REPRESENTATIONS OF PRACTICE: LEARNING WHEN VISUALIZING, DOCUMENTING AND TESTING

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Abstract:

This paper addresses learning processes as representing practices in intraorganizational networks. Five networks of practice (competence networks) designed to facilitate learning in a large distributed organization are studied. The networks meet mainly through on-line tools and partly face to face. Three ideal types of representing practices have been identified, i.e. 'Visualizing`, `Documenting` and `Testing`. Networks located in natural science use pictures as boundary objects when visualizing; networks located in social science is occupied with testing through the use of field notes and emotions as their boundary object; a third type use documents. All three are combined with storytelling, sensing, reflections and sensemaking, as well as use ICT tools, in different ways. We argue that representation practices serve as boundary objects (boundary spanning process-tools) facilitating learning.

Key words: Learning in organizations, Network of practice, Managed networks, Learning as practice. Boundary objects.

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1. INTRODUCTION

Individual and collective learning that cover both the explorative and exploitative sides, and that integrate action and reflection, is a challenge for both researchers and practitioners. Practice based approaches have addressed important issues such as the contextual, social and personal sides of practice, knowledge, learning and innovation (Brown and Duguid, 1991; Gherardi and Nicolini, 2001; Schatzki, 2001; Gherardi, 2006 and 2009). How learning can take place, be facilitated or hampered within self-organized communities of practice (CoPs) or fields of practice have been researched and theorized. The last decade also learning across units within or across organizations has got increasing attention. As part of that, different 'bridges' have been suggested in order to facilitate learning; such as brokers, boundary objects and diverse interactions (Wenger, 2003); and relational qualities such as appreciation, trust, support, care, identifying, involvement and dialogue (Eide, 2007; Hislop, 2009).

Practice based approaches have contributed with increased understanding of learning not least in different self-organized communities within organizations, and has focused on craft/task based activities, professional activities, expert/creative activities, or virtual activities (Amin & Roberts, 2006), and shared physical context. However, the understanding of learning in managed networks of communities within and across organizations is still in an early phase (Newell et al., 2009). This paper contributes with increased understanding of learning in a distributed organization and in a managed network context. Distributed organizations are ones whose internal activities are geographically dispersed (see Duarte & Snyder, 2006). The study also contributes to the understanding of how boundary objects and online contexts can be used in distributed organizations where employees lack a shared physical daily/weekly presence. The main research question explored and described is: *How can representations of practice serve as boundary objects facilitating learning in managed networks of practice (NoPs)?*

The paper is structured as such: Core theoretical concepts and assumptions are briefly elaborated as a frame, before describing the methodology and context. The main findings of three ideal types of representing practices are then introduced, described and briefly compared. In the last chapter the main categories are summarized and discussed, before suggesting implications for future research and practice.

2.0 LEARNING AS PRACTICES

2.1 Practice based learning

Learning and knowing can be studied through exploring "what people do, and how they do it" (Orlikowski, 2002, p. 271). Further one can argue as Brown & Duguid (1991, p. 11) that "Learning is, therefore, a process of giving meaning to, or seeking to understand, life experiences". We assume that practice and learning are holistic, i.e. include broad versatile dimensions and different levels (explicit and more implicit, tacit and disguised levels). Also different notions of time tend to be involved, such as reflections, sense making and narrating *in-action* as well as *on-action*. According to Gherardi (2006, p. 41) practice is collective when it is shared and when "actions are regarded answerable to norms of correct or incorrect practice, to criteria of aesthetics

taste and to standards of fairness". Further one can argue that learning as social practice and accomplishment depend upon different relational structures and relational qualities (Wenger, 1998; Eide, 2007; Hislop, 2009).

Communities of practices (CoPs) are often seen as informal, organic, self-organized units of activity: "produced by its members through their mutual engagement…that tend to escape formal descriptions and control" (Wenger, 1998, p. 118), and "who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger et al., 2002, p. 4). The elaboration of CoPs seems to assume that the members regularly work together, or as described in Orr (1996), regularly meet during lunchtime and meetings where they share work experiences. Some however does not have the opportunity of directly working together nor meeting regularly (daily, weekly) in other ways, since they are spread around large geographically areas. One alternative then can be to increase the interactions through the use of other media than face to face such as phone, email, videoconferences and interactive ICT, as well as to try to create a community where such common focus and experiences can be shared. This might be done through networks of practices (NoPs) or managed networks of practices (MNoPs) within or across organizations.

Networks of practice, in opposite to a channel type of network, is a community with less open structure; participation is more intensive; and it tent to involve and dependent upon shared identity and professionalism/specialization which contribute to shared knowing and goals; and often shared social practices (Newell et al., 2009). If NoPs are created formally, they can be started by the management, and given tasks by the management, but they do not have to be managed by the formal managers. Nevertheless one can argue management has contributed in creating a 'bridge' between distributed employees, being a broker contributing to a 'work space' where employees can meet and learn in a legitimate way. One reason for organizing for such networks can be the aim of obtaining similar self organized learning activities that can take place in CoPs, and to facilitate innovation (Swan et al. 2002). However if this is possible is a much debated topic (e.g. Thompson, 2005; Hislop, 2009). A core point seems to be how one sees the role of managers, i.e. if one assumes that managers can control such communities or rather be brokers and cultivators trying to facilitate for learning and innovation, without being too directly involved.

