

Walking & Talking - Sharing best practice

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Abstract

Moving towards more communication intensive organizations where work tends to become more mobile there is a growing need to support learning among knowledge workers. This paper reports on a study of a group of knowledge workers, working both closely together and sometimes geographically separated was carried out in order to find out how and when learning took place and when the need for learning was obvious and perhaps not satisfied. The interviews and observations indicated that the need for more flexible learning possibilities exceeds the ones provided. The results from the study are analyzed and discussed, after which we suggest pointers for design divided into the categories: Walking around, Around meetings, Formalizing intuition and Sharing feelings.

1. Introduction

Knowledge workers learn continuously and their work tend to take on a more mobile character, thus requiring flexible and mobile systems accompanied by competence development applications and methods. Understanding the context and environment within which we cooperate and communicate with co-workers and peers in order to share knowledge and learn from each other is essential to be able to design support for the learning process. The methods for development of mobile competence development activities need to be updated to meet the growing needs and requirements that follow these partly changed working conditions.

In mobile work settings community building and awareness tools, become increasingly important when the distribution in time and space creates difficulties in localizing people for face-to-face meetings [3, 20] and makes the opportunistic meetings less likely to occur [31]. The aim is therefore to bring the employees together in order to create and maintain close cooperation and possibilities for information exchange and knowledge sharing.

Looking at previous work within the field of cooperative work and collaborative learning much attention has given mobile work settings respectively distance education. Highlighted areas are for instance

communication and collaboration in distributed work [30, 31, 15] and learning under regular working conditions [8, 14]. Another perspective to elaborate further is the issue of how distributed workers can be supported to learn from each other under more mobile working conditions. When it comes to mobile technologies it seems to support organizational activities and not focused within a particular office or at a particular desk [16, 3, 4] more then actual support for learning activities.

This paper will illustrate why and how individuals need flexible competence development, that would answer to the nature of their work. We aim to explore the needs of daily collaborative learning among mobile knowledge workers to be able to inform the design implications of IT support for continuous learning in mobile settings. It is not to come up with concrete design of tools supporting these processes. The research questions are:

(1) *What are the difficulties in enabling flexible continuous learning and knowledge sharing during mobile working conditions for IT consultants?*

(2) *How can the processes communication and collaboration be supported and improved with IT solutions to enable more learning?*

The following section introduces theories on knowledge work that our work is based upon and related research. Section three outlines the methodology followed by results that are analyzed and discussed in section four. Section five suggests implications for design and section six ends the paper with our conclusions.

2. The process of learning

This section outlines research on the knowledge process concerning learning-while-working to frame the area and increase the understanding on these issues.

2.1. Knowledge types and processes

Competence involves more than just technical or administrative skills or knowledge on used methods and routines, such skills based on experience, formal training and personal qualities. Competence also involves skills such as handling rapid organizational changes, understanding people and how they work together as well as handling unpredictable tasks [19]. Molander [19]

defines knowledge in action as something that you not just do, but as knowing what you do. He talks about embodied knowledge and embodied learning and that an expert not only should know a lot, she should not have stopped learning. There is also a need for personal engagement to fulfil tasks in the best way and disposition, attitudes are also of importance for performance. These characters are perhaps not knowledge, but important and necessary aspects for keeping knowledge alive.

According to Wenger [30] social participation is important for the learning process and shapes what we do as well as who we are and how we interpret what we do. This social participation as a process of learning and knowing include four interconnected and mutually defining components; meaning (learning as experience), practice (learning as doing), community (learning as belonging) and identity (learning as becoming).

Blackler [5] writes about different types of knowledge and how it looks different in different types of organizations. He presents a figure that summarizes trends suggested by the knowledge management literature shown by the arrows.

Table 1 Blackler [5]

Collective endeavour	Knowledge-Routinized Organizations: Depend on embedded knowledge Ex: Machine Bureaucracy, f.i. a traditional factory	Communication-Intensive: Depend on encultured Knowledge <i>A trend/struggle/strive towards this organization</i>
	Expert-Dependent: Depend on embodied competencies Ex: Professional bureaucracy, f.i. a hospital	Symbolic-Analyst-Dependent: Depend on embrained skills Ex: Knowledge intensive firm, f.i. Software consultancy
Contributions of key individuals	Focus on familiar problems	Focus on novel problems

As figure 1 shows, there is, according to the reviewed commentators in Blackler's paper, a shift away from dependence on the embodied (of experts and key members) and embedded knowledge (in rules, routines, procedures and technologies) in organizations. The arrows point towards organizations with embrained skills (where problem solvers and creative workers survive) and

encultured knowledge (where the emphasis is on collective understanding). This shift that might occur have impact on technologies used in existing work systems. As working patterns are being transformed by the encodification of knowledge the technology is making it possible for organization/employees to work more independently from geographical location by facilitating internal communication. This trend would also facilitate Knowledge creation, which refers to the creation of new tacit and explicit knowledge and an interplay between these dimensions as knowledge moves through individual, group and organizational levels [2]. Nonaka [22] has divided knowledge creation into four modes: socialization, externalization, internalization and combination.

