WORKPLACE LEARNING COMMUNITIES; HORIZONTAL *AND* VERTICAL?

Keywords: communities of practice, horizontal communities, vertical communities, hospital, learning in practice

Etty R. Nilsen, etty.nilsen@hibu.no, Buskerud University College, Norway[1]

ABSTRACT

This empirical study of opportunities for learning in a hospital contributes to the discussion of learning at work and particularly the notion of workplace learning as a horizontal community. Horizontal communities, although focused as such in existing literature, are found to be scarce in this study due to division of labor and physical layout. The horizontal communities seldom reach the in situ domain, and contrary to what is proclaimed in the normative literature, the horizontal interaction seems to be further afar from the task performance itself than what is labeled here as *vertical communities* appear to be.

[1] Etty R. Nilsen, Buskerud University College, Postboks 235, 3603 Kongsberg, Norway. Telephone: +47 97021325, Fax: +47 32 11 71 10, etty.nilsen@hibu.no

1. INTRODUCTION

The concepts of learning and knowledge creation in organizations have received substantial attention over the past decades. Even so, studies on where and how this learning takes place at work, and on how opportunities and barriers emerge; are few. Thus, this study focuses on how opportunities for learning emerge during work.

The practical opportunity to learn and create knowledge in interaction with colleagues, vertically and horizontally in an organizational setting, is described only indirectly in the theoretical frameworks. Although the issue is raised and there are normative voices on the subject, like Boland and Tenkasi: "This means that the community must, of necessity, have a space for conversation and action isolated from the larger organization" (Boland & Tenkasi, 1995), little attention is paid to how or whether these opportunities are facilitated nor to the physical location of the 'space for conversation'.

Dividing the interactions in horizontal and vertical will contribute to increase the understanding of the connections between learning and work. This insight forms a contribution to the literature since learning and knowledge creation that take place horizontally between peers, differs from vertical interactions, for example between superior or subordinate or across departments or disciplines. It is likely that peers will have a higher degree of redundant knowledge (Nonaka, 1994) and this gives a different basis for learning and knowledge creation than vertical interaction.

In this study I ask where and how opportunities for learning and knowledge creation can be categorized in four departments in a hospital. Opportunities for learning and knowledge creation are largely operationalized as interaction during work. This approach differs from more conventional research on learning and knowledge creation in two aspects. Firstly, the opportunities for learning are studied through studying work itself with focus on interaction. Secondly, the research is carried out in a public hospital; a context associated with complexity and pluralism; and at the same time hierarchical and strictly procedure based; due to the character of the enterprise.

2. WORKPLACE LEARNING COMMUNITIES

Learning during work, or workplace learning, has a flavor of both learning by doing as well as a master-apprentice relation. Several theoretical approaches engaged with learning during work and task performance, for instance activity theory (Engeström, 1987), a cultural perspective on learning in organizations (Yanow, 2000), social learning theory (Bandura, 1977; Lave & Wenger, 1991), the community of practice framework (Wenger, 1998), and an actor-network perspective (Nicolini, Gherardi, & Yanow, 2003), emphasize the necessity of creating shared contexts. Interaction and collective reflection are seen as a necessary context for learning and creating knowledge, especially when tacit knowledge is involved (Handley, Clark, Fincham, & Sturdy, 2006; Ikujiro Nonaka & Takeuchi, 1995; von Krogh, Ichijo, & Nonaka, 2000).

The aspect of interaction is key, and learning takes place in the negotiation of meaning which happens between people (Lampel & Bhalla, 2004). Opportunities for learning and knowledge creation in the work context arise constantly and the question is further whether this interaction includes an explicit collective reflection in a social context?

According to Nonaka, the continuous dialogue is a necessary condition for knowledge creation (Nonaka 1994), and for practitioners, "knowledge is inherently and necessarily connected with the situation the practitioner is in and often comes from explicit reflection on surprises that give hints about the practitioner's tacit assumptions" (Bartunek, Trullen, Bonet, & Sauquet, 2003:63). A chance to observe peers and colleagues in the midst of action is an opportunity for learning and knowledge creation in itself, and well known both from the master-apprentice model and pedagogical theory. Nonaka (1994) will claim that externalization, where tacit knowledge is made explicit, is when new knowledge is created and this is what Bartunek et al. above label explicit reflection.

