to promote processes of learning amongst the employees. Results indicate that simplistic solutions such as group-email and Internet-based common spaces for information and collaborative learning, departing from the situated needs of the individual, has the highest potential of succeeding.

Keywords: Knowledge worker, situated learning, informal learning
BRT-Keywords: GA

1 Introduction

> *"The situation is quite pressing. You arrive at a point in life when you feel you can't take it anymore. When I turn 40 I'm gonna work at the local car manufacturer, sorting paperclips."*

These are the words of a 30 year old IT consultant at a small Scandinavian Company. It summons up what are the terms of everyday life for most knowledge workers of today. In a climate where new innovations more or less constantly surfaces on a market that is rapidly growing, there is a continuos pressure of learning more all the time.

This scenario can indeed put pressure on the (often) young men and women working in the IT sector, but at the same time it can be perceived as a dynamic and stimulating work situation with great potential for personal development.

An increasing number of companies and organizations appreciate the knowledge and competence of its employees as an important competitive factor (Robertson et al, 1998). For management, to be able to cope with situations such as key experts leaving the organization, knowledge being hidden in documents and individuals and workers

being geographically dispersed, makes knowledge management an important strategic tool in knowledge intensive firms (Wathne et al, 1996).

Hence, the need for flexible structures and tools that promotes knowledge creation and learning is vital to any knowledge intensive firm, but the conditions outlined above signals the need for change. When traditional classroom-based courses appear to lack several of the necessary properties to provide for flexibility in time and space, it is natural to look to information technology as a way out of the maze. Any design, organizational or technological, aimed at supporting the learning processes for today's knowledge worker needs to departure from a thorough analysis of the actual working situation (Snis, 1999).

This paper reports from a study on a small department of a Scandinavian IT consulting firm, (Semcon Data). The study was induced by the management, due to the poor outcome of an internal knowledge management project. The first phase of the project aimed at exploring the present learning processes from the perspective of the individual consultants. The results are primarily derived from interviews with consultant and management, complemented with visits to the central office. Further research will involve the design, implementation and evaluation of IT-solutions based on the results from the first phase. These results identify benign organizational structures, where learning is naturally integrated in the daily practice. The results also points towards organizational structures of alienation, where the individual learners, primarily due to lack of time, to some extent ends up on their own trying to acquire the necessary competence and skills.

We argue that IT solutions aiming at supporting learning under such circumstances should address two major issues. (i) The need for timely information and (ii) enhanced possibilities for collaboration.

Others have done related research. Orlikowski (1992) reports from the introduction of Lotus Notes into a consultancy firm. Her result points our attention to the importance of correct mental models and coherence with the organizational reward system in order for groupware technology to be successfully implemented. Robertson et al (1998) has done similar work in their studies of the use of groupware (email and Notes) in an expert consultancy firm. They arrive at the conclusion that the need for constant coordination between organizational members is a key element in successful diffusion of groupware technology.

The next section describes some theoretical frameworks used to inform the analysis of our results. Section three outlines the methodological approach in the study. Section four presents the results, which are subsequently discussed in section five. The paper ends with a short discussion of the implications for design of IT support derived from the results of the study.

2 Knowledgework and learning

This section starts with a short discussion on the concepts of information and knowledge. Subsequently some key aspects of learning, used to structure and analyze the results from our empirical study, are presented.

Information is something that is different from, but related to, knowledge. To strictly define the notion of information is difficult, still we know how to evaluate any instance of this notion with respect to a number of aspects (i.e. consistency, stability, availability, etc.). Dahlbom & Mathiasen (1993, p 27) distinct the two concept by saying

"Information is something we provide and receive, knowledge and competence are something we have."

Alter (1996) sees information as something that proceeds knowledge. This process is in turn related to communication and dissemination of knowledge. Andersen (1994) defines knowledge to be a person's understanding of actual and imagined relations.

Dahlbom and Mathiassen (1993, p 119) outlines the necessary skills for system developers and IT consultants, they say;

"They [system developers] are called upon because of their technical competence, but they have to be equally skilled at handling organizational change."

This technological competence contains both know-how of a variety of operating systems, programming languages, applications and software packages as well as methods and techniques aimed at structured problem-solving and systems design. Being competent in handling change is an even more complex skill based on personal qualities and experiences.