According to Nonaka and Takeuchi [24] knowledge creation is a spiraling process of interactions between explicit and tacit knowledge that leads to the creation of new knowledge. Perhaps this can be seen as the interaction between theory and practice and the integration between working and learning. According to the authors socialization involves capturing knowledge through physical proximity, for instance walking around the office or through interaction with suppliers and customers. Externalization of knowledge is the translation of tacit knowledge into comprehensible forms that can be understood by forms that are easy to understand. Internalization is the conversion of the newly created explicit knowledge into tacit by identifying the relevance for one's self within the organization. The combination involves the conversion of more explicit knowledge into more complex sets of explicit knowledge.

Nonaka and Takeuchi [24] discusses that what distinguishes the knowledge-creative company from other companies, where knowledge is created but not supported in the same way, is that it systematically manages the knowledge creation process. They mean that a management and an organization with awareness of knowledge creation processes can provide better prerequisites and help facilitate successful support of knowledge creation. Nonaka and Konno [23] have adapted the concept "ba" to elaborate their model on knowledge creation. They explain ba as a shared space for emerging relationships. The space can be physical (e.g. an office), virtual (e.g. e-mail, NetMeeting), mental (e.g. shared experience, ideas etc) or a combination. Knowledge creation is what differentiates ba from ordinary interaction between humans and it provides a platform that serves the advancing of individual and/or collective knowledge. An awareness of ba and its processes, and a management that provides ba, can help facilitate successful support of knowledge creation and the struggle towards the communication-intensive organization (figure 1) is therefore a positive trend.

2.2. Working and Learning

An important aspect that affects learning is collaboration and enhancing communities of practice [30]. There is a great need for supporting collaboration as people are and become more distributed in time and space, for instance in the work of allocating, creating, and sharing knowledge. People need to work together in order to create knowledge and to provide the capabilities and resources required in complex settings.

The problem of continuously learning and working is, complex in many ways. Brown and Duguid [8] are asking for a conceptual shift, to see that working, learning, and innovating are interrelated and compatible and thus potentially complementary, not conflicting forces. As of today however they see that education and training generally focus on abstract representations to the detriment, if not exclusion of actual practice. They talk about canonical and noncanonical practice where canonical practice means that workers are held to a map rather than the road conditions and that there seem to be a divergence between espoused practice and actual practice. The noncanonical practices however, connects theory and work practice and contributes to the whole community's collective knowledge, and bring about an increased understanding through for instance trouble shooting. So what the authors say is that the canonical practice may occur if there is a gap between what the corporation supplies and what a particular community actually needs, that cannot be bridged.

2.3. Related studies

The need for continuous learning are easier to satisfy when other co-workers or members of the community are within physical proximity, making them able to communicate with little or no time delay and with scarce effort. Bellotti and Bly [3] studied a team of distributed product designers in a consulting firm, who used technology for collaboration. They saw problems which mobility imposes for distributed collaboration such as; locating people, lack of awareness, lack of communication and co-ordination. These activities are poorly supported by existing technology and the lack of resources makes it difficult to collaborate successfully over distance. This dilemma is also addressed by Whittaker et al. [31] who discusses how previous work indicates that physical proximity is crucial for informal communication, but that trends towards telework, mobile work and globalization are geographically separating workers. In spite of the importance of the spontaneous interaction, informal communication is often poorly supported by technology.

Bly and Bellotti [3] further on criticize the design of computer support for mobile work not to support what they call local mobility, and say that we have to design for mobility and not against it.

3. Research approach

This paper is based on data collected in a field study of partly mobile knowledge workers in a customer relation's team at Volvo Information Technology in Sweden. The focus has been to gain insight and get a comprehensive picture of the relations between working and learning in order to be able to come up with suggestions of IT-support to enable learning also when work have a more mobile character. The work practice and how the mobile context is expressed is essential in order to examine the learning requirements during work and what constraints and guidelines this context put upon the design of new artifacts and systems.