Schön indirectly discusses where learning takes place in his account on *reflective practice* and *reflection in action* (Schön, 1983; Yanow, 2007). Schön distinguishes between reflection-in-action and reflection-on-action. The difference between reflection **in** and reflection **on** makes a difference, and Schön is very explicit in stating that this is due to the fact that "our knowing is ordinarily tacit" (1983:49). *Reflection-in-action* is when the practitioner reflects on what she is doing while she is doing it. Schön (1983) does compare reflection-in-action to Hannah Arendt's concept of "stop-and-think" which hints even more to reflection taking place in the midst of task performance. *Reflection-on-practice* (on as opposed to in) happens <u>after</u> action has taken place, and can be *out of* the actual hands-on work situation.

These differences between reflection-on-action and reflection-in-action may seem minor and unimportant. However, if we speak of 1) collective reflection in addition to individual reflection and 2) know-how and skills and tacit knowledge that need visualization in order to be reflected on, then reflection-in-action and reflection-on-action appear to be two different processes. These reflective conversations (Schön, 1983) that the practitioner conducts with herself during task performance (action), is likely to be an internal conversation, and seems to have little to do with collective reflection. As Yanow and Tsoukas state: "despite his emphasis on practice, Schön was a cognitivist after all" (2007:6). However, Schön's example on jazz musicians and how they "make on-the-spot" adjustments to the sounds they hear" (1983:55) points to a "collective conversation", which is similar to the interactions that this study focuses on. It deviates, however, from the collective reflection in that for the improvising musicians there is no demand to express and codify their knowledge (other than codified as music), rather they listen and watch and act on what they see and hear. Both these types of interactions are relevant for a hospital setting, and the opportunities for them to emerge are under study here.

Schön also has some examples from training situations, where we can guess that there is collective reflection in action going on, but he does not state it explicitly. He is more explicit about the reflective conversation that the practitioner will have with his client. Still, even though the collective does not seem to have been Schön's 'business', his framework of reflection-in-action and reflection-on-action contributes to the rationale for focusing on reflection in the work place.

An opportunity for learning and knowledge creation can be planned or can emerge by chance. Physical proximity increases the emergent type of opportunity for interaction and hence for learning and knowledge creation. Physical proximity facilitates face-to-face interaction, and one of the advantages is that it is easier to avoid misunderstandings

(Kraut, Fussell, Brennan, & Siegel, 2002), and in its turn mistakes (Hedberg, 1993). In an environment where practical hands-on work is a large part of the activity, it is not necessarily the conversation that leads to learning – rather observational learning (Bandura, 1977) or socializing and externalization (I. Nonaka, 1994) or passive monitoring (Kraut, et al., 2002), which means that information and knowledge can be picked up even without any specific communicative intent (Kraut, et al., 2002:154).

2.1 Classifications of interaction in practice

Interactions can be classified in different ways, formal vs. informal interaction, face-to-face vs. virtual, emergent vs. planned, horizontal vs. vertical.

Formal vs. informal is a common way to categorize interactions both in and out of an organizational setting. This categorization is however problematic since it is complicated to give a good definition of what is formal and what is informal, and this is further complicated by informal activity going on in formal interactions and vice versa. Some interactions have both a formal and an informal side to them. Marsick and Volpe define informal learning as "Informal learning occurs as the result of individuals making sense of experiences they encounter during their daily work lives" (Marsick and Volpe (1999) in Ouweneel, Taris, van Zolingen, & Schreurs, 2009:29). According to this definition, the focus of this study is on informal learning, and this typology is therefore not sufficiently fine-grained to be used in this study, and the issue needs further exploration.

Face-to-face vs. virtual interaction is of great current interest, due to use of ICT, extensive use of remote work, and due to globalization in general. Face-to-face vs. virtual interaction is a simplification and a continuum rather than a dichotomy. There are many degrees of "operational proximity" (Tagliaventi & Mattarelli, 2006) between the two, but the difference between "seeing each other or not" while working is a main shift that applies to this study. This is relevant in this study due to two factors: 1) In general, learning through watching your peers or other colleagues is key in a situated learning perspective where knowledge is viewed as embedded and partly tacit, and face to face contact is a central issue. 2) In particular, since the organization under study is a hospital which is a "business" with a high degree of semiskilled work and where the units under study are all practical, operative units. Verbal interaction (talk) is however not reserved for situations with elements of tacit knowledge or practical work. Studies on knowledge intensive environments show that verbal and symbolic interaction is continuously necessary, and as a parallel to codified communication in order to paint 'the whole picture'. The claim is that "the learning organization is always already a talking organization" (Styhre, Josephson, & Knauseder, 2006:90).

