THE PASSION FOR LEARNING AND KNOWING

Proceedings of the 6th International Conference on Organizational Learning and Knowledge

Edited by:
Silvia Gherardi
Davide Nicolini

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Foreword

Silvia Gherardi and Davide Nicolini

Conference Convenors

Rucola, University of Trento[1]

This two-volume set contains the papers presented at the 6th International Conference on Organizational Learning and Knowledge held in Trento on June 9-11 2006.

The conference was the latest in a series which has been held at Lancaster, George Washington University, and the Ivey School, University of Western Ontario (see this site for previous OLK Conferences), and aimed to explore the different aspects of the relationship between learning, knowing and the organizing process from the perspective of the passion for knowledge.

The conference theme

In April, when I was in Paris and went to see an exhibition on Matisse and his later life, I came across a picture accompanied by an extract from a letter that Matisse had written to his friend André Rouveyre:

"You want to know the origin of this sentimental study of a tree, which could be entitled 'Birth of a Tree in the Head of an Artist'.
There are two ways of drawing a tree:
*   - with the imitative technique taught in the art schools of Europe*
*   - with the feelings that its closeness and contemplation suggest, as in the East".*

Looking at the picture and on reading this comment I was struck by the analogy that one can draw with other fields of knowledge, for example organization studies: our knowledge may either imitate the life of the organization studied or resonate with it. And of course I thought of the theme of this conference and felt the desire to translate Matisse's thought into the organizational scholars' community since the tension between reason and passion will be at the heart of conference.

From Silvia Gherardi's conference opening speech[2]

For this conference we proposed a theme of close interest to our Research Unit: passionate knowledge, the non-cognitive and non instrumental aspects of learning and knowing.

This is a very broad theme in philosophy, in the humanities and in Western thought in general, but it has a special symbolic meaning in organization studies: it is the OTHER of our discipline, especially when we take Weber, as we do in a faculty of sociology, as the starting point for organization studies. Together with the bureaucratic model we have inherited the motto 'sine ira ac studio', distanced ourselves from the object studied, and forgotten about love and empathy.

In particular, knowledge, in organizational learning and knowing, has been studied mainly as an object, a substance, in relation to problem-solving. Knowing as a situated activity (knowing-in practice) is a complementary view, or in Derrida's terms it stands in a relation of supplementarity to the rationality of the first term. Knowledge in the face of mystery may convey the idea of an intimate relation between the knower and the known, of the closeness between the subject who manufactures knowledge and his/her object of study.

Knowledge for the sake of knowledge, the pursuit of knowledge as an end in itself, the pleasure of venturing into the unknown and transgressing the boundaries of what has been

institutionalised as truth and valid knowledge, are aspects of non-instrumental knowledge that contain an element of Utopia, of creativity and of self-generating innovativeness.

The verb 'to know' suggests active engagement with the world and intentionality. But knowing is passivity as well. As Polanyi wrote, learning in a passive mode is like learning to surrender to works of art: "this is neither to observe nor to handle them, but to live in them. Thus the satisfaction of gaining intellectual control over the external world is linked to a satisfaction of gaining control over ourselves". As in the arts, which are the best examples of human non-instrumental activity, we commit ourselves to knowledge for its own sake. We engage in art and in knowing for the love of creation; both forms of activity may be seen as endeavours without a specific purpose. The Greek term for this 'doing' as an end in itself is *poiesis*.

Art is a form of non-discursive knowledge which privileges the visual and the imagination over the textual and remind us that we also know with the body and through the senses: sight, but also smell, hearing, and taste. Aesthetic understanding of organizational life is a form of passionate knowledge.

Passion is also a source of energy and a source for action because it connects us with others: it is the energy which nourishes our decisions. Hegel wrote that passion is what allows us to realise ourselves in the world, since the will is not pure spirit, nor disembodied freedom, and passion is not simply confined to the body. The term 'passion' derives from the Greek *paskein*, 'to suffer', and its etymology harks back to passivity, acceptance of the action of the world upon ourselves, being like porous soil

The theme of this conference was thus an open invitation to consider the dark side of knowledge and to explore the non-cognitive side of organizational learning and knowing.

The proceedings

The present proceedings are a collection of all the papers accepted for presentation at the conference. Authors responded to a call for papers that invited them to focus on the relation between passion, learning and knowledge/knowing, in view of expanding the current debate on knowing and learning and exploring a less intentional, less instrumental, more reflexive aspect of learning and knowing in organizations.

More than two hundred scholars responded to the call and submitted contributions. The papers were selected through a blind review process carried out by external reviewers; the present collection represents largely the result of this selection process.

In the call for paper we asked contributors to focus on seven main themes: the social creation and destruction of knowledge; the issue of knowledge management (passion or possession?); the multivoicedness of learning, development and knowing; the role of artifacts of knowing; the passion for measuring (and how to measure the passion); the tacit and aesthetic nature of knowing; and the role of feelings and emotions in face-to-face and distant teaching and learning.

These themes were then used for organizing the conference sessions and they are echoed in the contributions collected here.

Volume one brings together the papers that addressed the first theme of the conference, that is, how to conceptualize the social creation and destruction of organizational knowledge. Essays in this volume discuss topics such as the role of discourse dialogue, storytelling, and emotions in the social creation and destruction of knowledge, the conceptualization of organizational knowing as activity and practice, the relationship between educational and

organizational learning processes, the social circulation and distribution of knowledge, the issues of leadership, management, power, and control in the creation and destruction of knowledge.

Volume two collects the essays dealing with the other important themes addressed during the conference, that is, the multivoicedness of learning in novel and challenging conditions, the issue of passionate learning and innovation, the topic of learning across boundaries and in distance settings, the reflective practices of learning, the tacit and aesthetic nature of knowing, the issue of measurement, and the central role of objects, artifacts, and new technologies as objects and enablers of learning and knowing.

Overall, the two volumes constitute a good cross section of the state of the debate on the different aspects of the relationship between learning, knowing and the organizing process from the perspective of the passion for knowledge.

The future

This was the sixth conference of the OLK network and the last one. The first conference was held in 1994, in Lancaster, thanks to the generosity and the enthusiasm of Mark Easterby-Smith. The Trento group – Rucola – has been present in OLK from the outset, and on two occasions we have had the honour of editing its journal's special issues on conferences (Management Learning 1998, Journal of Management Studies, 2000).

Were therefore extremely pleased to host the last conference and to announce the successful academic merger of this network with the OCLK conferences that, for years, have constituted another important forum for scholars and practitioners interested in the topics of knowing and learning. Starting from 2006 in Warwick, the conference will be in fact held yearly under the OKLC banner and will continue together the conversation.

Acknowledgments

Endnotes

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[2] The introductory speech was accompanied by the following images: Boccioni U., La risata (1911); Kiefer, A., Buch mit Flügen (1992); Van Gogh, V., The starry night (1889); Minjun, Y., Le duc et moi (1996); Chagall, M., The voyager (1917). The presentation is available http://www.unitn.it/events/olk6

Identity and Power in Organizational Learning

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Abstract

This paper presents the conceptual framework for analysing learning in a change project on a teacher training college. We address this project through social learning theory with a special emphasis on Wenger's concepts *the negotiation of meaning* and *identity*. These concepts are further developed by drawing on discourse theoretical insight – especially an organization theoretical application of *Foucault's conception of power*. Thus, we want to discuss the impact of identity and power on the learning within the change project. We regard organizational learning as processes that take place on various loosely coupled arenas. On this basis, we try to identify the tensions of identity and power that are involved in the negotiating meaning.

Keywords: Organizational change, negotiation of meaning, identity, power.

1. Introduction

The purpose of this paper is to develop a conceptual framework for understanding and analysing learning as it emerges in the relationship between participants in a change project at a teacher training college. The teacher training college is called Hjørring Seminarium. This college experiments with a new teaching system where two teachers that teach the same subject are going to collaborate in the development, planning, implementation and evaluation of the teaching. The purpose of this experiment is to create a better working environment. The questions of the project are how teachers learn their new role and how the informal learning system is affected.