The study was based on qualitative data collection techniques and conducted during three weeks in February 2002. Techniques used were qualitative semi-structured interviews and non-participant observations [27].

The interview method used was Mc Cracken's systematic guide for the open-ended long interview [17]. The questionnaire was designed to give the investigator an instrument of inquiry that provided openness and flexibility, and allowed the subject to have some control in the interview situation. The interviewees differ in experience in the job and at the department. They also have different roles and the sample represented a diversity of tasks the consultants were handling, for instance; economic follow up, sales, contract signing, project leading, coordination and investigations.

Three semi-structured interviews were held. Each interview lasted for approximately one hour, and was recorded. Non-participant observations were conducted for a total of 32 hours during five working days, by a researcher who was not previously familiar with the work place. Different persons were shadowed each day in order to study as much diverse work tasks as possible. The other researcher took part in the observations for 8 hours. The observations were based on the notion of "Quick and Dirty Ethnography" [13] to find relevant information for the task at hand, namely: finding design implications to support continuous learning for mobile workers.

Observational field studies can identify new possibilities for design of IT as well as give an understanding of the context that we are designing for [6]. Using fieldwork to inform IT design has been exercised in various settings, such as offices [4, 2, 29], police work [1], control rooms [12], public organizations [28] libraries [10], as well as the home [21].

The transfer from field studies to design is a main issue in the research. Solutions to the problem of formulating and purveying have been suggested. Hughes et al. [11] suggests the "quick and dirty" approach. Here the aim of the field study is to find relevant issues for design within the environment, rather than to give a

complete understanding of an environment. In our study we have used the idea that a quick and focused study can find the relevant areas for design. However we have not done the study in collaboration with a design team. This means that we have not had the possibility to get input to focus our study on the areas most relevant for a specific group of designer. In this paper we deal with this problem by providing general design pointers rather than to give specific implications for construction. By doing this we also address the problem the contextual boundaries of our field study. It is difficult to draw unambiguous conclusions for design from fieldwork since the fieldwork is conducted in a context with specific physical, social and temporal aspects. The idea of suggesting pointers to design rather than designing something for this specific context also solves this dilemma.

The interviews and notes from observations was transcribed and analyzed collaboratively. It was not possible to arrange for complete anonymity since one of the authors is a co-worker at the department. However, the individual consultant was, kept anonymous in transcripts.

4. Mobile Learning in a Customer Relations team at Volvo IT

In this section we analyze and exhibit the main issues of mobility and learning derived from our field studies. We found that learning in the customer relations team is dependent on mobility within the office. We also found that specific work tasks triggered knowledge sharing. When examining the actual content of what they talk about when learning from each other we saw that it is a struggle between attempts to formalize and verbalize very fuzzy competencies as well as a will to rely on and share feelings as a tool in their work. This may not be a specific mobile aspect, but it certainly has great implications when designing support for the mobile worker.

The interviewees were asked to elaborate on their understanding of the daily work situation, personal development, company culture and competence. This gave us an understanding of how the team perceives learning. It also directed us towards when, and how learning took place in the work place. During the interviews the members of the team showed to be quite conscious about their learning situation. This was substantiated in the field studies. We observed attempts to improve their possibilities for daily learning.

The team saw their learning situation as inadequate. However, they displayed a will to improve the ways and possibilities to learn. Organizational and cultural aspects such as debiting your time to customers and obsolete rules and routines somewhat restrained this. This is, using Brown and Duguid's [8] ideas, building a canonical

practice rather than the non-canonical that would increase understanding and help troubleshooting instead of creating obstacles for it. Further more, the knowledge creation processes needs to be continuously managed [24]. The studied group is partly distributed but sometimes work close. The dominating ways to develop your competence is through practice and asking around. Based on our findings we engendered 4 categories representing learning situations and ways of learning. They are presented here.

4.1. Walking around

The persons studied engaged in walking around the office frequently. The use of local mobility has been discussed in previous research (se for example [3]). However the mobility created situations for learning which were dependent on the unplanned meetings that the walks created. The excerpt below is an example of this.

Adam calls the person in charge of the accounts in the office. As soon as he gets a ring tone she presses "busy" and he won't be able to get through. Adam rises and walks down to her office to talk to her in person.

A need for information creates the unplanned mobility. Adam is forced to either wait for the information or to by pass the call screening by meeting her in person.