Networks of different types are operating both within and across organizations. The interactions between the 'contexts' and activities seems critical, if to become integrated as a more holistic learning practice (Fuglesang & Eide, forthcoming). Wenger (1998, 2003) points at the importance of both some shared aspects and some difference in order to learn, and that practicing is not taking place within sharply separate communities (i.e. the importance of integration). Boundary crossing tends to create tensions which can either open up for learning or close. Wenger (2003) suggest three main bridges that can facilitate learning within and not least across units: people (who act as *brokers*, e.g. which transfer and translate ideas, objects and views), *boundary objects*, and *varied interactions* between people. Below we focus mainly on boundary objects and knowledge.

2.2 Knowledge and Boundary objects – towards process

Knowledge has often been seen as an object that can be made explicit and transferred, however this view has been supplemented with or changed with a more process view addressing the stickiness often hampering transferring and a turn to other concepts when trying to understand how actors know and learn (Orlikowski, 2002). We share the process view on knowledge/knowing where capability is a main side, but where there still can be involved also materialized and more stable elements (Knorr & Cetina, 1997, 2001; Tsoukas & Chia, 2002; Orlikowski, 2005; Gherardi, 2009; Corradi et al., 2010). If knowledge no longer is seen mainly as objects, but processes, how then to understand boundary objects? One can argue that similar to changing the view of knowledge from mainly being an object toward mainly being processes, we can change from 'boundary objects' to 'boundary spanning process-tools'. The interesting focus then is how boundary spanning processes can be facilitated through different kinds of 'vehicles' being tangible or intangible.

Traditionally, boundary objects have mainly been seen as external things, such as forms, drawings, models and diagrams. They are seen as useful for knowledge sharing, since information can be transferred from one context to another context with important contextual features relevant to the receiver intact (Star & Griesmeier,1989). When boundary objects are enacted, they create "windows" and give access to different types of knowledge. Star and Griesmeier (1989) describe how a questionnaire form to fill inn information was able to transport context knowledge needed to create an exhibition, from the archeologist at the site, to a museum. Boundary objects are however not merely material; boundary objects can be 'stuff and things, tools, artefacts and techniques, and ideas, stories and memories' (Bowker & Star, 2000, p, 298). Below we briefly review the nature and role further.

2.2.1 Nature of boundary objects/ boundary spanning process 'tools'

The notion of boundary objects was first developed within actor-network theory, but has been taken up by Wenger among others. He (Wenger, 1998, p. 105) defines boundary objects as "artifacts, documents, terms, concepts, and other forms of reification around which communities of practice can organize their interconnections". For example, a memo telling a story, call upon the fore-understanding and meaning processes of the person reading the memo, but according to Wenger, the relations are not only between the person and the memo, it is also between the CoP where the person is situated and the CoP which the memo comes from. That there are two contexts involved can contribute to communication problems that calls for negotiations of meaning. One reason for this potential problem can be the difference between what Wenger calls the practices of design versus practices of use. In our empirical context this might be seen as the difference between experiencing phenomena during practices of working versus trying to express or to understand the phenomena through practices of representation. In a later texts he (Wenger, 2003) group boundary objects into three main forms, i.e. artifacts, discourses and processes. This latter seems to include a turn from a focus mainly on physical objects, to language and processes.

According to Nosek (2004), boundary objects can be anything perceptible by the senses, e.g. cognitive maps, non-verbal expressions such as body language, tone, heartbeat, gestures, and brain patterns. Heartbeats and brain patterns can hardly be communicated

to others directly; they are probably to be displayed on drawings (on paper or screen), and then interpreted. Others have addressed power point slides, technology and physical artifacts as examples of boundary objects (Newell et al. 2009). We would add different physical tools, prototypes, examples /stories about or shared experiences such as activities, thoughts and emotions, probably also different ways to call upon memories, attentions, and focus, which start shared processing. Even though boundary objects mainly are described as physical and cognitive artifacts, we assume a broader and versatile understanding and are open to the idea that emotions can serve as boundary spanning objects/process-tools. For example, emotions can be part of stories and what is communicated, known and learned, as well as what resonates with the other that experiences the expressed. Pure stripped cognitive 'facts' can describe some aspects of life and practices, but far from all. Further, we propose that that actors (individuals and collectives) differ in preferences and practices when it comes to how and what they communicate, learn and know, which can be reflected in the boundary objects/process-tools applied and how they are used.

2.2.2 The roles of boundary objects /spanning process-tools

The literature review shows that boundary objects can contribute to point of reference, visualize knowledge, knowledge transferee, interaction, coordination and alignment, as well as exchange of experiences, thoughts and emotions in dialogues and perspectives taking (Star & Griesmeier, 1989; Boland & Tenkasi, 1995; Fisher & Reaves, 1995; Chrisman, 1999; Koskinen & Mäkinen, 2007; Barrett & Oborn, 2010). Boundary objects can enhance the capacity of an idea, theory or practice to translate across culturally defined boundaries, for example, between communities of knowledge or practice (Fox, 2011). It has been argued that boundary objects are objects that "have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds." (Star & Griesemer, 1989). This latter quote addresses the interpretative and translation processes of people 'using' them. Put differently, it addresses flexibility and process, rather than something static and fixed (Newell, et al., 2009). The meanings enacted toward the boundary object can thereby differ from one person to another. If the use of the boundary object contribute to similar learning is then not strait forward. In short, it can be a bridge or to say interface between contexts. Further, we propose that one main (although not only) role of boundary objects or to say 'boundary spanning process-tools' is to help people to disclose and communicate about experiences and practices so that they can reflect on-action and prepare for later 'in-action'.