We are about to develop a conceptual framework that draws on a microsociological approach to organizational learning. Our reference is the social learning theory (Lave and Wenger, 1991) and the Communities-of-Practice approach (Wenger, 1998; Brown and Duguid, 2001). In accord with Wenger's concept *negotiation of meaning*, we assert that learning is constructed through negotiations of meanings on different arenas in an organization. We are especially interested in two interrelated aspects of these negotiations: *identity* and *power*. These concepts serve as a means for focussing on the tensions and potential conflicts involved in negotiating the new teaching systems. Evidently, identity and power are closely linked in various ways. Furthermore, there are contrasts between individual identity and the power of social configurations that actors represent. But our particular focus is the intertwinement of identity with power conflicts in the negotiation of meaning that Wenger has indicated with a concept of alignment. This suggests that individuals coordinate their energies, actions and practices in order to bridge two kinds of interests in the negotiation

of meaning: on one hand the organizational interests, and on the other the interests of the profession. In this way, relations of power are inscribed in processes of negotiation of meaning, and thus in learning processes and organizational change.

In the following, the main points of social learning theory are described. This includes the notion of learning through participation in communities of practice and the concept of negotiation of meaning. Secondly, we discuss identity and power. Thirdly, we draw some implications in regard to the learning processes at Hjørring Seminarium.

Negotiation of meaning

We will use the concept of negotiation of meaning (Wenger, 1998: 63) to capture the learning processes in the project. Negotiation of meaning takes place at different arenas: in the organization as a whole, in the steering committee and in the teacher teams. At the outset, we cannot presume any consistency between these different levels. Instead, we might perceive these arenas as relatively loosely coupled (Weick, 1976) in the sense that negotiation of meaning at the different arenas is relatively independent, etc.

According to the theory of situated learning, the centre for organisational learning processes (collective and individual) is in the communities of practice. The communities of practice negotiate knowledge and ways of conduct. The community learns through practice and negotiation of meaning. To keep up with working life changes, the community of practice negotiates and adapts to different challenges (Lave & Wenger, 1991).

The knowledge of the community of practice emerges while the employees solve their tasks and perform their work. Internally the community of practice negotiates the meaning with influences from outside and inside. They create a *history of learning* as a consequence of the decisions they make.

We relate with negotiation to the structures and patterns of the world and we produce meanings that change them, and in this process of negotiation of meaning we experience the world and our engagement in it as meaningful. We are continuously involved in creating meanings. Both routine activities and challenging activities involve negotiation of meaning. The process can involve language and resemble what is ordinarily regarded as negotiation, but it can also be something more implicit in everyday conversation and conduct.

Wenger understands negotiation of meaning as a process involving the duality of *reification* and *participation*. *Reification* is to give "form to our experience by producing objects that congeal this experience into "thingness"" (ibid: 58). Reifications from outside like rules or tasks must be re-appropriated into a local process to become meaningful. We arrange our participation around reifications. Reifications can be very meaningful, but also the opposite. To make reifications means to some extent to detach from the lived world.

Participation is used to describe "the social experience of living in the world in terms of membership in social communities and active involvement in social enterprises" (ibid: 55). It is about the way we engage in practice. It is the active process of creating meaning in

abstractions, rules, poems, symbols and so on. It is also about identity: Through participation, it is possible to develop an "identity of participation" (ibid: 56).

Identity and Power

We use the concepts *identity* and *power* in order to capture the forces between individual identity and the social configurations that individuals represent. Wenger captures this relationship in the concept of alignment, which describes how "…participants become connected through the coordination of their energies, actions, and practices" (Wenger, 1998: 179). However, Wenger has a tendency to describe participation and power as two different systems where power is considered an external structure (Fox, 2000). Instead, we suggest – along with Fox – to draw from Foucault's writings on power (Foucault 1978, 1979, 1980). According to Foucault, power should be seen as internalized in the individual. The individual is both the target and instrument of power (Foucault, 1993). Power is within the negotiation of meanings. It is in the act of participation and it is expressed in different forms of reification.

"Rather than being causally observable social episodes, they represent ways in which both individual and collectively organized bodies become socially inscribed and normalized through the routine aspects of organizations. In this way, power is embedded in the fibre and fabric of everyday life" (Hardy and Clegg, 1996: 631).

At the core of power are practices of surveillance, which is linked directly to the organizations culture and thus the negotiation of meaning. These practices of surveillance govern the negotiation processes towards conformity and normalization. These rules are tacit and taken-for-granted, but they regulate and modify ways of talking, acting, thinking and being. They indicate the criteria for judging what counts as knowledge and learning (e.g. Haugaard, 1997). Practices of surveillance are instruments of power. The understanding of surveillance is not limited to our everyday understanding of surveillance. Surveillance comprises personal, technical, bureaucratic or juridicial surveillance (Hardy and Clegg, 1996: 631). In the machine bureaucracy (Mintzberg, 1983) surveillance is characterized by "…supervision, routinization, formalization, mechanization, legislation and design that seek to effect increasing control of employee behaviour, dispositions and embodiment" (Hardy and Clegg, 1996: 631). These practices of surveillance, however, are not to be conceived as external to individuals. They are manifestations of a culture in which actors have specific positions and roles according to the culture. But even if power is not external to individuals, identity typically has a specific form and role, where leaders are planners, supervisors and controllers, and where workers' identities are a kind of therapeutic guard against the rationalization and standardization processes of the organization.

In our days' more indirect forms of surveillance, the mechanisms of power are embedded and embodied in individuals' values and attitudes through practices of socialization, education and training. Thus, there is nothing in today's society that indicates that surveillance disappears or looses its relevance. In organizations where the team has emerged as the basic

unit of the organization, there are also mechanisms of surveillance (Sewell, 1998). The flexible man is subjected to the norms and values of the new capitalism (Sennett, 1999). Surveillance has become internalized in individuals as a form of governmentality where moral standards serve as an art of self-government and self-reflexivity (Foucault, 1994; Clegg et. al., 2002). In this case, identity is fused with the practices of surveillance, and people 'are their profession'.

The change project at Hjørring seminarium

In the last couple of years there have been a number of persons absent from work at the teacher training college on a long-term basis, due to illness. This is understood as related to the working environment. The causal connection is not clear, but a number of different problems connected to the psycho-social working environment are apparent: overtime, difficulties connected to cooperation, feelings of loneliness, lacks of structure, too many and too hard challenges, and so on. After a bottom-up process of some duration it was agreed to try to create a better psycho-social working environment through a change project where the educational practice of the teachers would be reorganised in teams of teachers sharing the responsibility for teaching the main subject that they have in common. In this way, the change project marks a shift in the role of the teacher, from what has been called the teacher as "private practitioner", to a new and more collaborative role. The project provides new possibilities for professional development through for instance collegial sparring and exchange of knowledge.

The leadership supports the change project, and a steering committee including representatives of each teacher team is established. The focus is on professional and methodological development of practice and rooting of the results in practice. The meetings of the steering committee can be seen as an arena for negotiation of meaning. In this arena the participant negotiate meaning with both the purpose of the change project and the role they are going to play.

The negotiation of meaning in the steering committee

The steering committee consists of five persons. All of them are professional in their own subject. Through observations of the meetings, it has become clear that the participants do not agree on the role of the committee or on the purpose of the change project. The committee is about to develop into a community centered around the practice of steering the change project. It consists of members who are also members of other communities of practice, including their subject-related teacher team. For that reason, the members can be described as *brokers*, who participate in a new community by using their experience from other communities, transferring and transforming elements of one practice into the other. This interchange between thinking and conduct in the teacher teams and in the steering committee

takes place through processes of negotiation, and in so far, these different communities of practice can be viewed as loosely coupled.