Emergent vs. planned interaction touches on the field of knowledge management and how it has basis in managing knowledge top-down, as opposed to organizational learning (for discussion see Easterby-Smith, 1997; Vera & Crossan, 2003)) and the question of whether knowledge can be managed (Brown & Duguid, 2000). Facilitating, constructing and managing interaction and cooperation, as opposed to seeing interaction as an emergent organizational feature, is a central question of how to manage knowledge during work. It is a question of whether intervention will hurt and obstruct the knowledge processes, rather than facilitate them (Thompson, 2005). This is relevant

to how for example the phenomenon of CoP has been developed by Wenger from a description of CoPs as an emergent phenomenon towards a well developed knowledge management tool (Wenger, McDermott, & Snyder, 2002). Although CoPs are seen as emergent, an increasing number of contributions suggest that they can, to a certain extent, be facilitated or even created (Newell, Robertson, Scarbrough, & Swan, 2002; Thompson, 2005; Wenger, et al., 2002).

Interference can have a "chilling effect" on creativity since creativity is driven by tacit knowledge and spontaneity (Brown & Duguid, 2000). The level of managerial interference is not only a question of too much or too little, but also of interference that actually creates barriers to learning and knowledge creation. If a community consist of members that participate by choice because they have something to contribute, it will seem hard to manage (Lampel & Bhalla, 2004) and attempts to manage it will risk killing the knowledge processes and the community itself (Brown & Duguid, 2000; Thompson, 2005).

Interactions can be divided in horizontal and vertical. The communities described in the literature on learning in organizations are generally horizontal interactions or communities, made up of members with similar occupations and/or positions, for example the studies of apprenticeships mentioned by Lave and Wenger (1991). Another illustrating example is Orr's photocopy machine technicians (Orr, 1996), also used as a case by Brown and Duguid (Brown & Duguid, 1991a; 2001).

Communities of practice (Wenger, 1998) and occupational communities (van Maanen & Barley, 1984) are horizontally shaped interactions. Communities of practice (CoP) are defined in the following way by Wenger: "Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger, 2007). A community of practice is a group of employees all involved in a shared practice (Lave & Wenger, 1991). Even though these communities can be formal or informal (Brown & Duguid, 2001; Wenger & Snyder, 2000), the "natural", "self-selected", and "non-interfered-by-management group" vision of a CoP has become dominant (Thompson, 2005). One of the ways of facilitating creation of CoPs is through providing structures. Thompson (2005) divides structure into seeding structures and controlling structures. Seeding structures aim to use "structure in a non-prescriptive way in the hope of indirectly seeding future collaboration" (Thompson, 2005:162). This is opposed to directly controlling present collaboration through controlling structures, which can be done through introducing best practice and consultants. Controlling structures are, according to Thompson, likely to fail because they "impose structural constraints on an emergent social dynamic" (Thompson, 2005:163). "They cannot be created by, for example, simply drawing them into an organization chart; people must also identify with, and thus feel motivated to contribute…" (Thompson, 2005:151).

An occupational community (van Maanen & Barley, 1984), also a horizontal community, is "a group of people who consider themselves to be engaged in the same sort of work; who identify (more or less positively) with their work; who share a set of values, norms, and perspectives that apply to, but extend beyond, work related matters and, whose social relationships meld the realms of work and leisure" (van Maanen & Barley, 1984:295). Furthermore, an occupational community has a degree of autonomy

as a key feature (Marschall, 2004). However, this is not a description of an interaction; it is a description of common features of members of an organization.

In the CoP framework the communities are described as emergent horizontal communities with members from more or less the same occupation and hierarchical level. Whereas vertical interaction which could labeled vertical communities, are often a result of reporting relationships, teams or projects or other types of interaction that emerges as a result of the character of the work or the way work is organized. Members of different occupations interact with others, spanning both departmental and hierarchical boundaries.

Vertical interactions or communities are interactions where the participants are heterogeneous in terms of occupations, positions in the hierarchy, departmental affiliation etc. In a vertical community the knowledge base may differ largely between the participants, they may belong to differing epistemic cultures (Knorr-Cetina, 1999), and the level of redundant knowledge can be low (Cohen & Levinthal, 1990; I. Nonaka, 1994). This forms, on one hand, a more challenging point of departure for learning than in horizontal communities. The challenges are due to power issues, cultural issues etc. On the other hand, the diversity opens for opportunities of knowledge creation in a different way than among peers. Knowledge diversity in a community is considered to be a strength, and diversity facilitates access to a broader technical and social information network, which means that the group has knowledge of a wider variety of potential approaches and solutions which can improve the quality of the task solution (Owens & Neale, 2000).