Adam gets help as soon as he gets there. He wants an account code for a project. She opens up an excel spreadsheet with the codes. On the spreadsheet there is one more account code that Adam needs, he asks her to print that out too. She prints out the codes and explains how the new account system works. Adam takes the printout and walks back up to the office.

By being physically present Adam is able to pick up additional information as well as engaging in personal dialogue concerning the content of the documents.

On the way he passes the coffee room where Mike is getting some water. Adam shows Mike the spreadsheet and explains how the new account system works.

Adam then continues into the office and spots Mario at his desk. He knows that Mario also needs one of the codes to report some work he has done together with Adam. He walks over to Mario and while talking about the new system Mario enters his working hours into the online databas, assisted by Adams comments.

Here the walk creates two new learning situations. The understanding concerning the use of the new account codes are passed on and unplanned discussions about the documents occur.

Adam continues onto the desk of Eric. When Adam is explaining the spreadsheet to Eric he chooses to not only explain the account system, but also what the account codes should be used for as well as what not to use it for.

In this learning situation Adam adjusts how he talks about the new thing they all need to learn. Being face to face and knowing the colleague he can adapt to the level of the person. Or at least he is able to adjust to what he thinks is an appropriate level.

We noticed that walking around not only was a way to seek people to ask about things but it also gave the effect of creating un-planned learning situations. The walking seemed important for the customer relations team. This might be because they are not always around in the office. The studied workers were also dependent on their colleagues walking around. The department of the salespersons is placed just outside the meeting rooms and this facilitates the meeting of colleagues when being at the office.

Adam makes a phone call to Mark. He gets no answer. Adam needs some information and input from Mark on a new project Adam is working on. Five minutes later Mark walks by into one of the meeting rooms. Adam shouts out to him and Mark stops. They start talking about the projects and after talking a while Adam follows Mark into the meeting room to continue the discussion.

The walking creates unplanned learning situations. In the first excerpts Adam (being mobile) chooses whom to approach and who to pass in the office. In the second excerpt other people's mobility takes them in sight of Adam and thereby triggers learning situations.

4.2. Around Meetings

Whenever the salespersons were going to a sales meeting they made great efforts to try to create a common understanding of what was going to happen. Concerning what roles they should take in the meeting, what kind of information they had about the customer, history connected to the customer and so on. We found that being on the way to and from meetings produced a focused learning situation.

Ricky and Jill are in the car, driving to a meeting with an important customer. They are discussing what will happen at the meeting. "Do you know if he is really in charge of the decision to invest in this?" asks Jill. "I'm not sure but he is in charge of the department at least," replies Ricky. "What did he ask the last time he talked to you?" Jill wants to know. "Well we talked about the system but things were pretty unclear at that time."

Jill and Ricky continue the discussion on how they know and feel about the customer and goes on to set up the meeting. They decide what to say and how customers like this can be handled. Jill is the more experienced and also gives Ricky some more history on the customer. This is also done on the way back from the meeting. They both try to share their feelings on the outcome of the meeting.

"I'm not sure if we really showed that we could solve most of their problems," says Jill. "Well I think that we made a quite good impression anyway, to bad that we didn't anticipate more of what he wanted," Ricky replies. "Well how should we go on after this?" Ricky asks. "Well I think at least that we should have some more meetings with the people at the office before we get back to them" Ricky says.

They both sum up their impressions from the meeting as well as share thoughts on how the work process should go on after this, negotiating practice.

In the example above two persons went to meet the customer, but it is just as usual to go visit a customer alone, especially if the assignment is of smaller character. We have no reason to expect that the need to talk or get information about the history of the customer is smaller in this case. However, when this issue is brought up in the interviews the time going to and from meetings is very much considered "dead time" [26]. The waiting time is not described as useful for focusing on the meeting and reflection on the customer, rather on making other use of the time. Perry et al. [26] studied single travelers and found similar understanding of the time alone as away from the workplace being "dead time".

"If you visit a customer and want to show something on the server or if you sit and wait for a meeting, which happens quite often, you don't have the opportunity to check you emails or look for information on for instance the intranet. And not just emails, all outlook is something you would like to have with you at the meeting and in the car."

This gives an indication of being on the move alone, compared to going to a meeting in company with a colleague. It shows the shift in the understanding of the time, and what it could or should be used for.