A central issue on the first meetings was how the committee is going to direct the project. The members discussed whether they should lay down guidelines for the teacher teams' way of conducting their teaching, or if it should rather be in the hands of the teacher teams to define the concrete implementation of the change project. This negotiation concerns the core of the practice of the committee, that is: whether the committee should try to direct the project or not. The negotiation of meaning at the first meetings resulted in leaving it to the subject-related teacher teams to work out the new way of organising the teaching. The committee decided, furthermore, that it was its own task to evaluate the change project..

The negotiation of meaning at the first meetings in the committee revealed that there are different notions of the connection between the psycho-social working environment and the re-organisation with teacher teams. Thus, they negotiated very central topics, such as whether cooperation in teams actually is unambiguously positive with regard to the psycho-social working environment. Alternatively, it might be possible to detect a negative effect of the re-organisation. The dominant understanding is that organising in teams improves the psycho-social work environment, even if it means that one has to work more. This is so, because the team organisation makes the work more exciting, inspiring and developing. But one participant had another view of this topic. She thought that the new organisation of the work might have a negative effect on the psycho-social environment. This is because the new social relations of collaborating teams would cause increased workload and complexity. While the dominant opinion held that the effect of the team organization is learning and development, the less approved position argued that rationalisation and effectiveness are the results.

The opposed ways of understanding the project are, of course, an effect of differences in the participant's experiences and knowledge. The majority agree on view that the team organisation contains a potential for learning and development, and this understanding of development is also generally approved in organisation theory. The team organisation can be view as a "recipe of organising", an accepted model of how an organisation should be improved (Røvik, 1998). Agreeing that team organisation as associated with development is to connect with a larger discourse on the necessity of learning and development that implies a positive coherence between collaboration and development.

Even though the more sceptical view on the change project did not at first influence the learning of the community, it is interesting that the negotiation of meaning involved two different ways of understanding, and consequently, two different approaches to learning. The first understanding focuses on the potential for experiencing with new ways of cooperation. Learning is here directed towards the development of practice. In the second understanding, focus is on how the new possibilities can lighten the workload through coordination and rationalisation of the teaching. Learning is here directed towards adaptation of ways of conduct, so that the practice of teaching can cope with increasing workloads.

According to the dominant discourse in the committee, one should think that at least four out of five teams would utilize the new opportunities to experiment and create developmental learning. But in reality, the teams do only experiment slightly and the new opportunities are mainly used as a means to coordinate and rationalise the teaching practise. Thus, no direct connection between attitude and act is found. This is, however, not surprising since it confirms the well-know notion of a distinction between espoused theories of action and theories-in-use (Argyris 1990).

Learning

Is knowledge socially created in the steering committee? And, if so, which kind of knowledge is created? The committee lacks interest in directing the project. Because of that, the negotiation of meaning will take place locally, within the teacher teams. In this way, the elaboration of the project is handled by the teams, and in line with their interests and comprehensions, which will guarantee their motivation. The problem is, however, that the purpose of the change project with regard to change and development of practice is not ensured. Maybe development will occur, but it depends on the motivation of the teams. So far, there are indications suggesting that the teams primarily use the new opportunities to adapt to work demands, instead of taking advantage of the chance to develop their own practice. In that way, the main result of the learning will be to reproduce, standardise or rationalise the practice.

When the committee leave it to the teacher teams to create the meaning of the project and transform ideas to concrete practice, the committee is at the same time reproducing a basic assumption in the organisation, which could be described as the "private practising" teacher's extensive freedom to decide for herself how she will teach. When the committee give up on directing the project, they at the same time protect and support the legitimacy of the "private practising" teacher, even though one purpose with the change project was to increase the level of corporation. Thus, the socially constructed knowledge that is the result of the learning process can be characterised as stabilising, culture preserving and single-loop.

The negotiation of meaning excludes the discourse of the minority, of team corporation as a strategy of learning and development. Therefore, the existing everyday logic of the production life will dominate and restrict the practical implementation of the change project.

This case is an example of a more general problem concerning learning through participating in communities of practice. The learning of the communities of practice may be more characterized by adaptation than by development. The collective learning in the communities of practice is directed at adapting their practice to influences from the outside. However this must not be understood in any deterministic way. The community of practice do negotiate their response to the influences. Still, the learning is adaptive. The communities of practice "make the job possible by inventing and maintaining ways of squaring institutional demands with the shifting reality of actual situations." (Wenger, 1998: 46). So, the

communities of practice are capable of developing or preserving solutions to work demands that are often full of conflicts. The communities of practice are also very capable of transferring the socially developed knowledge of how to perform their practice to newcomers. The advantage of this kind of learning is that "tings are getting done", and newcomers will soon be effective workers. One should not fail to appreciate the adaptive kind of learning, even when developmental learning is the focus of interest. But the problem with the adaptive learning is that it can lead to unintended consequences because it is not possible to investigate and change more basic assumptions held by the organisation. Thus, the adaptive learning will often only treat the symptoms of occurring problems. Obviously, this does not imply reflection of the background out of which the problems occurred or of unintended consequences of their usual treatment.

Ellström (2000) asserts that the life of organisations is in line with the logic of production, which is in many ways opposite the logic of leaning. The employees are able to learn as an integrated part of working, but the result will be learning that is subordinated to the logic of production. This point illuminates that working life learning often becomes adaptive because it is closely connected to the actual performance of the work. The teachers in our case experience an increase in workload and complexity and the logic of production is becoming more dominating. The way they use the opportunities of the change project is more in line with the logic of production than with the logic of learning. This means that rationalisation and standard teaching dominate over regards to professional competencies and to unique qualities of the teaching. Eventually, that can also lead to problems with the professional identity.

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Enndotes

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Building bridges between the past, present and future: Narrative and emotional remembering of organizational change efforts

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Abstract: In our paper, we explore the multidimensional, comprehensive and complex characteristics of change. For this purpose, we trace change in a current study focusing on the consequentiality of change efforts in health care projects in Finland. In our study, we perceive change from the perspective of knowledge creation and destruction as deeply embedded in social practices. We use narratives gathered in employees' interviews as bridges to reconstruct the consequences of organizational change efforts.

Introduction

The long-term consequences of change efforts in workplaces are often poorly understood. In particular, those consequences that deviate from explicit goals are not considered. Change is multidimensional, comprehensive and complex, and the contexts in which change occurs are often themselves changing. Therefore, change is unforeseeable and cannot be planned in advance (Pettigrew 1995: 94-95). However, conceiving of change in a different way is not enough. In fact, the nature of knowledge about change also requires new perspectives and reflection on the evaluations of organizational change efforts. Instead of perceiving knowledge as an accumulation of mental content that can be transferred from one location in time and space to another, there is a need for a view of knowledge that perceives knowledge as deeply embedded in social practices and lived temporalities.

Recent discussions in practice-based approaches on knowledge in organizations provide promising theoretical frameworks with which to explore long-term change efforts (Nicolini, Gherardi, and Yanow 2003). These approaches perceive knowledge or "knowing in organizations as social, processual, materially and historically mediated, emergent, situated, and always open-ended and temporary in character" (Nicolini, Gherardi, and Yanow 2003: 26). Among the discussed approaches, cultural historical activity theory (CHAT) emphasizes the socially and historically mediated character of knowledge (Engeström 2001). This approach provides us with conceptual tools and enables units of analysis that explore the macro level of change as well as the micro level of individual actions in social practices. The motivation for change emerges from historically accumulated tensions, or contradictions, within and between organizations under study (Engeström 2001: 136-137, Engeström, 1987). However, these dynamics do not occur in a deterministic way but require the engagement of human agency (Engeström 1996).