One such vertical community much used in organizations today is the project group. A project group is usually initiated top-down and is seldom an emerging activity. It does however have some features of a community of practice. The purpose of projects is to solve specific problems and tasks, usually within a limited time period. In the organization under study project work is in frequent use, also for learning purposes. Between the projects and the rest of the organization learning boundaries emerge, and knowledge is sticky within the project frame (Brown & Duguid, 2001). Interestingly enough, co-location has been identified as an important factor on knowledge integration among project members, which is a matter only scarcely commented on in the literature on CoPs.

In the horizontal interaction with peers the degree of redundancy or overlapping knowledge (I. Nonaka, 1994), will be high, peers will see each other in action and will be able to show each other how they work while they simultaneously reflect, individually and collectively (Duguid, 2006), and when interaction happens during task performance, peers see each other in action even without being for example motivated by the need to solve a problem. The CoP framework has its emphasis on the horizontal relations, but problematizes to a very low degree the scarceness of the interaction between peers as seen in this case. Nonaka emphasizes the role of the middle managers to facilitate for *Ba* and does mention the cost of such organizing with what they label as "the right mix of people" (I. Nonaka, Toyama, & Konno, 2000), but the interaction during or close to task performance is often unintentional and Nonaka et al.'s picture of the manager as omnipresent and reading the situation is foreign in the hospital under study, where middle managers are increasingly distant to hands-on work situations

3. METHODS AND CASE

The context for this study is a hospital in Norway. This paper addresses learning during work in the complex practice of a hospital which also labels itself a learning organization. This is examined through a study of how learning takes place and is studied through the practice lens in how it is perceived by the employees, represented by the informants. During the time of this study the hospital opened a new and very modern clinic, the medical-surgical clinic. The majority of the medical somatic activity moved to this new clinic at the time of this study. One large unit remained in the old premises, the maternity/gynaecology department. The building of the new clinic is of special interest since it breaks with the traditional layout of a hospital ward, but is in many aspects mainstream as to how new hospital buildings are built. The architectural design is minimalistic with single-bed-in-patient accommodation, ward kitchen and cafeteria, and big open spaces. On occupation of the new premises, a completely new vocabulary was introduced which relates both to the architecture, for example "the middle core", and the work method, for example patient focused redesign.

A hospital is both a knowledge-intensive *and* a skills-intensive organization. The fact that it is also bureaucratic and hierarchical does not necessarily represent a contradiction to the notion of the knowledge intensive organization, as bureaucracies are perhaps less rigid and more fluid and dynamic than they are commonly perceived to be (Styhre & Börjesson, 2006). The discussion of what a bureaucracy is or is not is outside the focus of this study, but within the bureaucratic frame, the hospital has features of a knowledge intensive company, is skills-intensive and has a diverse workforce. This combination constitutes a challenge to knowledge management.

I have studied four units with pertaining interactions. Choosing four units within an organization makes it possible to develop contrasts within the case, and this is an alternative to comparative case studies (Hartley, 2004). A case study is useful in exploring new and/or emerging processes or behaviours and when the phenomenon under study is informal (Hartley, 2004). Learning and knowledge creation during work are processes and interactions which often happen so close to and so intertwined with the daily tasks and routines, that the employees are seldom aware of them. Further, what causes the absence of these processes is even harder to identify. These phenomena are context specific to a very high degree, and can be identified in stories told from practice, associations made and metaphors suggested (Nonaka 1994). The four units under study can be divided in two categories. The cardiac ward and the maternity- and gynaecology ward belong to the first category, while the kitchen staff and the receptionists belong to the second. The latter two are non-medical support staffs, while the two former are clinical wards. This was driven by an interest to study units in the low end of the hierarchy, since they have received relatively little attention in research in hospitals and research on learning in organizations.

These issues are examined according to a classical qualitative and interpretive research approach where the most important data come from the interviews, supplemented by observation and document studies. Four units in a hospital are studied, two hospital wards and two support staff units. Through using Czarniawska's approach "narrative interviews" (Czarniawska, 1998) and through an open approach as an interviewer and researcher, I encouraged the informants to tell the story of their workday, starting in the morning and guiding me through their day. Instead of giving a detailed account of the subject of the research project and the purpose of the interview, I would ask questions

along the way that related to the phenomena, sometimes interrupting and follow up on the topics that they mentioned; topics that were relevant to the research question. To a certain extent I view the interviews as data jointly constructed by the informant and the researcher, in a social-constructivist vein.