How are these professional skills and qualities acquired? How does one learn the "tricks of the trade" as a freshman at a new firm? Lave and Wenger (1991) claims that such learning processes are strongly situated and comes from legitimate peripheral participation in a community of practice. The legitimate peripherally should be understood in terms of newcomers (apprentices) moving from peripheral to full participation through gradually expanding their knowledge of the community praxis, in interactions with other actors (i.e. other newcomers or masters) in, or related to, the community. Their analytical approach stresses the importance of learning, not to be understood in terms of the cognitive processes of an individual learner, but rather as situated participation in the social world.

Lave and Wenger also states that learning involves the construction and shaping of the learners identity as he or she moves from peripheral to full participation in the sociocultural practices of a community, (ibid. p 53). This identity is gradually constructed when the learner is socialized into the culture of practice.

It is probably safe to say that the conditions for knowledgeworkers in the IT-sector is somewhat unique with respect to the high pace of new innovations that, when launched on the marked, constantly changes the prerequisites and the context of the community. This is to some extent discussed by Lave & Wenger (ibid.) when they highlights the fact that the communities change over time and shall not be perceived as static objects.

However, their focus is more on the fact communities change as a result of the actions and interactions within the community, than on the consequences of a constantly changing context. Argyris (1991) argues that these conditions makes learning far from unproblematic. Rapid changes in the environment often produce situations where old ways of solving problems no longer works to full satisfaction. This calls for, what Argyris labels as, double-loop, or radical, learning where the learner critically reflects over his own behavior and strategies for problem-solving. Instead of single-loop strategies, aimed at incremental fine-tuning of existing strategies. When the single-loop strategies does not succeed, the result is often defensive and denying. Blaming someone or something else. Hence, the ability to learn becomes blocked when it is needed the most.

Dalin (1997) points to the fact that learning in an organizational setting can be formal as well as informal. Formal learning refers to situations when the learning

processes are stimulated by planned and systematically realized educational efforts (i.e. courses). Informal learning refers to situations when learning occurs without these efforts, for instance when trying a new work-task, alone or in collaboration with others. Spender (1998) also makes this distinction between individual and social learning.

3 The Method

In order to find out how and where learning takes place at Semcon Data, we set out to perform a study with two different focuses. Firstly we wanted to explore how the manager and the consultants perceived the learning situation of today. Secondly we wanted to observe the working conditions and organizational structures in action. To start with we conducted semistructured interviews with a stratified sample of six consultants. Three of the interviewees had started to work as consultants during the last two years. The others had up to ten years experience of the field. The sample also varied with respect to the type of mission they were presently engaged in (see section 4.1). The educational background also varied from shorter post-graduate diplomas to full academic degrees. The only female consultant presently employed at the department participated. The interviews were conducted at the departmental office during two weeks in February 1999. Each interview lasted for approximately one hour, and was recorded on tape. The interviews were preceded by an email with a short missive, explaining the objectives of the study and the areas to be explored during the interviews. The missive, sent out shortly before the interview, stated that the session were to focus on the following themes, all connected to the overall focus on learning from the perspective of the individual respondent.

- Communication, coordination and distribution of knowledge
- Conditions and programs for personal development
- Organizational versus individual goals
- The organizational culture

The respondents were asked to reflect upon these topics, and during the interview they were encouraged to give elucidative examples. In some cases we requested clarifying answers via email. It was not possible to arrange for total anonymity since the interviews had to be scheduled by the manager.

To observe the working conditions and organizational structures in action, a number of visits to the departmental office were conducted during February and March 1999. This phase also included several interviews with the manager and studies of the company intranet and transcripts of official documents.

4 Analysis of the Case Study

Semcon Data is one of six companies in the Semcon Group. There are 10 departments at different locations in Sweden. The subject of this study was one such department, located in a small town in the southwest of Sweden. The department employs 15 IT consultants (March 1999) and has a small administrative staff with one manager, a secretary and one receptionist. The department is presently understaffed with an immediate need for two to four consultants. The problem of recruiting personnel with an appropriate profile together with a wish to address the management of the competence development of existing staff launched a program for knowledge management within Semcon Data. The program was

called K2001, and was an extension of an existing program for the entire Semcon Group (K2000). The program contained strategies for continuos scanning of trends and innovations that could foresee coming needs of the clients. The program also provided a forum for networking and establishing contacts between fellow workers. Finally it aimed at providing a database with relevant information on the competence of the staff and a collection of courses that the employees could take as part of their work. The system has not succeeded to the intended degree, the database is rarely updated and few consultants have taken the advantage of the offered courses.