In our paper, we will explore the multidimensional, comprehensive and complex characteristics of change. For this purpose, we will trace change in a current study focusing

on the consequentiality of change efforts in health care projects in Finland. The projects under focus have contributed to structures, working conditions and methods locally and nationwide in Finnish healthcare. In our study, we perceive change from the perspective of knowledge creation and destruction as deeply embedded in social practices. We use narratives gathered in employees' interviews as bridges to reconstruct the consequences of organizational change efforts. The knowledge in narrative form enables us to explore change both as individual lived experiences and on the organizational (the activity) level of change. Memory does not consist of separate steps but is always related to the past and the future in accounts of lived experience. Memory "conveys something of the past into the future" (Styhre 2003:18/ Bergson 1998: 2, Wood 2002). Besides the past, the social act of narrating also involves the present and the future (Engeström, Engeström & Kerosuo 2003). The research questions guiding the study are (1) what kinds of change narratives the interviewees construct, (2) what kind of meta-narrative the change narratives produce, and (3) how the consequences of the change project can be conceptualized with analytical tools. The analytical tools that will be used derive from activity theory, and they will be explained in the analysis.

The research questions of our study raise theoretical and methodological challenges concerning the links between organizational and individual knowledge, and in particular, knowledge related to organizational memory. Furthermore, the challenges for exploring the temporality of change efforts need to be met. We will begin by discussing earlier studies that focus on the collective nature of knowledge as organizational memory in order to outline our approach to knowledge creation in organizations. Our approach draws from three different paradigms: the theories of organizational learning and knowledge, the activity-theoretical studies on work and organization, and the narrative approach. After discussing the starting points of this study, we will provide a case example from a current research project as an example of knowledge creation in organizational change efforts. Then we will present the method of the study. After that we will describe the data of the study, which leads us to the findings. Finally we will discuss and conclude our findings in terms of the social creation of knowledge and organizational memory in organizational change efforts.

Organizational memory in remembering organizational change efforts

Organizational memory is a central construct in theories of organizational learning and knowledge (Casey and Olivera 2003: 2). It constructs the collective type of organizational knowledge "from an organization's history that can be brought to bear on present decisions" (Casey and Olivera 2003: 2/Walsh and Ungson 1991: 61). In this study, organizational memory serves as a conceptual device that captures the substance of organizational change efforts that were carried out in the past.

The high number of articles applying the concept of organizational memory tells about its intuitive appeal in academic discourses. However, in spite of its importance in organizational theories, studies of organizational memory are fragmented between scientific disciplines and

the concept itself has remained underdeveloped (Casey and Olivera 2003). Casey and Olivera (2003) are interested in the processes by which the organizational memory is formed and the way it affects organizational phenomena, and feel that both are lacking in the literature. Furthermore, Casey and Olivera (2003: 13) pay attention to the epistemological and ontological assumptions of the theories of organizational memory. In their review, Casey and Olivera found that the predominant worldview in theories of organizational memory was functionalism representing the objectivist perspective. The other three paradigms (the interpretative perspective, radical humanism and radical structuralism) presented by Burrel and Morgan (1979) were poorly represented in the studies of organizational memory reviewed by Casey and Olivera. Neither were the issues of space and time seriously considered in the reviewed articles, although they are relevant elements of organizational memory (Casey and Olivera 2003: 15-16).

Practice-based approaches to knowledge conceive knowledge as manifesting itself in social actions that are sustained by symbols, technologies and relations (Gherardi 2000; Nicolini, Gherardi and Yanow 2003). While representing differing epistemological and ontological assumptions, the practice-based approaches (the interpretative-cultural approach, the community of practice approach, the cultural historical activity theory, and the sociology of translations approach) share a relational, interactive and participative approach to knowledge creation in the social context instead of conceiving of knowledge as a static entity that can be mechanically transferred in time and space. On the contrary, knowledge is approached as mediated by socially accumulated artifacts in social realities. Knowledge is understood as an ongoing social accomplishment constituted and reconstituted in everyday practice. It is never understood as a static entity but in a state of becoming (Styhre 2003). In this study, ontologies and epistemologies of practice-based approaches provide useful starting points for understanding the substance of knowledge, temporality, and the act of remembering concerning organizational memory. Next, we will discuss these challenges starting with the substance of knowledge.

Many scholars consider organizational knowledge as embedded in routines and standard operating procedures in organizational studies that seek to locate the substance of organizational memory. Furthermore, knowledge is also observed as interwoven into organizations' products, processes, technologies, structures, culture and norms (Argote 1999). However, it remains unclear how knowledge (or memory) is transferred, used and remembered in organizations besides understanding individuals as acting as carriers of knowledge. The concept of mediation articulated in practice-based approaches of knowledge clarifies the process of knowledge creation in terms of social histories and organizational cultures. In cultural historical activity theory, memory is collective or social in the sense that it is mediated by socio-historically evolved (i.e. collective) tools or instruments while individuals do the remembering in communities of memory (Vygotsky 1978; Wertsch 1987: 19, Engeström, Brown, Engeström and Koistinen 1990). Remembering is considered a social and collective act in which people draw upon cultural resources to say what the past might

have or must have been (Middleton & Edwards 1990). Remembering then becomes an act of giving "social sense" to individual experiences and feelings of the past while the act of remembering also involves individuals making their experiences accountable to their present social context (Shotter 1990).

Knowledge creation bridges the present with the past and the future (Styhre 2003: 22). Thus knowledge is never only related to the actual present, but is always related also to previous experiences and anticipated futures. In process philosophy, memory "imports the past into present" (Styhre 2003:18/ Bergson 1988: 73). Bergson's ontology emphasizes *experienced or lived time* as opposed to mechanical *clock time*. The experience of lived time is disruptive, fluid, non-linear, and based on qualitative differences (Styhre 2003: 17/Deleuze 1999). To Proust, memories are *real* inasmuch as they are based on experiences and can be recalled and discussed, but they are never *actual* in terms of being *present* (Styhre 2003: 18). From the perspective of organizational memory, knowledge cannot be chunked into temporalities of past, present and future, but into real, actual and present knowledge. Knowledge that is 'stored' can be actualized but it is not the 'same' knowledge it once was but knowledge from a different lived time.

Remembering as a social action is often carried out in narrative form. Knowledge is often mediated through narratives in the organizational world (Czarniawska-Joerges 1995). Narratives can be considered a basic form of human knowledge (Bruner 1986). People intend to remember and tell stories about things that are significant to them (Bruner 1986.) Narratives are devices for understanding human action. Action and the context of an activity in which the action is carried out are embodied in narratives. People create narratives to structure past experiences, and narratives are embodied with different events, experiences and feelings (Middleton & Edwards 1990). Stories represent organizational culture and are building material for norms and ways of action. But stories are not stable, they "flow" in organizations. They are produced, consumed, interpreted, and criticized, individually and selectively. People's individual, social and professional histories affect their remembering while the different voices of the organization are present in narratives (Czarniawska 2004). However, people do not only construct knowledge, they also create their historical realities and collectives in object-oriented activity (Engeström 2000; Miettinen 2000).

In the following, the social creation and destruction of knowledge is studied in organizational change efforts that were carried out in the past. The concept of organizational memory is applied to capture the substance of organizational change efforts. It is defined as mediated by culturally and historically accumulated artifacts and interactions that are being realized in social actions. Temporality is understood as 'lived time' involving actualized presents with real pasts and anticipated futures. The social creation and destruction of knowledge is studied in acts of remembering that take a narrative form. In the following section we will describe our case example.

Case: Change Laboratory project at a hospital ward

This section describes the case example of the study. The larger research project is presented first. The research project examines the stabilization and diffusion of innovative forms of work and learning in eight health care projects that have applied the developmental work research approach in Finland. These projects have contributed to structures, working conditions and methods locally and nationwide in Finnish health care. The main research problem of the study explores the realization of sustainability and diffusion in health care projects. The sub-problems investigate (1) the stabilization and maintenance processes of the projects, (2) the encapsulation, evaporation and destabilization processes of the projects, and (3) the tools and interventions enhancing the sustainability and diffusion of innovations. The methodological basis for the study draws from three sources: activity-theoretical studies of work and organizations, ethnographic methodology, in this case archeological ethnography, and the narrative approach. The phases of the project are as follows: (1) the mapping of the former projects, (2) discussion and interventions on the results of the mapping phase, and (3) follow-ups of the maintenance and bridging in interventions. This is done in organization-specific feedback interventions. The project is scheduled for 2004-2007. The first completed project of the eight health care projects represents the case of this study. It is a Change Laboratory project at a hospital ward at the Oulu University Hospital.