3.0 METHOD AND CONTEXT

The aim of the study is to develop new insights about learning as practice, and in particular the natures and roles of boundary objects/spanning process-tools, in networks designed to facilitate learning in organizations. Grounded Theory (GT) (Glaser & Strauss, 1967) provided our methodological approach here, primarily due to its ability to facilitate and offer explanations and descriptions of complex organizational practice (Orlikowski, 1993). Our aim is not statistic generalizations, the closest to what you can

get to "generalizations" are core concepts which can have general implications elsewhere (Glaser, 1992).

3.1 The Case and sub-cases

The empirical study takes place in two regions of the Norwegian Labor Inspection Authority (NLIA). The organization is chosen since it seeks to facilitate individual and collective learning, and shared practices across geography, through formally created networks of practice ('competence'). The regions are selected due to the long geographic distance between the employees in these regions and consequently lack of face-to-face (f2f) interactions. The employees' work either from small regional offices or home office, and they are often on the move undertaking inspections all over their district. The NLIA is a distributed public organization with small district offices scattered all over the country. The inspectors in this organization have mixed backgrounds. Historically speaking, people with some years of experience were recruited from industries in the building and construction sectors, very often they had been union representatives. Others moved up from working as clerks to being an inspector, often after gaining qualifications from working closely with an old-timer (experienced college). More recently, people have entered the organization with a professional college/university degree (bachelors or masters).

The networks were selected based on the following criteria's; they all offered a distributed context (networks from the two largest regions) and they represented different knowledge areas adding variation to the study. The study involves data from five competence networks: two networks set up for preventing accidents, one for occupational hygiene and two within the area of psychological well-being. All of the networks are staffed with around eight to fourteen people.

The tool used in the network settings is, the GoToMeeting tool, a highly rated (Lipschutz, 2007) web-based tool that allows everyone in a group meeting to share whatever is on each participant's computer. The tool contains features like screen sharing, sharing of keyboard and mouse control, chat, phone and the tool is also integrated with email and the Outlook calendar for the efficient booking of meetings (see *http://www.gotomeeting.com*). While you can share everything you have on your computer and have a telephone meeting, the contenders do not see each other. The GoToMeeting tool was introduced in the organization at the same time as the competence networks were established, and have become an important tool in the inspectors' daily tasks in project work and are the main channel for the networks, which meet once a month online, but only once or twice a year face-to-face.

3.2 Data gathering and analyzes

The field work is done by the first author. It started with a few interviews which where helpful in developing an overview and for building relationships with coordinators and members in the competence networks. The relationships gave access to participate in their meetings, first the face to face meetings and then online meetings. A moderate participative role was taken during observations (Spradley, 1980), i.e. asking question, giving some feedback and interacting socially. The informants were asked about sharing and learning activities and media use in the network context, and out of these activities we were able to describe practice. The study is based on interviews with 14 ordinary network members, 2 managers (who observe the meetings) and 3 network coordinators (ordinary Inspectors) and observation of online meetings over a 1.5 year period.

This study employed the theoretical sampling procedures developed by Strauss and Corbin (1994) for conducting qualitative analysis. Our chosen informants have worked in the organization between 1to 20 years, and in the networks from 1 – 5 years. We sought interview data from multiple members of the networks, figuring they could give us different insights into our topic. In particular we targeted informants working within different tasks and knowledge needs. In this way we hoped to understand the evolving learning practices in different competence network contexts.

The interviews lasted from 45 minutes up to two hours. Interviews were semi-structured, tape- recorded and transcribed. Due to the long travel distances, 9 of the 18 interviews were conducted by telephone. Although phone interviews are thought a second-best option for obtaining data where social cues are important (Opdenakker, 2006), our phone interviews proved as elaborative as the ones we conducted f2f. One reason for this may have been the informants' familiarity with presenting and elaborating complex matters via the phone.

The comparison between data (and not data and theory) is put in the foreground in Grounded theory, but we did not enter the field tabula rasa. Theory has helped us to interpret findings in the analysis as recommended by Turner (Turner 1981; Cutcliff, 2000) for Grounded theory. As our data analysis progressed, and categories emerged, it was necessary to turn to new bodies of literature to develop our perspective for analyses. The interviews' and observational data have been analysed several times. In this process we have used the Nvivo 8.0 tool to organize our material, label incidents and develop categories. The interviews have also at several occasions been read as an entity, adding new interpretations of the findings. While all incidents in our data previously have been systematic analyzed as recommended by Strauss (1987) and findings published in other articles, the categories in this papers has developed more inductively. Moving faster towards developing theoretical ideas, concepts, as recommended by Glaser (1992), but with close reference to the data. Activities described in the interview data and observational data have been compared and the activities within each practice have been "moved around" between the emerging categories – our typologies (ideal types); they have also been discussed and member checked at several occasions during the study.