4.1 Work at Semcon Data

At present there are three types of projects that a consultant can be assigned to: helpdesk, system administration and systems development. All projects are located in the near region of the office (50 km radius).

Working in a helpdesk or systems administration project, the consultant is placed at the premises of the customer. The projects vary in length from three months to several years. In the longest projects, personnel is occasionally replaced. The helpdesk consultants all work at Semcon's biggest customer, a car manufacturer with several thousand employees. Here they assist the constructing engineers with expertise knowledge in various software packages for Computer Assisted Design (CAD). Alone or in groups of two, the systems administrators are mainly occupied with setting up and maintaining various workstations and servers on the Unix platform. Since the daily workteam often consists of the consultant and the client it is natural that most learning is conducted in the field.

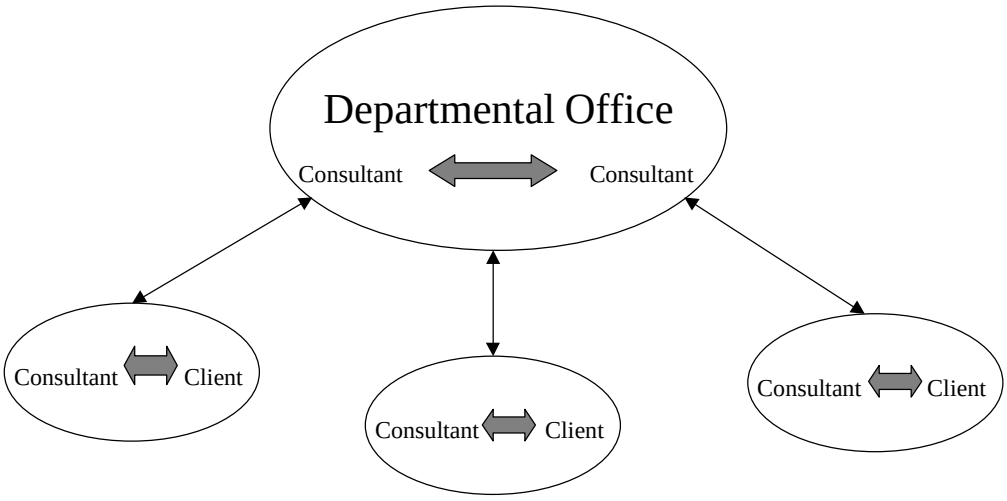

FIGURE 1 The working situation

The system development projects are primarily situated at Semcon's office. The manager does the initial project negotiations with the client. Two of the senior consultants are then responsible for project quality and systems design. The remaining project members are a team of 1-3 junior consultants. An additional project type that has recently been introduced at the department is the overtime projects. Here all junior consultants that wants to learn more in some specific area, related to a systems development project, could join the project, using his or her spare time. The chief designer then assigns the volunteer to a sharply delimited task within the project.

Even though the main physical meeting points for all workers at Semcon Data is

the office building, the monthly department meetings are the only time when the whole group meets face to face. These meetings serve a valuable purpose of coordination and awareness regarding the present content and progress of ongoing projects. The manager tries to promote additional visits, for instance by standing invitations for lunch at the office canteen, but due to pressed agendas this rarely happens. The office also contains a laboratory, where consultants are invited to experiment, work, play and socialize after work hours. It is equipped with a few computers, and is used frequently by a small group of some of the consultants, others have only visited once or twice. For virtual meetings, the department uses mainly email and the company intranet.