Data were analyzed according to categories deducted from theory and new categories that emerged from the data. Data were reduced aided by a computer software program. In this approach I have been inspired by grounded theory's *Constant Comparative Method* (Glaser & Strauss, 1967). As opposed to coding all the data first and then doing the analysis, the constant comparative method meets the threat of de-contextualizing the data through going in and out of the analysis process. I attempted to "discover regularities through the categorization of elements and the exploration of their connections" (Dainty, Bagilhole, & Neale, 2000; Glaser & Strauss, 1967). In order for the categories to arise from the data, albeit keeping an a priori list in mind, I created codes which in language were more similar to the language used by the informants. I started by linking descriptive and interpretive codes to my data material, identified themes and trends connected to the research question – and to emerging issues, but did not, however, utilize a strict coding paradigm as prescribed by Glaser and Strauss (1967). The aim is not to promote consistency in terms, but rather to uncover diversity in order to better understand the phenomena under study (Miles & Huberman, 1994).

4. FINDINGS AND DISCUSSION

On the wards, most of the reflection on practice takes place away from the "doing"; during lunch and breaks, outside the delivery room, in the hallway, in the lounge etc. It takes place within the confines of the ward or the department, but not where the actual work takes place and where the patients are. Horizontally, the opportunities for interaction seem to emerge in connection with task performance for only one of the occupational groups under study; the maternity care assistants. This is shown in table 1 below:

Table 1: Place for horizontal and vertical interaction

Occupational groups	Horizontal interaction	Vertical interaction
Midwives in the maternity/ gyneacology ward	*In the break room.* *In the passing in the hallway.*	*In the break room with subordinates, peers and middle management.* *During meetings, projects, courses, around new technology.* *During deliveries, during gynecological examination and operations.*
Maternity support assistants in the maternity/ gyneacology ward	*In the break room.* *In the passing in the hallway.* *Continuously while performing tasks, with patient present.*	*In the break room with peers, midwives and middle management.* *During deliveries.*
Nurses and health care assistants on the cardiology ward	*During report.* *In the passing in the hallway.* *Meetings (middle managers).*	*During report and rounds.* *Internal and external courses.* *Lunch and breaks.* *Projects, courses and meetings.*
Receptionists, middle core	*"War-veteran" group with peers.* *Staff meetings.*	*In the passing.* *On "rounds" looking for work (interaction with nurses).* *Interaction with patients, relatives.* *Courses, breaks and technology (fax machine).*
Kitchen *aids*	*Morning coffee, "break-on-the-phone", meetings.*	*Interaction with patients and relatives.* *Projects and technology.*

All groups under study have low opportunity for interaction during task performance, with the exception of these maternity support assistants. They seem to contact each other and have very many similarities with the description of a community of practice described by Wenger (Wenger, 1998). They discuss treatment methods with each other, in the presence of and with the patients. They seem to collectively reflect on practice with their peers during supervision of breastfeeding. However, in the delivery room with the midwife and the patient, which is a vertical community, this seldom happens. Here the maternity care assistants are potential knowledge activists (von Krogh, et al., 2000), but are not permitted to speak during deliveries, unless asked.

4.1   Horizontal communities

Horizontal interaction is left to live its own life in the units under study in the sense that this does not appear to be emphasized in how work is organized. Horizontal interaction during task performance appears to be sacrificed for the sake of efficient task performance, for example the relation between the nurse and the patient is "privatized" in the cardiac ward since how the work day is organized becomes a matter between the nurse and the patient and the nurses' paths do not cross. The lack of horizontal interactions is not only due to efficiency demands; also autonomy and physical distance. The midwives' omit participating in "each other's" deliveries due to professional autonomy, and the single-bed-in-patient accommodation influences how work is

organized, and thereby separates peers during the work-day. One of the nurses in the cardiac ward describes it like this:

> "Yes, we were very much aware of it in the beginning when we re-organized because we had informal meeting places earlier. While now we have our own patients all day, then we were preoccupied with – that's what we said – I was part of the re-organizing and had responsibilities there. Then I said that we have to talk to each other and about the patient; we should not have the sole responsibility. However, we have not been able to have those regular meeting places, but, at the same time, we talk more or less constantly." (nurse G, cardiac ward)

On the wards, most of the reflection on practice takes place away from the "doing"; during lunch and breaks, outside the delivery room, in the hallway, in the lounge etc. It takes place within the confines of the ward or the department, but not where the actual work takes place and where the patients are. Horizontally, the opportunities for interaction seem to emerge in connection with task performance for only one of the occupational groups under study; the maternity care assistants. All groups under study have low opportunity for collective reflection during task performance, with the exception of the maternity support assistants. They seem to contact each other and have very many similarities with the description of a community of practice described by Wenger (Wenger, 1998). They discuss treatment methods with each other, in the presence of and with the patients. They seem to collectively reflect on practice with their peers during supervision of breastfeeding. However, in the delivery room with the midwife and the patient, which is a vertical community, this seldom happens. Here the maternity care assistants are potential knowledge activists (von Krogh, et al., 2000), but are not permitted to speak during deliveries, unless asked.