4.0 PRACTICES OF REPRESENTING PRACTICE - IN ORDER TO LEARN

Three ideal types of representations as part of the learning practices in networks have been developed, i.e. 'visualizing', 'documenting' and 'testing'. The three practices are illustrated in the figure below:

Justification

Documents

Documenting

Activity outside network

Senses, storytelling, conversations, reflection-on action, sense-making

Activity outside network

Visualizing

Pictures

Testing

Problems and solutions

Field notes & Emotions

Activity outside network
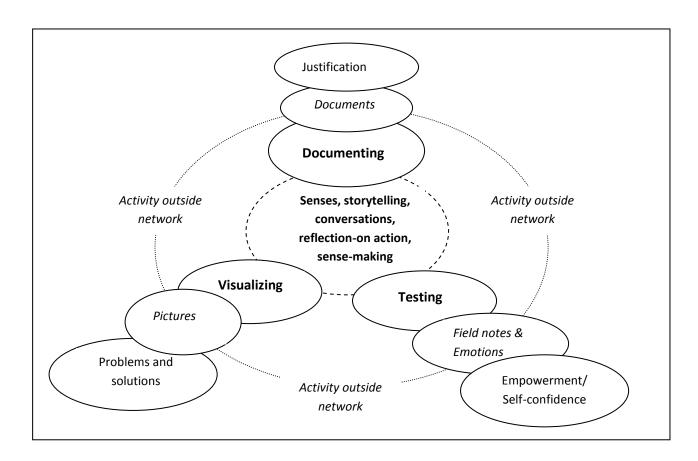
Empowerment/ Self-confidence

Figure 1: Three ideal types of learning practices within the networks of practice

The three representing practices are learning modes that are used and function differently across networks. The networks mostly working with phenomena and knowledge close to natural science typically practice the ideal type 'visualizing' and 'documenting'. The networks working with psychosocial work environment phenomena and largely based on knowledge related to social science typically practice the ideal type of 'testing' and 'documenting'. Main reasons for 'visualizing' versus 'testing' seems related to the work ontology and knowledge paradigm, while 'documenting' seems to be a strongly expected way of practicing rooted in the logic of bureaucracy, seeking more objective, documented and transparent work practice which the learning practice is strongly embedded within. While one can argue all three ideal types are embedded in and intertwined with the more overall practices of working that the employees are involved with in their everyday life outside the network. Without interesting activity outside the networks there would have been little to represent and work with in the networks. Without the networks, what then? One of the reasons for establishing the networks was that the expert center present in the earlier organizational model was closed done, and one tries to involve the whole organization in the learning and knowledge development through these networks. Another co-existing reason was that one wanted to reduce the more individual and coincidental 'try-and fail' learning practice that often took place when employees worked alone distributed around the country. One hoped to facilitate collective and reflective learning and practice through these networks, and was also creating norms against try-and fail learning and mainly experience/action with little shared reflection. The three ideal types of representations are using

partly different types of boundary objects, and have different learning results. But they all seem to involve senses, storytelling, conversations, reflections-on action, and sense-making. The main type of senses and reflection approach are however partly different. Below we describe each of the ideal types in separate sections.

4.1 Visualizing

This representation practice is used mostly by the networks set up for knowledge areas in the naturalistic knowledge areas, i.e the Accident networks and the network of Occupation Hygiene, where the majority has an engineering background. When 'visualizing´ they inform about, and discuss, what they have seen or would like to see at inspected sites. Pictures are used together with oral stories and conversations from the field, in order to show problems or solutions to problems. One inspector illustrates the use of pictures this way:

> ”...it could be pictures of what is sensible placement of ventilation facilities, what is unreasonable placement of ventilation facilities, and why in a welding workshop. So you can use a half hour to explain it, but it takes 3 minutes if you have a picture” (Member of the network for occupational hygiene)

Senses in use are both seeing and hearing. ´Visualized practice´ is possible if bringing a camera and taking pictures during inspections; and since the technology at hand facilitates efficient sharing of pictures. Pictures taken at enterprises are presented at f2f meetings as well as online. Historically, various types of engineers are used to illustrate their work through drawings or prototypes. In the labor inspectorate, pictures are used to illustrate practice, e.g.: What can go wrong with different equipment and what must we look for when conducting inspections? How should a proper scaffold look like? The inspectors can in principle take pictures in the business of what they believe is relevant for their job. But some images they are more careful to send out, and some images they will not submit to anyone, because they know that there is sensitive technology for the company. Some of our informants stressed the importance of taking and attaching pictures to the case before putting it into the archive, useful for the task handling and for later sharing online on GoToMeeting in projects or in the network.

Example of picture in use is presented below (picture 1).

Picture 1.

The picture illustrate what they present to each other. In the conversation and storytelling they focused on the work processes related to this job, the problem of dust in work processes and experiences regarding risk preventing efforts. This is then reflected on and made sense of. The picture illustrates how polluted air is taken out of the production hall through a point extraction, put on the machine were the dust is produced. The pictures illustrate a solution to a more general problem situation for the inspectors. They often struggle to find effective solutions to fulfill the requirement of the legislation and in a cost-efficient way for the inspected work place, i.e. finding solutions that both can work for both parts. When they talk about these pictures, the presenter address attention towards certain eras of the picture to illustrate how the problem were solved.