4.3. Formalizing intuition

Efforts are continuously made in the group in order to simplify as well as understand and learn more about reality. The efforts concern how things are to be handled as well as how different persons should be confronted in order to improve work. Analyzing the daily work tasks carries out these improvements. This is a way to develop competence, by sharing practice on the common work tasks. We use the word intuition to describe this category because it is not possible for us (as observers) or for the studied group to define exactly why they suggest a certain tone of voice in an email or how to be seated in a meeting. Quotes from the interviews illustrate how the formalization of intuition is used in learning.

"Ricky and I usually work like this: (interviewee imitates a conversation) - I have written this to a customer, is it good wording? And then you think, - well what is your goal with this e-mail? - I want to reach this and this. - Well ok, how about writing it in this way? That will do it I think! Many times you think things are pretty obvious, but then you discuss them with a colleague and it is not that obvious anymore, you get a different view when asking each other, so that is good."

What is displayed here is a shift in understanding (a learning situation) created by the need to discuss the daily work with colleagues. The two persons in the discussion have their desks facing each other so communication is performed without having to move around, when they both are sitting at their desks that is. The excerpts show attempts to formalize things that clearly are very subjective and situated. The excerpt below also illustrates the importance of the actual collaborative formalization rather than the result.

“Ricky and I have written a list together in which we continuously have written down little hints that has to do with certain customers. It has sort of become a book. We don’t look in it that often but since we wrote it the content is in our heads”

There seem to be a need to discuss more non-formal work-related issues in detail, for instance about how to handle different personalities and how to act with different customers to meet their need, especially since they mostly work alone in the field. During our field studies we did not experience this when being distributed. The mobility hinders the collaborative formalization of intuition.

4.4. Sharing feelings

We observed a high awareness off the importance of learning from your colleagues and that discussing things in detail leads to interesting spin-off effects as increased knowledge on common work tasks. The difference between this category and the one of formalizing intuition is that attempts to put feelings and hunches into concrete work terms are not made here. Rather you just try to express your feelings.

Two colleagues are discussing a recent meeting. “How did you feel the meeting went out?”

I’m not sure, not perfect but as good as we could do. I have a feeling that we do not completely understand the customer. But I sense that we know the customer now. That we have a relation”

The excerpt shows how feelings and understandings can be discussed without clearly describing what you mean. To be around colleagues and socialize seem to be an important part in the learning cycle in the team. See below:

“It is always good to work together with people that knows more in your field, and kind of rub yourself against them to be infected by their knowledge”

This shows an understanding of learning that exceeds traditional courses and books. Below we can also see how the actual social parts of the learning are important.

“Sometimes if I’m about to meet a customer I can get some information about them by checking the Intranet. However for me it is not a very valuable information source. I rather speak to my colleagues who worked with that customer or those technologies.”

There were several examples of this kind, and they all illustrate that being able to continuously learn from your colleagues by discussing feelings around persons (mostly customers) and work tasks seem to be a prerequisite for this type of job.

5. Discussion and implications for design

Based in our categorizations we here discuss and present a number of implications for design that takes into account the unique prerequisites of the mobile workers we have studied.

5.1. Walking around

The implications supporting this can address the issue from, at least, two different ways. Namely, bringing the distributed colleague into the office and enhancing the actual “walk around” at the office. As Bellotti & Bly [3] we saw problems with locating people, lack of awareness, lack of communication and co-ordination, prerequisites for collaborative learning.

Mediating “walking around”

If the aim is to make a useful tool for collaborative learning available for a mobile participant it is important to consider the basis of the “walk around”. The problem is that the interaction that creates the actual learning rarely can be foreseen. This means that a mediated interaction sent to a certain person does not create the same opportunistic possibilities as the walk in the office. A mediated tool for the “walk around” would have to let the user “walk by” users and be able to decide whether or not to engage in interaction with them. This would be a first step for mediating the “walk around”.

Supporting “walking around”

Another way to support the “walk around” would be to focus on the mobile users in the office. Discussion around documents and other artifacts were not uncommon. Also discussions where no artifact was present often concerned things that in some way were connected to e.g. documents. The ability to bring documents in an easy way to an opportunistic meeting would enhance the possibility of mobile learning.

One main point in walking around is that you do not always know whom you are going to bump into or if the persons that you are looking for will be around. This means that tools for finding people in the office actually would obstruct the possibility of creative and intuitive learning situations from walking around the office.

5.2. Around Meetings

The physical nature of actual mobility need to be considered when looking at “learning when going to and from meetings”, meaning that driving or walking limits the possibilities for output and input that the user would be able to utilize. Aside from this the support for learning processes here can take two different sides, either supporting a lone salesperson or supporting the interaction of two or more persons.