Outside the office, the members of the department often meet for social activities (i.e. concerts, sport events, etc.) or parties. This is a much cultural habit appreciated (reported in nearly all the interviews), spread throughout the entire Semcon group. This "Semcon spirit" is introduced to all newcomers through an obligatory course that is held periodically throughout the year. The newly recruited consultants from all over Sweden meets at a conference center for a two day seminar that is lead by the vice president of the Semcon group and contains lectures in company procedures, mixed with social activities and a dinner party. There are also other efforts done by the concern management in order to promote the team spirit amongst the employees such as invitations to events

In addition to the introductory course, there is an ambition to let a newcomer start with a minimum of two weeks work at the office. During these weeks he/she is introduced to working standards, routines and ongoing projects at the department. This brief introduction is followed by a carrier-plan-conversation with the manager, and then the newcomer is ready to engage in a project. This principle is sometimes compromised, due to heavy workload, and one of the interviews reported on a newcomer being sent of to a client the second day on the job.

4.2 Learning at Semcon Data

The results from the interviews painted a picture of the structures of learning that is summarized in the following matrix. Spender (1998) and Dalin (1997) inspired the dimensions. Each cell in figure 2 contains examples of learning activities and the media most commonly used in the process is presented in italics.

Learning	Informal	Formal
Individual	**Search for information/facts** *Encyclopedias* *The Internet (www)* *Manuals*	**Self studies** **Learning by doing** *Books* *Journals* *The Internet (www)* *Manuals*
Social	**Client Interaction** **Support** *The Internet* *Telephone* *Email*	**Projects** **Courses** *The Internet (News, www)* *Social milieus* *The Laboratory*

FIGURE 2 Learning

Adding a cautious quantitative dimension to the matrix would suggest that the upper half dominate over the lower, and the left half dominate over the right. A majority of the interviewees referred to searching for information on the Internet, as a constant source of learning, they also stressed the fact that this was a time-consuming task and expressed the wish to rationalize this through collaboration with other consultants

> *"There are many persons sitting on hyperlinks that are priceless once you get hold of them, just after having spent plenty of time searching…"*

Represented in all four cells of the matrix, the Internet is the dominating media for learning. Several of the interviewees also reported that the Internet was their first choice of media when searching for facts and information. The domination of individual learning over social is further emphasized when asking about the learning of deeper knowledge, through more formal processes. The interviewees linked the need for doing this type of work from home with the tight schedule during working hours. These viewpoints are expressed in the following quotes

> *"….It's all about accumulating knowledge, because in the end this is what brings you a raise"*

> *"It is tough to make it an eight to five job"*

> *"You do a lot of reading at home at night, you got to be updated…"*

The habit of doing most of this training at home after work hours is also in a sense encouraged by implicit norms in the company culture, linked to more formal systems for rewards and promotion. For instance, when participating in an overtime project, the learner does not report all the time spent in the project, but is empowered to estimate the equivalent amount of expert-performance his or hers efforts corresponds to. Furthermore one of the respondents says

> *"You're in the game [the IT sector] out of your own interest in the field, and here it's a prerequisite to invest a lot of your spare time."*

The fact that these conditions can sometimes be stressing is underlined by the opening quote of this paper. Finally the lack of time is also held responsible for the fact that so few of the consultants choose to take the offered courses.

> *"They (the courses) often run in weekends or evenings. The question is if you are capable of learning under these circumstances."*

5 Discussion

Analyzing the way work is structured and perceived by the interviewed consultants, contrasting it with how it can be argued to promote or prevent learning results in three major reflections.

(I) The overtime projects are perfect examples of legitimate peripheral participation in action. To be able to develop new skills and knowledge through active participation in the community of practice is argued by Lave & Wenger (1991) to constitute a necessary foundation for learning. To start with less vital and less complex tasks, before moving on to more central and vital is also typical for legitimate peripheral participation (ibid, p 96). However it is important to stress that this must be accompanied

by a possibility for the learner to observe how his or her contribution fits in to the greater whole of the entire project. Otherwise there is a risk of reducing the potential learning effects. Since most of the work in this project are done from home, this is a risk worth noticing.