`Visualized practice` address the complexity the inspector and their authority face. Even thought their mission is to insure health and safety for employees, it can be problematic to impose that without also considering the costs and practical solutions for the business or public authority they have inspected. The stories they tell are often about the need to find a cost effective way to solve the health and safety risks. Examples in the stories are often smaller businesses, that will get bankrupt if authority force them to install what is needed to get rid of the problem. The inspectors therefore sometimes have to explore and develop problem solutions in innovative ways, rather than to apply ready made solutions (i.e. more exploitative approaches). They make robust inspection practices by helping forward a process involving many actors and actants - the law but also the interests of the inspected organization through pictures and stories. The pictures and stories are also about the enterprises situation, about dangerous chemicals and features of the existing industrial building. In sum an involvement of heterogeneous entities (documents, people, equipment) leading to innovations – that adds up to a situation where the intentions of the law is insured, but with less costs for the inspected entity. The main 'boundary objects' here, their window into the practice of the others,

are the pictures and stories illustrating problems and/or the problem solution. Such as, how they got rid of the polluted air in an effective and cost effective way**.** A sharing one innovation/solution might trigger further innovations or the use of the innovation in other contexts as well. The ´visualized practice´ seek to reduce complexity, and facilitate reflections, dialogue and constructions at individual and collective levels, and hence distributed learning. The visualized practice represents a culture of engineers and focus on practical solutions, which seems easier transferred by the use of technology. While others argue that awareness is hard to develop online, the visualized practice described here creates awareness quickly in this online context, but here this mechanism is also supported culturally by the strong task oriented identity, the importance of doing inspections, and the phenomena these employees work with. Visualized practice is in Star and Griesmeiers (1989) terminology, an ideal type of a solved problem - and when shared - communicating a better road map for doing inspections. It supports the way of thinking of inspections, as to enforce the law by working together with the inspected entity, to find solutions which both the business and the "law" can live with. Many inspectors regards this as the most effective way to insure their mission. Using stories and pictures on GoToMeeting serves this purpose well.

4.2 Documenting

Inspectors in all five networks open up the archive to share their way of reporting in official documents on inspected enterprises. In a bureaucracy documents stored in archives are seen as a mean of ensuring the impersonal use of the law for the individual client (Weber, 1971). All written official documents regarding a case have to be stored for control, by the others or used as evidence if somebody has a complaint. But this archive is also important material for knowledge sharing and learning, not only through content analyses but through the conversations. The ´documenting practice´ category represents findings were the inspectors through the GoToMeeting tool are able to represent on screen the whole process of case handling (outside of the network) like inspection on site, picture taking, dialog with other public bodies and inspected business. Here norms regarding the quality of work come into play, like quality of interviews, note taking, communication, pictures and written correspondence. The use of documents is a necessary resource for learning activities in a bureaucratically organizational context. To achieve 'equal handling', documents are needed to understand the practice of others, and works as the window (a boundary object) into it:

> *"We are very dependent on presenting each other's documentation, where the information is, what it says, how we use it, then we use GoToMeeting."* (Experienced Inspector)

Through documenting practice they show each other documentation of conducted task handling, legislation used, where it is and what it says. Then this can be shared and discussed. This practice differs from visualized practice since it adds the following essentials:

1) The inspector displays how he or she formulates letters and how he or she makes references to the law, and sends information to the inspected enterprise.
2) The inspector displays the whole process from the first letter to the enterprise, notes taken at the inspected site and how he or she has followed up after orders have been put on an enterprise.

The activities represented in the network is the practice of law enforcement when conducting inspections and writing letters when being outside the network. Senses in use are hearing and seeing. GoTo Meeting is seen as a proper tool, since it facilitates the sharing of whatever is on the individual inspectors computer; letter, notes and more important access to their work systems intranet, Vyr, a register for injuries, and Ephorte an archive and task handling system. Using documents is a way to share the practice of individuals with a group since it reveals both standard procedures of the organization, and also local variants and personal interpretations and habits regarding the process and how the task handling is written up. In such it can develop both the practice of the individual and the collective toward increased similarity. They also use pictures in this practice. GoToMeeting is in this respect regarded as very effective:

> *"If the legislation is changing, pictures on screen can easily create a mutual understanding of the new legislation. Like when I present machines and equipment that are in line with the new rules. Using the GoToMeeting tool, using pictures takes three minutes as compared to 30 minutes if you had to explain only with words." (Experienced employee)*

`Documenting practice` are, compared to `Visualized practice`, a more inward oriented towards the individual inspectors use of the legislation, checklists and how he or she write up letters to the inspected business. The practice was developed as a coordination effort to insure unity when task handlers worked together in projects, now inspectors are often distributed geographically so the practice is enacted in the networks as a way of sharing and learning. The result of the activity is justifications, mutual understanding of the practice of the others and more collective practice. However documenting as a representation mode in the learning practice depends upon how open they are, and that differ. Some are more reluctant to disclose too much about what they actually do, as they are afraid to lose some of their flexibility when 'in-action', since new routines increasing the standardizing can then be forced upon them. One can argue the veildness of practice then are not mainly due to tacitness, but it is willingly disguised (Heidegger, 1927/1996).

4.3 Testing

This ideal type of representation practice, 'testing', we found in the two networks for psychological well-being. 'Testing practice´ refers to the question: did I conduct my case handling correctly? Also this practice is closely related to the norms for objective case handling, being aware of the personal and subjective perceptions and judgments, they seek toward more "objective" or correct handling, through socially shared, controlled and constructed solutions in the network. This practice is supporting individual decision making and distributed authority, through confirming or adjusting individual subjective judgments in collective processes.

In the organization they distinguish between Level 1, 2 and 3 inspections. Level 1 is the easiest, where the inspector conducts unannounced inspections using a simple questionnaire, interviewing some of the people they meet at the work site. Levels 2 and 3 are more advanced inspections, involving announced inspections and separate interviews with management and employees or group interviews. Within the area of psychological well-being, inspections are always at Level 2 or 3, producing a lot of material for the inspector which must be analyzed and interpreted in relation to professional knowledge regarding negative effects of stress, and the law.