Aiding a single salesperson

Discussions right before and after meetings seem to be a very focused learning situation. When a person is alone this could be a moment for reflection but it would not give the possibility to interact, share and gain knowledge.

The fact that an important meeting is about to begin or just has ended seems to be the trigger of these focused learning situations. If trying to have mediated discussions the non-present party would not have the meeting focus, going to or leaving a meeting. Different design

experiments would help determine whether or not the focus of both participants would be necessary or if the difference in focus actually could enhance these learning situations. It might also be possible to let a system designed for single users aid the reflection by giving inputs and ideas to the user. It could also be valuable to aid reflection and sum-up of meetings. These implications would also have to be further elaborated to be able to determine the value.

Aiding more than one person going to and from meetings

Discussions on the way to and from meetings often concern history and experience from other meetings with the same customer or meetings concerning the same product. If information concerning this could be accessed these discussions could be more structured. However, while giving more structure makes the discussion more focused and helps the users to create a common understanding this could also take away creativity from the interaction. Such an application would therefore need to be optional.

5.3. Formalizing

Formalizing vague and subjective perceptions is one of the main tools the studied group uses to share tacit understandings, as interplay between tacit and explicit knowledge [2]. This means putting words to a lot of things that not always fits into verbalized descriptions. Aiding this process would be valuable to the group when distributed. Written or voice communication is often not sufficient for sharing these kinds of understandings. The design implication here would be to let distributed colleagues share this information aided by additional tools for communication.

This way of building and forming a foundation for knowledge sharing and creation is what will form a knowledge creation organization [24] and the urge to learn more as part of this will help reaching what Nonaka & Konno [23] refers to as ‘ba’ the space for emerging relationships.

5.4. Sharing feelings

Being able to express feelings to colleagues seems to be an important part of learning about people and work practice for the salespersons. They use a variety of terms to articulate feelings concerning especially customers and meetings. They seem to prefer talking to people instead of looking for information on for instance the Intranet. This is something that Nardi et al. [21] writes about, that it is now what you know but who you know that is important when looking for information.

Interesting was also that they seemed to have a good view of what their co-workers do, but need to know how co-workers with the same tasks do in practice which

is constantly done by discussing how to do in different situations and how to handle different types of persons.

Supporting interaction for learning by sharing feelings it is important to have in mind the importance of meeting persons or talking to persons in order to read not just what they say, but what they show with body language and facial expressions. Solutions such as possibilities to express feelings as well as being able to read others feelings in different ways are important to consider when designing for sharing feelings.

5.5. Supporting learning

To summarize, walking around is characterized by informal, emergent, situated action where sharing feelings is the dominating learning type. This require mainly multi-user IT support that is instant, easy to adapt and support the need for information and communication in here and now situations. Talking and learning in situations around meetings are more characterized by focused and formal, planned actions that require foremost single user IT support that provide access to collections of facts and artifacts such as documents in order to be prepared and preplanned.

Table 2: Implications for support

	Type of learning	Dominating IT support need
Walking around	“Sharing feelings” →	Multi-user support
Around meetings	“Formalising” →	Single-user support

6. Conclusions

For the studied customer relation’s workers there were special situations where learning could be noticed to be more explicit and conscious as a part of the collaboration and communication processes. Such as around meetings, when walking around, when asking around and when formalizing around work situations, hence mostly mobile work settings. The will to constantly be able to learn from colleagues and a will to share feelings and practice with each other was something very obvious and natural among some of the workers in the group. They know how to organize and coordinate as well as find whatever they need to perform their job at hand. This shows, we believe the great need for actually enabling flexible continuous learning and knowledge sharing also during mobile working conditions since these are common ways of working in the group. It also became clear that there was a great need to be able to learn more from others as well as share more with others. However, we sensed some difficulties in enabling continuous and flexible learning

through collaboration and communication. Both organizational aspects, lack of time and technology for remote access to people and information could be the obstacles for more effective learning here. We do not believe in codifying and formalizing work or knowledge as a primary solution here, nor do we want to strive to package information, formal or intuitive aspects of work, since the need mostly seems to be support for ad hoc communication. Neither do we suggest that IT solutions would be the only way to facilitate learning. Rather, is one conclusion that awareness tools and knowledge sharing supporting technology as well as better possibilities for preparing and planning would be helpful in the situations described above, to fulfil the expressed need of flexible learning possibilities and to be better prepared for challenges.

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