One example of a formally initiated community is the meetings that the middle managers have. These meetings resemble a community of practice, since CoPs are essentially informal and "produced by its members through mutual engagement" (Wenger 1998:118). That is; these meetings are conducted in an informal manner and without an agenda, but are formal in that they are institutionalized as an activity with a set time and day, and removed from task performance to a predestined site. These meetings were institutionalized by the members themselves as a bottom-up initiative, and only middle managers on the wards automatically become members. This is an institutionalized meeting space, and as an organizational learning mechanism it is integrated since these managers reflect collectively on the tasks that they actually perform themselves (Lipshitz, Popper, & Friedman, 2002). This example shows that the middle managers have initiated a closer interaction horizontally. Vertically, as mentioned above, the picture is different since the middle managers have become increasingly distant to the hands-on activity. The middle manager is seldom present in the practice-space, and has almost solely administrative tasks. Their tasks are solved at the desk and not with the patient, which is an example of fragmentation of practice. One of the middle managers describe it a follows:

> "And we see that the communication we had earlier as a group, as we were many in a ward corridor; that is gone. Now we are maybe three or, at the most, four on a ward (yard), and many are staying with the patient. Thus, the natural communication we had earlier is gone. And to get that group together is more difficult now than it was in the old building. So, because - and we have talked a lot about that, and I am saying that when I have a free moment - I like to go and find out how things are going and if there is anything special, - nobody is there. Because then they are with the patients and I will stand there and wait to see if anyone is coming, but nobody does. Therefore, you may say that the arenas that I feel I should have had are now missing." (department manager F, department U)

A fragmented practice is a way to describe how each employee has her day outlined due to the needs of the patient (or customer), and other persons and institutions external to the ward, while there are few occasions that call for horizontal interaction. One example here is how the nurses in the cardiac ward "never" have lunch together anymore, since their day is organized around the patients, their appointments for treatment etc.

Findings from this study indicate that collective reflection takes place *on* action, but seldom *in* action, where they can show their peers: Look! (Duguid, 2006). I will argue that this seemingly minor difference between reflections *in* and *out of* practice is of importance, since the practical and the tacit dimensions of knowledge are visualized and developed in the practical performance of the tasks, where a person actually sees how and what another person does (Brown & Duguid, 1991b; I. Nonaka, 1994). Practice that is reflected on *out of practice*, cannot substitute the simultaneous situation of learning and doing. In this organization where there is a lot of practical and manual work and where employees are part of a field that traditionally has had a high awareness of tacit knowledge (Heggen, 1997), *learning from each other while doing* seems to lose territory.

4.2 Vertical communities

As for horizontal interaction; vertical interaction takes place in the passing, but additionally the occupational groups interact vertically during task performance in repetitive patterns, such as during deliveries (for instance midwife and maternity care assistant). Compared to horizontal interaction, vertical interaction appears to be more formalized and the vertical interaction or *vertical communities* are part of the division of labour where employees are involved with each other and interact out of necessity of performing a task. The "vertical communities", a concept introduced here to label the interaction that takes place across occupational groups, across departmental boundaries, up and down the hierarchy and sometimes with patients and families, seem to a larger degree to be inherent in the work practices and part of the task performance and therefore more frequent by necessity, so to speak.

The project work is a vertical community, which is frequently used in this organization, and these top down initiated communities seem to facilitate and enhance reflection on practice. However, this interaction is also frequently obstructed for a number of reasons and therefore does not turn into an opportunity for learning and knowledge creation.

5. CONTRIBUTIONS AND CONCLUSION

Dividing the interactions in horizontal and vertical communities will contribute to increase the understanding of the connections between learning and work. This insight forms a contribution to the literature since learning and knowledge creation that can take place horizontally between peers, differs from vertical interactions, for example superior or subordinate or across departments or disciplines. It is likely that peers will have a higher degree of redundant knowledge and this gives a different basis for learning and knowledge creation than vertical interaction.

Horizontally, opportunities for learning and knowledge creation in connection with work were found to be scarce. In light of the difference in horizontal and vertical places for interaction and hence for learning and knowledge creation, the data on horizontal interaction are fit to question the assumptions in the community of practice framework, both the assumption that CoPs emerge in practice, and as an implication for management when CoPs are used as a KM tool. The vertical interactions, or communities as labeled here, emerge partly as a result of task performance and also more frequently during task performance. Findings from this study do not mirror the emphasis on horizontal communities within organizational learning literature. Vertical communities, on the other hand, seem to play an important role as opportunities for learning at work. However, vertical communities cannot substitute the horizontal communities since the content of these different categories interaction will contain learning and knowledge creation on qualitatively different levels. While the horizontal communities are obstructed by division of labor and physical layout, vertical communities seem to be obstructed by power issues and professional antagonism. In general, however, interaction and opportunity for learning and knowledge creation emerge predominantly separate from task performance.