The 'testing practice' differs from visualized practice and documenting practice regarding the following:

1) The participants have to read documents <u>before</u> the meeting
2) ICT are, as they see it, not able to mediate this learning practice well

While the colleagues in the other networks commented that presentations were more or less unprepared, some of the commentators in 'testing practice' have to read through all documents, and minutes of observations and interviews, to try in advance to pick out and argue for the relevant and most essential 'facts' to be discussed in the case. This is time consuming. Due to the complexity of the material and the role of personal likes and dislikes which the inspector might have, social cues are important for sharing through testing practice. F2f meetings are preferred, online discussions are possible but then it is not always possible to have the needed in-depth discussions. This 'testing practice' have some similarity to the traditional learning mode where the apprentice followed the experienced inspector on inspections and learns by observing the experience, sharing and discussing observations, but here this happens without doing the inspections together. Instead they share their notes, stories and emotions from inspections in order to re-create some of the richness and complexity to do the 'test':

> *" We have so much data after level 2 or level 3 inspections. It is hard to sum up the best solution. If somebody is unsure about if he or she have done it correctly, we can do a "test". Go through his or hers case and discuss it. Very often it turns out that he or she did not think very wrong. We discuss like if it is acceptable that a manager are moody; one day he gives everybody a hug, the next day he do not look at you at all –and the employees tells us that they feel unsafe. Then <u>we use our own emotions to conduct our judgments</u>. This is an important role of our network, to discuss with colleagues' the judgments in our work, our use of our personal emotions. Like: What is too much and what is foreseeable of moody behavior? (Coordinator of a network for psychosocial well being, our underlining)*

`Testing practice` reviles a "hidden" or "tacit" attention/attunement, checklist and judgments among inspectors who work within the area of physiological well-being. One can argue it involves intimacy knowledge and know-how, based largely on personal knowledge but also distributed across inspectors. The rules and requirements within this area are not so straightforward: it is not so easy to measure stress compared to polluted air. To share their own "checklist` (what they felt at the inspection) they have to find a way to express their own emotions during inspections first. Senses in use are seeing and hearing. Pervious personal and shared experiences have formed their emotions and fore-understanding, which they use when they have to figure out whether e.g. the behavior of the manager (in the case above) are foreseeable or not, and the work environment a risk or not.

The individual inspectors` use field notes, emotions and stories as 'boundary objects', making up a "window into the practice of the other".:

> *" The psycho-social, is about to feel and to be touched. No, it is not. Or in other words it is too. But it's within regulatory limits. The law says that you should not be exposed to adverse psychological burden. And then you have to know a little about what is a unfortunate mental strain, and you need to know a lot about the psyche and body. And this is where the problem is in a sense, to be able to explain it well enough in writing. For you are going to have to justify it professionally, and you should connect it to the regulations. What is it you must expect in a job, and what is it that is so much or so special that you could not have expected it. Then it's not according to the law. It's also about to be as uniform as possible, that we need this network .*

There are the professional reasons from what we know about the body and psyche and bodily reactions, and so we have the network that creates the framework, so like together so this should be fairly objectively. (Member a network of psychosocial well being)

Note taking when conducting inspections is regarded very important, for example notes from observations of where people sat, how they behaved and how they interacted, when the problems were discussed with the employees and management. All seen as helpful in the restructuring of what the inspector saw and felt during fieldwork. A reconstruction through detailed descriptions helps to create a certain feeling of objectivity, since they can agree upon that climate in the workplace on the basis of these observations represented in field notes and stories. Emotions are according to them important to share and discuss to insure a sense of "objectivity", since emotions are seen as the most personal and 'subjective', such a notion of emotions fits surprisingly well to the idea about bureaucracies described by Weber (1971, p. 128).

To us these finding suggests that the sharing and learning processes promote self-confidence and empowerment of the individual through focus upon their individual role in task handling, on how to conduct, follow up inspections and put orders within new areas. One coordinator explains it this way:

We know the rules, we know what the health impact might be, stress is not good, but how to use it in practice – it is fun to get new angles on it, like today when we discussed integrity (personality at work). We do not put orders on it today, but the day someone is a bit tough and puts an order on it, and manages to do it in a way that it does make sense… many will follow I am completely convinced" (Coordinator of a network for physiological well being)

Such an empowerment process can promote "responsible" autonomy (Newell et al 2009), since they promote critical discussion of the use of the rules, professional knowledge, use of personal emotions and the role of personal judgments. When sharing emotions, social cues are important for sharing - f2f is, coming not as a surprise to us, preferred. Online discussions are seen as possible, but it is regarded as not good enough since it is difficult to get in-depth discussions. This might have more to do with time spent in the network than the media (GoToMeeting or f2f). A f2f meeting takes one whole day, a GoToMeeting meeting is scheduled for only 1-2 hours, leaving less time for in-depth discussions.