(II) The alienation or isolation of the individual consultant primarily during projects outside the office, but also when working at home, can pose a serious hindrance to effective learning. To have full access to the community of practice is vital according to Lave & Wenger. They point out that this does not imply co-presence with other members of the community, merely participation in their activity system (ibid, p 98). The results could suggest that the consultants tend to draw parallels between working alone and learning alone. To some extent, the use of the laboratory contradicts this assumption, at least with respect to its frequent users. Yet another factor that prevents the consultant from participating in the community of practice defined by the Semcon consultants is the competition offered by the communities of practice present at clients where they spend most of their time. The interviews had several comments pointing in that direction. The manager also said that in his experience, most consultants reported a sense of starting a brand-new job each time they joined a new project.

(III) The dominating impressions from the interviews are the shortage of time and once again the lack of communication with fellow consultants, constraining them from becoming a true community of practice. The conditions are bordering on the failure-leads-to-failure phenomenon characteristic of the blocking of single-loop learning. The reward systems and the close social bonds amongst the consultants are motivators for collaboration. Still increased alienation seems to be the most plausible outcome.

6 Implications for design

The empirical data from the study identifies the pressing time-situation as an obvious point of departure for discussing designs aimed at enhancing the learning processes at Semcon Data. The experiences from the relative failure of the K2001 project also indicate that such support should be highly automated. A promising technology that supports the user in an autonomous way are software (intelligent) agents (Fagrell, 1996). These are designed to reduce the workload for the user, and the area of information retrieval promises to be an important field for agents (Gordon et al, 1999). An interesting example is Viktor, a web-based search agent that, based on the users grading of the first search-results, gradually improves its performance serving the user with better and better hits for each time. Viktor was developed at the department of Informatics at the University of Gothenburg.

The need for more interaction and information sharing among the consultants can be met by a variety of technical solutions. However, combining the results from our study with the conclusions derived from the studies of Orlikowski (1992) and Robertson et al (1998) points in a direction away from complex and sophisticated groupware (Notes) towards more *simplistic and automated solutions*. An interesting concept that could meet the demands in this case is a Common Information Space, CIS. Bannon and Bødker (1996) argue in favor of such systems when there is a need for communication and mutual access to information. It would be natural to choose the Internet as a platform for this CSCW technology (Bentley et al, 1997), thereby providing the highest degree of flexibility with respect to access and maintenance for mobile users.

The functionality and information contained in such a CIS should evolve in

coherence with the demand of its users, but shared bookmark-files, FAQ's and asynchronous discussion-boards are examples that could be directly derived from the empirical data. Also the optimized queries obtained from software agent's, such as Viktor could be an important part in such a CIS.

The possibility to send an email to a group of people makes this a simple but yet powerful technique for group communication (Robertson et al, 1998). In order for this to become an efficient groupware it is however important for the users to understand this media based on a fruitful cognitive model (Orlikowski, 1992). If email is perceived as a media for person to person communication, like the ordinary telephone call or a letter, the risk is obvious that no effective group communication can be mediated by its use. If, instead understood from the metaphor of a meeting, with the group members seated around a virtual table, the proper patterns of use is more likely to be used. With this cognitive model it is more natural to use the "reply all"-option when reacting on a message, a simple but yet effective way of coordinating information among all the participants of the group. Other behavior, such as agreed upon prefixes or codes in the subject line could further enhance the quality of the interaction (Sproull & Kiesler, 1991). Such codes serves the double purpose of signaling the nature and importance of the message and at the same time makes it possible to use filtering mechanisms, reducing the interaction overload (Ljungberg & Sørensen, 1998).

Finally, we address the problem of the classroom-based courses that restrains the student in both time and space. Such course concepts have little potential of succeeding in a working climate like the one described in this study. To design a course-concept, more flexible with respect to distribution of course material and interaction among students, is of vital importance if the demand for formal education is to increase. Techniques for streaming audio and video and increased bandwidth even make it possible to have real-time videoconferences over the Internet. There are several studies reporting on such distributed web education programs, see Svensson (1998) for an example. Even though the development of distributed courses are relatively expensive, we believe it to be a necessity for formal education in a society of knowledgeworkers.

A final conclusion is that the aim of the techniques should support the users rather than steeling their valuable time. In knowledge intensive firms *time* is of great importance why complex solutions, with an extensive administration need, run the risk of failure. In the IT-consulting sector it is commonly accepted that the consultant only is profitable when placed on a commission. Paradoxically it seems like knowledge intensive firms do not have time for knowledge (Know-how when No Time).

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