The medical ward under study was established in 1975. At that time it was a geriatric ward nursing long-term patients, many of them receiving end-stage care at the ward. The function of the ward remained almost unchanged for a long period of time. However, at the beginning of the 1990s when Finland was suffering from an economic recession, Oulu University Hospital faced retrenchment. Some wards were shut down and new types of patients began to flow to the medical ward under study from the closed wards. In 1997 a monitoring room was established in the ward for the new type of patients who needed intensified care. Intensified care included continuous monitoring of the patients who were not in need of traditional intensive care. Many of these patients stayed in intensified care for a few days before they were transferred to the ordinary wards. The staff was not prepared or trained for the new acute patients in the intensified care unit and began to show signs of exhaustion and frustration from not being able to master the enormous changes at their work (Peltola 2001; Kajamaa 2005).

A Change Laboratory project was then started at the ward in 1998 to reorganize work practices and to support employees' workrelated well-being. The Change Laboratory method represents a participatory approach for the development and change of work practices (Engeström et al. 1996). The method is grounded in the theoretical concepts and methodology articulated in cultural historical activity theory (Engeström, Miettinen and Punamäki 1999) and Developmental Work Research (DWR) (Engeström 1987; Engeström and Miettinen 1999). The Change Laboratory project at Oulu University Hospital involved charting the present troubles and defining the major contradictions in the work practices at the ward. Employees at the hospital ward participated in the Change Laboratory project. They analyzed

the present tensions of their work by tracing back the history of the ward in ten meetings. Together with the researchers, the employees created new solutions to improve their work at the ward (Peltola 2001; Kajamaa 2005).

The problems of the ward were concentrated on the monitoring room where intensified care was provided, and the room became the basic topic of the Change Laboratory meetings. The room was equipped with complex technology, and according to the nurses it was extremely demanding to work there. The room did not meet ergonomic requirements for hospital work. In addition, only one nurse was assigned to each shift, which made the shift extremely demanding and busy. The nurses started to avoid the room and instructed inexperienced visiting nurses to work there (Peltola 2001; Kajamaa 2005).

The workers identified three types of patients who were coming to the ward. These were patients that were there to be tested, patients who needed monitoring of their condition, and patients needing rest. A new model of working was created at the Change Laboratory. The ward was divided into three modules, and the staff started to shift between modules so that they were in the monitoring room one at a time. The other two modules cared for internal patients who were not in the need of intensified care. Everyone needed to learn new things to be able to manage the work in the monitoring room. An additional nurse was assigned to the monitoring room. The new "three module" model was tested at the ward, but the employees did not fully approve the model. The ideas did not become concretized after the project was over. The customary division of labor, for example, was confused, and daily routines were upset. The workers felt insecure and shifted between their old ways of working and the new model. The researchers felt that the management of the hospital did not endorse the change systematically enough (Peltola 2001; Peltola and Mäkitalo 1999, Kajamaa 2005). The last written document we could find of the Change Laboratory project (Peltola 2001) indicated that the ward was still searching for new solutions to their problems. Next, we will present the method of our study.

The method of the study

The methodology of the study involves the narrative approach and activity-theoretical studies on work and organization. We suggest that the narratives represent 'organizational memory' in the acts of remembering mediated by socio-cultural artifacts and interactions at work. We also suggest that the act of narrating represents time as 'lived time' involving real pasts in actual presents and anticipated futures. The section is structured so that we will begin with some general principles underlying our method, then we will present the method of data gathering, and finally, we will present the process of analysis.

In our study we traced the consequences of the change project e.g. the organizational memory 'in the making' by using a narrative approach in the data gathering as well in the analysis of our data. Cultural historical activity theory provided us with analytical concepts to study the processes and dynamics of change in more depth. The form of narrative analysis

depends on the researcher's views on the construction of knowledge, in other words of its epistemology. However, much narrative analysis is unclear about its epistemological commitments (Redwood 1999). Our thinking is influenced by cultural historical activity theory. Epistemologically, activity theory, as derived from Marx's thinking, is often considered realistic, but it can also be conceived of as a form of constructivism, because it emphasizes that signs mediate the construction of reality. Activity theory has the acting subject's potential to create reality in focus, and therefore activity theory can be considered constructionist. However, activity theory overcomes the traditional idea of constructivism, which stresses the individualism in the construction of knowledge, because it takes into account historicity, collectivity and cooperation in the construction of reality (Engeström 2000).

The method that is most often used to collect narratives is an interview. The past is present in an interview since in an interview situation interviewees live through their past experiences. In our study, we did not assume the narratives to carry the truth or true experience of what really happened in the change project. We see narratives as creations of the interviewees and narrating as a communicative act that links the individual and organizational narratives as well as the researcher to the interviewees (Kerosuo 2004). In order to remember, people use external and internal means (Engeström, Brown, Engeström & Koistinen 1990). For instance, Rier (2000), a trained sociologist, was a patient at an Intensive Care Unit (ICU). In his study, he narrates his past experiences of receiving care in the ICU. While not being able to talk or express himself otherwise, because of being only partially conscious or because of the treatments at the ICU, he communicated with his intimates and providers with handwritten notes. Afterwards he used these notes to recall his experiences during the care in order to make a retrospective narrative of what it is like to be a patient in an ICU. Radley and Taylor (2003) use photographs as memory aids for patients to narrate as an act of remembering their stay at the hospital. Despite the experiences related to learning from the past, both examples also involve goals for present activities. In Rier's case, the goal is gaining knowledge about intensive care in general, whereas in Radley and Taylor's example, it is establishing means for creating a new "sick-identity" and a future as a sick person.

Narrating is emotional in nature. Emotions are made present through being related to past events within accounts. People take actions to fashion the course and the form of the recollection. People can, for example, use narrative to create distance from unpleasant experiences and separate themselves emotionally from the past. This kind of a process provides an opportunity for emphasizing positive aspects of the unpleasant experience. However, an interview situation can also create a threat as it brings negative emotions from the past into the present. In some cases remembering and change require forgetting (Radley & Taylor 2003).

In the present study, we chose to interview the nursing staff from the ward. We wanted to hear the stories 'from the grassroots', how the employees have experienced the changes over the years and how they define the consequences of the Change Laboratory project. As a

starting point we thought that the stories of the employees are intertwined in the ward's historical events and contexts, and their narratives are both expressions of their own thinking and expressions of collective information about change. The interview data will be described in the following section in more detail.

The narrative analysis of the study began with the extraction of the interviewees' narratives of change from the data that were then emploted (Mishler 1986; Propp 1928/1968; Czarniawska 2004). We used Mishler's (1986) four categories in extracting the narratives. Those categories include 1) an orientation that describes the setting and character, 2) an abstract that summarizes the events or incidents of the story, 3) a complicating action that offers an evaluative commentary on events, conflicts and themes, and 4) a resolution that describes the outcomes of the story or conflict. Extracting the narratives from the data is exacting and there is simply no right way to do it. Researchers from different fields can carry out the process very differently and emphasize different kinds of plots. The researcher always makes interpretations and the interviewees never totally speak for themselves. It is a researcher's right and duty to make interpretations of the interviewees' stories, and most importantly to maintain a respectful attitude towards the storyteller during the whole process (Czarniawska 2004).