4.4 The network and learning practices

The learning practices described here are partly developed in the networks, and partly taken from other contexts. For some, it is natural to take their camera out on inspections along with the notebook. But some find it difficult to take pictures, as they may contain trade secrets or since that taking pictures is not part of the job, but the job of the police. When an accident at a work place have happened some inspectors, particularly in the districts, bring a camera because they know that the police officers in their district have little experience (it is very often their first job as an police officer) - to ensure that good pictures for legal proceedings are being taken. Sharing of documents, letters and formulations has been informally shared before the networks, but also more shared in recent years since inspections have been more and more conducted in projects. More project work has made it more clear that they have to carry out inspections and issue orders more equally. In other words the inspectors have become more dependent on each other to see which rules are used and how they use them - such as how to justify an

injunction. The GoToMeeting tool has been very helpful in these processes – because the tool helps the sharing of the legislation in use on distance. The testing practice of individual assessments have been developed in the networks and the precursors of today's networks (in one of the regions). Perceived benefit of the networks has varied, because much time has gone into discussing what the purpose of the networks should be, and different tasks have been given to the networks by the managers. Also the benefit has been hampered since it is the number of inspections that are measured (and not learning) and rewarded, therefore many consider learning in the field as the most important work and learning arena (and not the network), leaving less value for the learning taking place in the MNoP`s.

5.0 DISCUSSION AND CONCLUDING REMARKS

In this paper we set out to investigate learning processes in the form of practices in intraorganizational networks, in a geographically distributed organization where people often work alone or as pairs when being 'in-action'. We have asked the question: How can representations of practice serve as boundary objects facilitating learning in Managed NoP`s ? We have explored and described findings from five network cases in one organization, and used the concept of boundary objects (Star & Griesmeier, 1989), or to say, boundary spanning process-tools. Three ideal types of representations being part of learning practices where developed, for an overview of the three see Table 1.

Table 1: Learning as different representation practices

Practice	Visualization	Documenting	Testing
Activities in inspection context	Finding cost effective solutions to fulfill the requirement of the legislation	Enforce the law by conducting inspections and writing letters	Conduct judgments on complex matters
Boundary object	Pictures, stories, and conversations	Stories and documents from one case handling process (letters written)	Field notes, written letters and emotions. Stories.
Senses	Seeing (pictures) and hearing (stories)	Seeing and hearing written and oral words/texts	Seeing, hearing, feeling through rich stories
Approach	Analytical thinking	Analytical reasoning	Intuitive first, then analytical
Knowledge types	Engineering and practical	Juridical knowledge, context and writing skills	Tacit, intimacy and personal, emotions, gut feeling
Media use preference	GoToMeeting; Powerpoint	GoToMeeting, Powerpoint, access to Vyr, Ephorte.	Prefer face-to-face
Skills	Skills in reducing complexity	Skills in representing process on ICT, ICT skills	Skills in representing details/complexity and richness
Result of learning in the network	Sharing problems and problem solutions	Shared understanding of justification.	Empowerment and self-confidence. More reflective ('objective') and collective practice
Learning across outside and inside network	Explore outside, share inside	Explore and exploit inside	Reflection on action, thoughts and emotions. Develop knowledge, person and practice .
Hampering learning in the network	Too few pictures, lack of photo practice, that can visualize	Not all informants want to disclose practice. Practice is disguised. Afraid the autonomy/flexibility can be reduced through new collective routines	Complexity, trust, time in the network, attunement and real participation

The table shows the three practices we have uncovered. The first two practices make use of classical boundary objects described in the literature before (Bechky, 2003; Star & Griesemer, 1989: Wenger, 1998) pictures (and illustrations) and documents (the law, checklists and correspondence).

Our most surprising finding is the 'testing' practice with its use of emotions as a boundary object/spanning process-tool. We argue however, that this not only show emotions in the representing practice, but also in how they practice when out in the field. One can argue that they reproduce in the network, the complexity, emotions, empathy felt in the field when judging and coping with the situations. When doing their work, they use feelings and intimacy knowing. 'Intimacy knowing' (also termed 'intransitive understanding'), can take place and be shown as capable attention, seeing, judging and understanding of for example a nurse, glassblower, service worker or researcher in action or in conversations. An experienced nurse or radiographic can recognize patterns, understand and cope with a situation in a way that the novice is unable of. Feelings can then inform and guide the highly capable actor in use: "What

one learns is not technique; one learns to *judge* correctly. There are also rules, but they build no system, and only experienced individuals can apply them properly…The genuineness of the expression cannot be proved; one must *feel* it" (Wittgenstein, 1953/1992, p. 261-262, our translation). It is thus when distinguishing faces or situations, when reading a poem, or when knowing what word to use when talking. Certain rules become a part of us, incorporated into the self-identity and what we know, in a bodily, emotional, and anonymous way. The 'rules' and feelings locate us in a culture. We do not know them as explicit rules and cannot give full accounts of them because such 'rules' are situated, tacit, dynamic, and social, and differ from the logic of formal rules that are general, static, and explicit (Wittgenstein, 1953/1992).

In the networks of practice, the inspectors use emotions through rich stories (orally and through written field notes) to communicate and understand each other's practices. This is more than visualizing or documenting. Individuals in the psychological wellbeing networks relate with others where they use their experiences, attention and "gut feelings", i.e. intimacy knowing, when communicating and trying to represent the practice, so that others can use their own experiences/fore-understanding when trying to interpret and understand what the first person is communicating. Emotions can bring resonance, as it tends to bring up memories and more tacit knowing. After reaching a certain common glimpse of the case in matter through more intuitive approaches, they can start 'testing' the retold situation and activity through reflections and sense making. One can argue the perceptions, emotions, knowing and actions of the person can become more disclosed and ready for reflection on-action both for the involved person and the others in the network. It opens up for a collective elaboration, support and verification, or critical rethinking, about what is appropriate and preferable coping. Often it is a matter of professional and social support, a practice contributing to empowerment, legitimacy and development of self –confidence for the individual. It can also introduce and putt order on phenomenon not experienced by some of the inspectorate.