Horizontal communities, although focused as such in existing literature are found to be scarce in this study due to division of labor and physical layout. Lack of opportunities for horizontal interaction during task performance is a further consequence. While opportunities through horizontal interactions are scarce, vertical interaction appear more as a result of organization of work. The horizontal communities seldom reach the in situ domain, and contrary to what is proclaimed in the normative literature, the horizontal interaction seems to be further afar from the task performance itself than the vertical interaction appears to be. This pinpoints the difference between interacting in general and in operational proximity (Tagliaventi & Mattarelli, 2006), and having the opportunity to collectively reflect-in-action and not just on-action (Schön, 1983).

6. ISSUES FOR FURTHER RESEARCH

My conclusion is that interaction as opportunity for learning and knowledge creation is particularly horizontally scarce among peers, and this research calls for a differentiated view of the influence of autonomy as condition for division of labor, and more focus on the influence of the physical layout on learning and knowledge creation in organizations.

REFERENCES

Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs, New Jersey: Prentice-Hall.

Bartunek, J., Trullen, J., Bonet, E., & Sauquet, A. (2003). Sharing and expanding academic and practitioner knowledge in health care. *Journal of Health Services Research and Policy, 8*(Supplement 2), 62-68.

Boland, J., Richard J., & Tenkasi, R. V. (1995). Perspective Making and Perspective Taking in Communities of Knowing. *Organization Science, 6*(4), 350-372.

Brown, J. S., & Duguid, P. (1991a). Organizational learning and communities-of-practice: toward a unified view of working, learning, and innovation. *Organization Science, 2*(1), 40-57.

Brown, J. S., & Duguid, P. (1991b). Organizational learning and communities-of-practice: toward a unified view of working, learning, and innovation. . *Organization Science, 2*(1), 40-57.

Brown, J. S., & Duguid, P. (2000). Balancing Act: How to Capture Knowledge Without Killing It. *Harvard Business Review*(May-June), 73-80.

Brown, J. S., & Duguid, P. (2001). Knowledge and Organization: A social-Practice Perspective. *Organization Science, 12*(2).

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly, 35*, 128-152.

Czarniawska, B. (1998). *A narrative approach to organization studies* (Vol. 43). Thousand Oaks: Sage.

Dainty, A. R. J., Bagilhole, B. M., & Neale, R. H. (2000). Computer aided analysis of qualitative data in construction management research. [empirical]. *Building Research & Information, 28*(4), 226-233.

Duguid, P. (2006). What Talking About Machines Tells Us. *Organization Studies (01708406), 27*(12), 1794-1804.

Easterby-Smith, M. (1997). Disciplines of Organizational Learning: Contributions and Critiques. *Human Relations, 50*(9), 1085-1113.

Engeström, Y. (1987). *Learning by expanding: an activity-theoretical approach to developmental research*. Helsinki: Orienta-Konsultit.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research* (1 ed. Vol. 1). New York: Aldine de Gruyter.

Handley, K., Clark, T., Fincham, R., & Sturdy, A. (2006). *A space for reflection and learning? An investigation of physical, relational and existensial space in client-consultancy projects.* Paper presented at the OLKC 2006, University of Warwick.

Hartley, J. (2004). Case Study Research. In C. Cassel & G. Symon (Eds.), *Qualitative methods in organizational research. A practical guide*. London: Sage.

Hedberg, B. (1993). How Organizations Learn and Unlearn. In W. H. Starbuck & P. C. Nystrøm (Eds.), *Handbook of Organizational Design* (Vol. 1, pp. 1-27). New York: Oxford University Press.

Heggen, K. (1997). Taus kunnskap. Klargjøring, kritikk og didaktikk. *Nordisk pedagogik, 17*(1), 2-7.

Knorr-Cetina, K. (1999). *Epistemic cultures: how the sciences make knowledge*. Cambridge, Mass.: Harvard University Press.

Kraut, R. E., Fussell, S. R., Brennan, S. E., & Siegel, J. (2002). Understanding Effects of Proximity on Collaboration: Implications for Technologies to Support Remote Collaborative Work. In P. Hinds & S. Kiesler (Eds.), *Distributed Work*. Cambridge, Massachusetts: The MIT Press.