We categorized the extracted narratives of change into main plots and subplots. Narratives must always have a plot and the plot can be interpreted ambiguously (Czarniawska 1998). The researchers can emplot narratives from various perspectives, e.g. a biography can be emploted as romantic, satire, epic or tragic (Czarniawska 2004). In this part of the analysis our aim was to study our first research question of what kinds of change narratives the interviewees construct. Then we modeled 'a story map' representing each plot as a different path of change in the story map (Cussins 1992; Garud & Karnoe 2001; Engeström 2003). In other words, we provided a meta-narrative of the consequences of the change project at the hospital ward. This phase of the study focused on our second research question: what kind of meta-narrative do the change narratives produce? The meta-narrative is expressed in the form of an image in figure 1. We then conceptualized the consequences of the change project by analyzing the different change narratives with a variety of conceptual tools, such as *consequentiality, template, cultivation, impoverishment* and *maintenance*. The conceptual tools are explorative concepts that can be used in the analysis. We will define these concepts in more detail in the section where we report the findings. The aim in this part of the analysis was to provide information about the processes and dynamics of organizational change efforts and to provide findings for our third research question of how the consequences of a change project can be conceptualized with analytical tools. Before presenting the findings, we will give more information about our data and the conditions related to the data gathering.

Data of the study

We interviewed six nurses that had been involved in the Change Laboratory project in their work environment, the medical ward. There had originally been about 20 employees involved in the project but some of the staff had retired or had changed workplaces. We interviewed two people alone and four as a pair. The number of the interviews is four. Each interview lasted approximately one and a half hours. The ward and its physical objects functioned as a resource for remembering (Radley & Taylor 2003; Kerosuo 2004). The interview questions were semi-structured and the interviews invited remembering related to change. The interviews consisted of the following themes: (1) the starting points of the Change Laboratory, (2) the Change Laboratory in practice, and (3) the consequentiality of the Change Laboratory project in the ward. The interview situation was seen as "a production field" of narratives where stories told and shared by the interviewees are not entirely free narratives but embodied acts (Radley & Taylor 2003). One of us (AK) did the interviews. The interviews were then transcribed by an research assistant who was not otherwise involved with the project. The interviewer had an opportunity to make observations of the ward during the visits. The observations give support to the analysis of the data and are reflected on in the Discussion. The researchers in charge of the Change Laboratory project were also interviewed. Their interviews were not analyzed and used in this study but they support the present analysis.

The research setting of our study was challenging because the Change Laboratory project had not been followed up and information might have been lost during the years. The interviews were based on the employees' recollections and might be incoherent. Neither was it possible to find out everything that had happened in the change laboratory project. We had to reconcile the stories with the present. However e.g. organization researcher Czarniawska (2000) emphasizes that searching for the past is often expressly successful with longitudinal settings. Czarniawska (2000) uses the concept of "empty time", which describes a situation in which it is hard to proportion storytelling to the original events, where it seems like nothing happened and "the years are missing" in between the event and the story told afterwards. The empty time can however be filled because the stories have a plot structure (Czarniawska-Joerges 1995). The gaps in the stories indicate that the stories are individual and none of them can be considered truer than the other. Gaps can also be interpreted as a representation of multivoicedness in the organization.

Findings[4]

Our study provides three types of findings. We divided the findings according to our research questions. The first section of findings is named *Main plots in the change stories*. It introduces the findings of the first research question: What kinds of change narratives do the interviewees construct? Our plot structure analysis produced five types of plot, which we interpreted to be the main plots in the stories about the Change Laboratory project. We named

those five main plots as follows: 1) changes in the requirements, 2) changes in the facilities and equipment, 3) changes in the division of labor, 4) changes in the ways of working and 5) changes in the agency of the workers. All these plots relate to the monitoring room of the intensified care, which was in the center of the discussions in the Change Laboratory meetings as described earlier on. The second section reports the findings of the second research question: What kind of meta-narrative do the change narratives produce? This section is called *Paths and traces in the story-map*. We created a map, or in other words, a representation of the main plots extracted from the data. The map structured the data and served as a methodological tool in sketching the paths and traces of change. The third section is named *Consequences of the Change Laboratory project*. In that section we analyzed the consequences of the change project with the analytical concepts such as *consequentiality, template, cultivation, impoverishment* and *maintenance*. We will now present our findings in that order.

Main plots in the change stories

The challenges for change –changes in requirements

The first subsection describes the stories about the starting points of the Change Laboratory project and the requirements for the work at that time. All the interviewees described that time as a period of continuous changes and uncertainty. Demands on the staff were increasing greatly, and they had to start taking much more responsibility in their work than before. In particular, the nurses that took the primary responsibility for the care of the patients felt unskilled at taking care of the new types of patients. All of the interviewees agreed that the monitoring room was a major problem at that time and that it was "a chaotic place to work at", as one of the interviewees expressed it. The nurses did not want to work there because they had to work alone, and the nurse who did work there was so busy that she did not have time to go to the toilet or have lunch during the shift. The flow of patients was increasing in the ward and their symptoms were acute in nature. The ward started to receive new equipment, which made the nurses feel uncertain and unskilled.

According to the narrators, the Change Laboratory project concentrated on the problems in the monitoring room, and only a few issues were discussed outside the topic of the monitoring room. The workers videoed work in the monitoring room during the project and the tapes were analyzed in the Change Laboratory meetings. Presently, the regular nurses complete the shifts in the monitoring room. Some interviewees had the opinion that it depends on each patient whether or not they experience the work in the monitoring room as being difficult. Some patients only stay for a short period of time and are not as demanding.

The general opinion was that work in the ward is still pressing and the ward is understaffed, but the working conditions have become much better. "The monitoring room module" was invented in the project and implemented in 1998. This major change meant that there were three separate modules drawn up according to the three different patient types in

the ward. Nowadays nurses receive help quickly from the other nurses and doctors when they need it in the monitoring room. One of the workers in the monitoring room is always a nurse. The other can be a practical nurse, but usually the nurses do the shifts there because they are more skilled and they also have permission to give medicine to the patients, which practical nurses are not allowed to do.

Changes in the facilities and equipment

The monitoring room was totally renovated in the spring of 2004. The room was confining and cramped before and the equipment was poor. In the renovation, the room was expanded to include the room next door and the space was doubled. There are four beds in the current room now, where before were six beds in a room that was half the size. A new small office has been built in the monitoring room. The nurses have all the patients' records in the intensified care close to them. Before, the files were kept in the ward's general office, which was impractical. The equipment used to be outdated and noisy in the late 1990s. Because the monitoring room was so confining, the equipment was placed on the floor or set dangerously on chairs. The equipment started to malfunction and the hospital made many equipment purchases for the monitoring room in a short period. The equipment there is currently modern and convenient. However, some of the old equipment is still used along with the new equipment. On the other hand, some workers complained that the upgraded medical technology increased the number of patients in poorer health sent to the ward. Some interviewees thought that the equipment is difficult to use, especially as the situations in the room require an extremely fast reaction time. Responsibility for the equipment increases stress.

The office in the monitoring room has received a modern monitor, through which the nurses can oversee all four of the patients at once. The workers are constantly being trained to use the new computer systems and the equipment. Some interviewees thought that the training is intensive and can sometimes be tiring because it is usually done in addition to normal work. The caring plans for the patients have recently been moved to an electronic system, which has required a lot of learning from the staff. Some felt that since the new system was implemented, updating patient records is very time consuming and difficult. The workers called updating "invisible work", which takes time from the actual caring for the patients. The patient records must be updated every day because the patients may be transferred quickly to the intensive care unit if their condition weakens.

The problems of the ward's general office were one topic out of the discussions about the monitoring room. The office was also videotaped during the Change Laboratory project and the activity there was analyzed in the meetings. The office has "always been a problem", as one interviewee put it. It is always crowded with nurses and noisy. The ward's secretary works in the office full time and answers the phone there. The other nurses simultaneously e.g. assort medicine dosages, write reports, consult each other and give laboratory results to the patients in one small office. It is a problem that the morning shift and the evening shift use

the office one upon the other. Some interviewees thought that the patient's data protection might be compromised in this situation. A new office has been established for the doctors, which has eased the traffic in the general office. Some renewals have taken place in the office; the computer system has been renewed and the cabinets for medicines and some shelves have been rearranged, but the office would still need more improvements. It is still "a horrible place to work at", according to one of the interviewees.