Like the two other representation practices, also this one contributes to increased transparency of practice, reflection on action, and collective learning possible due to the shared activity in the network of practice. Which in turn may reduce the deficit of individual implicit use of discretion (Lipsky, 1980), and at the same time keep interpretation plastic enough for the individuals to adapt other meanings in each unique context for conducting inspections, an important feature of boundary objects (Star & Griesemer, 1989).

Inspectorates are bureaucracies where enforcement of regulations through the comparison between the regulations and more and less clear condition in the field as the main task. Meanwhile, the exercise of discretion is an important part of the work. Any measures must also be justified and follow the values of impartiality, equality before the law to bureaucratic procedures. In addition the inspectors face the challenge of balancing a variety of values (e.g. doing control, and at the same time being helpful), which means that one should not only enforce the law, but interpret it in relation to professional knowledge and also be solution oriented and helpful in relation to the inspected businesses.

Our findings suggest that the inspectors try to create a rich environment for knowledge sharing and learning: First, through the techniques of the 'visualized practice', they

share innovations in inspected enterprise by the analytical and solution oriented use of pictures and stories. Second they document their work by presenting the legislation they have used in a given case and their own letters to inspected businesses. In other words how they analyze a case and draw reasonable conclusions. These two practices communicate ideal types of conducting inspections regarding: 1) balancing the requirements of the law and what is cost –effective for the inspected entity; and 2) adjusting local/ individual use of the law with a larger group (network or project). The three practices differ in inward or outward focus. While visualization explore equipment used outside in inspected organizations, documenting is more focused on the internal use of the legislation on a group level and testing is more oriented towards the empowerment of the individual. The networks are seen as useful when they: offer solutions, justifications and/or empowerment/self-confidence, in other words they produce useful learning despite that they are not conducting tasks together, an important feature of NoP`s (Brown & Duguid, 2001). Hampering factors for learning described have been e.g. lack of picture taking as a problem for visualized practice, and lack of trust and openness in the two other representing practices. To us this underline learning as a social accomplishment (Hislop, 2009).

We see skills for learning, i.e. skills for communication and representation of work situations and practices, as important facilitating factor: First, for some (visualizing practice) this involves the skill to reduce the complexity of practice, this is done in some of the networks through using pictures in addition to storytelling and conversations. Second, the skills of representing cases by the use of ICT and documents. This learning skill varies between the participants and is related to their individual ability to represent the documents they are using from different systems through ICT. Third, the skills of communicating and representing the complexity and nuances of human and social work environment issues, this is not easily glimpsed by a picture, therefore they use rich written and oral stories, filled with emotions, in the hope that the reader/listener are able to glimpse the phenomena, context and coping. This both demands skills by the narrator, as well as the reader/listener, and it is here that the ICT-communication tool and short time can become one of the obstacles. The narrator's ability to make the experiences more explicit, to articulate it and narrate it in the written, spoken and body language, in ways that becomes meaningful for the others are critical. So is also their will and confidence to do so.

This paper has shown sides of how employees learn and perform legitimate and capable work performance by focusing at how they represent practice and reflection 'on-action' retrospectively. This take place in networks of practice - as a preparation for later 'in-action, in such one can argue it involves moves across work spaces (contexts). Also one can argue that 'on-action' narrating and reflections is in itself a kind of 'in-action'. The practices taking place in networks of practice should be interrelated or preferably intertwined with the practices taking place outside of the networks, if to function as parts in a broader holistic learning practice.

We see at least three implications of this research: First, since learning processes takes form of practices these can be identified and nurtured by management giving helpful support through developing arenas and technology. Available documents and pictures for sharing are dependent on the ICT tools at hand and existing work practices. But if to have pictures at hand, somebody must have taken them for a purpose. This shows that not only work activities are interconnected into a broader field of practices as practice based theorizing suggests (Schatzki et. al 2001; Newell et. al 2009; Nicolini, 2008).

Also MNoP`s learning activities can be heavily dependent on and interconnected to what seems to be minor and sometimes overlooked practicalities (as picture taking and attaching them to the case in the archive) within work practices. This address a insight dilemma to us. Critical resources, which can serve as boundary objects for learning can sometimes be minor, les useful, aspects of work practices, but most useful in an learning context. An awareness of theses relations can be useful to help the production of materials that can be helpful in learning in NoP`s.

Secondly, practices and their boundary objects differ regarding if they can be displayed best online or not. From a perspective were learning process are seen as practice (Newell et al. 2009), Managed NoP`s are at the best one out of several arenas were practices are shared and formed by the use of stories. Some practices are shared easier through pictures or other visualized means combined with richer stories. Others rely mostly on stories. We also acknowledge the role of emotions in knowledge work. And in particular individual emotions enacted as a `boundary object/spanning process-tools` in bureaucratic knowledge work reviled in this study. According to Wenger (1998), boundary objects have the ability to reconcile different perspectives . The sharing of emotions are to us boundary objects in the sense that the sharing of them helps individuals to recognize and reflect upon their discretion to become more "objective". While there is search for "stuff and things" having boundary object effects - to ease knowledge sharing we have also to take into account the role of versatile stories and deeper meaning which accompanies the use of them.

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