Lampel, J., & Bhalla, A. (2004). *Let's Get Natural: Communities of Practice and the Discourse of Spontaneous Sharing in Knowledge Management.* Paper presented at the The Fifth European Conference on Organizational Knowledge, Learning and Capabilities, Innsbruck, Austria.

Lave, J., & Wenger, E. (1991). *Situated learning. Legitimate peripheral participation*. Cambridge: Cambridge University Press.

Lipshitz, R., Popper, M., & Friedman, V. J. (2002). A Multifacet Model of Organizational Learning. *Journal of Applied Behavioral Science, 38*(1), 78.

Marschall, D. (2004, 16th August 2004). *Fifty Years of Occupational Community Studies:A Natural History of a Sociological Concept.* Paper presented at the Symbolic Interaction" Regular Session, 99th Annual Meeting, American Sociological Association, .

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis. An Expanded Sourcebook* (2 ed. Vol. 1). Thousand Oaks: Sage.

Newell, S., Robertson, M., Scarbrough, H., & Swan, J. (2002). *Managing knowledge work* (1st ed. Vol. 1). New York: Palgrave.

Nicolini, D., Gherardi, S., & Yanow, D. (Eds.). (2003). *Knowing in Organizations. A Practice-Based Approach*. New York: M.E. Sharpe.

Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science, 5*(1), 14-37.

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company. How Japanese Companies Create the Dynamics of Innovation* (1 ed. Vol. 1). New York: Oxford University Press.

Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, Ba, and Leadership: A Unified Model of Dynamic Knowledge Creation. *Long Range Planning, 33*(1), 5-34.

Orr, J. E. (1996). *Talking about machines. An Ethnography of a Modern Job*. Ithaca: ILR Press an imprint of Cornell University Press.

Ouweneel, A. P. E., Taris, T. W., van Zolingen, S. J., & Schreurs, P. J. G. (2009). How Task Characteristics and Social Support Relate to Managerial Learning: Empirical Evidence From Dutch Home Care. [Article]. *Journal of Psychology, 143*(1), 28-44.

Owens, D. A., & Neale, M. A. (2000). The dubious benefit of group heterogeneity in highly uncertain situations: Too much of a good thing. Unpublished Draft. Vanderbilt University, Tennessee.

Schön, D. A. (1983). *The Reflective Practitioner*: Basic Books.

Styhre, A., & Börjesson, S. (2006). *Innovativeness and creativity in bureaucratic organizations; Evidence from the pharmaceutical and the automotive industry*. Paper presented at the OLKC 2006 Conference.

Styhre, A., Josephson, P.-E., & Knauseder, I. (2006). Organization Learning in Non-writing Communities. [Empirical]. *Management Learning, 37*(1), 83-100.

Tagliaventi, M. R., & Mattarelli, E. (2006). The role of networks of practice, value sharing, and operational proximity in knowledge flows between professional groups. *Human Relations, 59*(3), 291-319.

Thompson, M. (2005). Structural and Epistemic Parameters in Communities of Practice. [empirical]. *Organization Science, 16*(2), 151-164.

van Maanen, J., & Barley, S. (1984). Occupational Communities: Culture and Control in Organizations. *Research in Organizational Behaviour, 6*, 287-365.

Vera, D., & Crossan, M. (2003). Organizational Learning and Knowledge Management: Toward an Integrative Framework. Malden, Oxford, Carlton: Blackwell Publishing Ltd.

von Krogh, G., Ichijo, K., & Nonaka, I. (2000). *Enabling Knowledge Creation. How to Unlock the Mystery of Tacit Knowledge and Release the Power of Innovation*. Oxford: Oxford University Press.

Wenger, E. (1998). *Communities of Practice. Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.

Wenger, E. (2007). Communities of practice - a brief introduction. http://www.ewenger.com/theory/communities_of_practice_intro.htm Date accessed June 23rd 2007.

Wenger, E., McDermott, R., & Snyder, W. M. (2002). *Cultivating Communities of Practice. A guide to managing knowledge*. Boston: Harvard Business School Press.

Wenger, E., & Snyder, W. (2000). Communities of practice: the organizational frontier. *Harvard Business Review*(January-February), 139-145.

Yanow, D. (2000). Seeing Organizational Learning: A 'Cultural' View. *Organization, 7*(2), 247-268.

Yanow, D. (2007). *Passionate Humility: Linking Reflection with Double-Loop Learning*. Paper presented at the 3rd Organization Studies Summer Workshop: "Orgnaizations studies as applied science: The generation and use of academic knowledge about organizations".

Yanow, D., & Tsoukas, H. (2007). What is reflection-in-action? Revisioning Schön, phenomologically. Unpublished Unpublished article. Vrije Universiteit, Amsterdam.