Changes in the division of labor

Before the Change Laboratory project, the responsibility of the monitoring room was in the hands of visiting workers, who according to the interviewees were not skilled enough to work there. The regular staff of the ward avoided working there. The monitoring room was basically under one nurse's responsibility, but she also had to take care of the ward while the visiting nurses did the work in the monitoring room. Before, decisions of "who goes where" were made on the spot at the beginning of each shift. The nurses were always afraid that the monitoring room would be their responsibility.

During the Change Laboratory project, many templates were created and many trials were carried out. At first a nurse from the ward was in the room for two days. The trial was seen as a difficult experience because the nurse had to be alone. Then a new intermediate shift between morning and evening was started, the aim of which was to increase staff resources in the monitoring room. When more people were employed, the visiting workers left the monitoring room. The monitoring room started to work as its own module and the rotation was renewed. In the new system the workers circulated between three modules. The system is still in use and the interviewees felt that the "three module model" is quite functional. The workers spend three weeks in each module at a time. The night shift was still a problem when our study was carried out. There was only one nurse assigned to the night shift, and it was said to be a nerve-wracking experience. The nurses felt that there should be another nurse because the same problems can occur as in the dayshift. At the beginning of the year 2005, an additional nurse was assigned to the night shift. One problem before the Change Laboratory project was that the doctors used to do their rounds in the monitoring room in the afternoon. An idea came up that the rounds could be started from the monitoring room, where the patients were in the most severe condition. More doctors have been employed in the ward, which has also improved the functionality of the monitoring room. Some interviewees thought that there are still problems related to the doctors' rounds. The length of time for the rounds stretch out, which might be just a matter of poor organization. Opinions on this issue varied; some thought that the delays depend on each doctor's way of working. Some thought that the time needed for the rounds depends on the patients, as some of them require more time than the others. Then and now, the nurses felt that delays in the doctors' rounds annoyingly lengthen workdays.

The high turnover of workers in the ward is problematic and complicates the flexible division of labor and the continuity of the patients' care. People have recently retired, some

practical nurses have left for other jobs, and some young nurses tend to change wards in periods of couple of years to gain different kinds of experiences of nursing work. Sometimes the ward is understaffed and nurses are often called to work on their days off. The problem increases in the summer when workers have holidays and temporary workers are difficult to find. The patients are nowadays "divided" equally between the workers. Workers take the total responsibility of the care of a patient assigned to them. The continuity of the care of each patient has improved. The nurse on the night shift in the monitoring room always remains there the next morning and consults with the morning shift. Now approximately seven years after the project, the ward's workers seem to work there with no trouble.

Changes in the ways of working

The interviewees told that before the Change Laboratory project the ward was divided into two parts and the division was unfair and asymmetrical. The ward was simply split into the two sides of the corridor. The ways of working were also split and very task-oriented. One of the interviewees remembered that the division changed during the project so that the work became more patient-oriented and each nurse had a certain patient that she took care of. The patients quite often have multiple illnesses and it is good that their care is limited to one nurse. The transition to this new patient-oriented system has taken a great deal of time, and the system still needs improvement. In the project, the collaboration between other wards was discussed. The ward felt that more collaboration is needed e.g. since the patients move from ward to ward. However, the work has stayed very ward-specific and collaboration has not developed. There are strong boundaries between the wards and the nursing staff does not communicate much, even though they thought they should. They have only collaborated in some acute emergencies that have taken place in the night shifts in the monitoring room. One of the interviewees had the opinion that "the three-module system" has clarified the workers' roles in the ward, "They all know better what they are supposed to be doing and what is expected."

The ward had staff meetings very rarely, perhaps once a year before the Change Laboratory project. The project introduced the workers to a system in which they started to have regular meetings where issues were discussed fairly openly. They e.g. discussed the atmosphere and the treatment of co-workers in the ward, which had not been discussed before. The workers have continued the meetings and they usually take place once a week. Nowadays there is a possibility to transfer to another ward to work if one wishes. It has not yet happened because the transfer sounds negative, as there is a belief that troublesome workers are forced to other wards and not wanted back. During the last years the transfer has been offered as a possibility to self-development, but the workers have still refused it because it demands quite much learning and readjustment. The workers have been offered workplace consulting in groups but they have not had the motivation to participate in it. Some explained that the three-shift work is difficult, because one should come to meetings on days off and so on.

Changes in the agency of the workers

The interviewees described their feelings related to the Change Laboratory project. The project was not easy and caused resistance in the ward. One interviewee said that the project was resisted the whole time it was being carried out. The interviewees remembered that they were not asked whether or not they wanted to participate in the Change Laboratory project, "It simply just came to the ward," and one had to learn new things all the time. The project itself caused anxiety and was very exhausting at first. The workers had to discuss things professionally and personally and do assignments besides their regular work. One interviewee thought that there were "circles" in the ward, which caused the flow of information for not being very smooth, but that the situation improved after the Change Laboratory. The project was "a site for development" for some interviewees and it helped to look at things from new perspectives. It required true will and took a long time for the ideas to become concrete. The templates innovated in the meetings needed "years of gestation", as one person put it. The workers had gone blind to the daily routines that caused disturbances in the new kind of care unit. It was extremely hard for the workers to plan for the ward's developmental challenges in the near future when the project officially ended. According to a couple of interviewees, the atmosphere has improved in the ward. Most of the nurses have accepted training and attended courses even during their spare time and have expanded their job descriptions. The changes in the demands have concerned the nurses especially, and some of them thought that the changes increased the possibility for them to make their own decisions at work and that the meaning of their work has very much increased, which has been a good thing. Practical nurses have received tasks that nurses used to do but are too busy to do now that their own work has expanded. Some practical nurses have apparently left the ward because they felt that they were not skilled enough for the new requirements. On the other hand the practical nurses are not allowed to conduct all the nursing work, which may cause uncomfortable situations. One practical nurse commented that her working pace has been increasing all the time, and learning the new computer system has been especially hard. The monitoring room uses nurses almost exclusively, and the pressure and responsibility for the bedridden patients in the other two modules is often on the practical nurses. Before, the head nurse used to speak in the meetings. The interviewees thought that in general their opinions are nowadays taken into account in ward meetings, and they feel that they can contribute to the decisions made in the meetings. Some interviewees thought that the general attitude in the ward is optimistic towards training. It is their personal choice how actively workers participate in training sessions. Some feel that there is simply no time for training sessions alongside regular work.

Our interpretation is that the Change Laboratory project has given the workers more responsibility in their work and the possibility to contribute to the decision-making in the ward meetings. During the project they became used to analyzing and talking about their practices and this style has continued in the ward. The workers have somehow become more aware of their agency as workers in the medical ward. Some interviewees expressed an expansion of agency and a better mastery of their work. Some felt that the increased working

pace and responsibility has added to their stress. However, we felt that it was remarkable how profoundly the interviewees reflected their feelings to a complete stranger in the interview situation.

Paths and traces in the story-map

The story-map (see figure 1) is a representation e.g. a visual model of the essential stories about the consequences of the change project that illustrates the meta-level of change in the sketched paths and traces on the map. By path Engeström (2003) means the diffusion or the progress of change, which occurs in time and place as material, discursive and cognitive trace. Paths can be external material imprints or internal representations. The number of paths and their crossings increase if the paths are used repeatedly and they start to formulate networks. However, if the network becomes stable during the process it stiffens up and starts to limit an actor's movements in it. When the new solutions proceed or perhaps vanish into the organization they leave certain identifiable marks and changes. This includes memory traces, documents and stories about change. Exploring the traces is reminiscent of archeological research. The traces are often fragmented and interpreting them is like piecing together a jigsaw puzzle.

The typology of the stories is shown on the map. We have marked the five main plots and their various subplots on the story-map. For instance, the subplot *increasing amount of patients* is a subplot to the main plot *changes in the requirements*. We had watched the tapes taken from the 10 meetings held during the Change Laboratory project and we had made summaries of the key points in them. That background information gave us our direction in classifying which of the stories are strongly connected to the original project and which have directed the project at its start or are related to some other developmental projects. The five main plots were named in the first result section as follows: 1) changes in the requirements, 2) changes in the facilities and equipment, 3) changes in the division of labor, 4) changes in the ways of working, and 5) changes in the agency of the workers. From those plots 3, 4 and 5 were most strongly connected to the Change Laboratory project. We came to this conclusion because the subplots around them included themes related to the themes in the videotapes taken from the original meetings, which we had watched.

Figure 1. *Main plots of the narratives in the story-map*
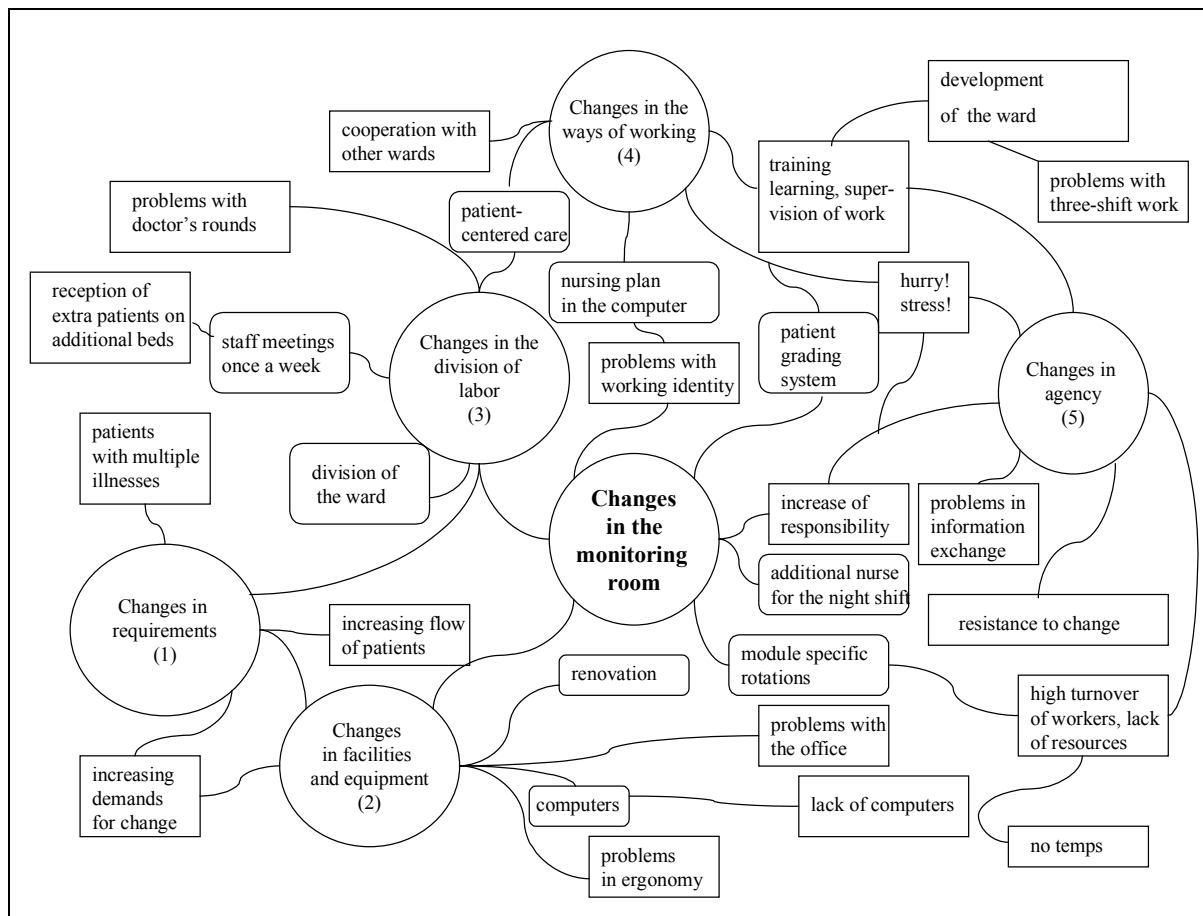
Consequences of the Change Laboratory project

The results have thus far consisted of the different plots in the stories of change and the paths and traces on the story-map. Thirdly, we will provide findings, which describe our analysis of the consequences of the Change Laboratory project using certain analytical tools. The analytical concepts are *consequentiality, template, cultivation, impoverishment* and *maintenance*. The analysis included the extraction of statements expressed from the stories. The chosen extracts were then studied further in order to find out how they express the phenomenon depicted by the concepts, leading then to identification of the processes and dynamics of change and how the change occurred.

By *consequentiality* we mean that the focus should be on tracing the intentional and the unintentional consequences of the developmental projects. Consequentiality is the main concept for the other concepts. However, we want to make a clear distinction between consequences and effects. Effects indicate causal relationships whereas the concept of consequentiality requires the engagement of temporal, local and some other relationships. The concept of consequentiality traces those engagements, the lack of them and their

preconditions (Engeström & Kerosuo 2004). *Template* is a basic unit of change. It is most often a very simple plan of action, a genuine principal of a phenomenon, solution or tool, which can be made visible or modeled. To survive, a template must have the ability to produce variety. It also must have the capacity for enrichment. A template's power is in its degree of providing duplicates and its ability to diffuse (Engeström & Kerosuo 2004). The *cultivation* of changes indicates processes in which the change is reshaped and remodeled. The cultivation of change usually requires conscious effort (Engeström & Kerosuo 2004). The circumstances may change in the organization, which requires the cultivation of templates in order for them to survive (Kajamaa 2005). *Maintenance* means taking care of, adjusting, updating, fixing and endorsing the changes that already are more or less established. Quite often the maintenance is invisible. If the changes are not maintained they start to impoverish, disintegrate and simplify. Then the change easily becomes superficial and encapsulated. (Engeström & Kerosuo 2004). *Impoverishment* means that the templates and solutions created in a change project have only partly been cultivated or maintained or have totally vanished and are hard to trace (Kajamaa 2005). Sometimes the templates have impoverished partly and lost some of their original idea, and some of the workers may still maintain the idea while others do not. The templates may also be cultivated to suit the organization's current needs in such a way that the researcher interprets them as being impoverished.

We found *templates* that had been maintained in the ward after the Change Laboratory project. The interviewees' stories revealed three templates that had been designed during the project and are still in concrete use. Firstly, the monitoring room was designed to be its own module. This is an established practice and in general the interviewees felt it was a practical solution. The ways of working in the monitoring room have been *cultivated* over the years. Firstly, there was a trial where the nurses attempted to be in the room alone two days at a time. It did not work and the old problems remained. When an additional nurse was assigned to the room, the two nurses started to be there six weeks together. Secondly, a new rotation was established. The three modules have each their own rotations in which all the shifts are marked beforehand with specific symbols. The rotation invented in the project is still in use and has been found to be very practical. It clarifies the roles in each shift and organizes the work on its behalf. Thirdly, there is the change in the doctors' visiting times. The interviewees were pleased that the doctors' rounds are now in the morning and that the afternoon is less hectic. The change in the schedule was invented and tried in the project and it has absorbed into the system. However, some nurses still felt that the ways of working of some of the doctors could be improved. These three templates can be said to be the most important in transforming the monitoring room from "a chaotic place to work at" towards a new kind of functional care unit. The monitoring room can be called a template for the consequentiality of the Change Laboratory project itself. There were in fact problems in implementing the new "three-module model" in the ward. In 1998, the same year the model was established, it was discarded and the ward went back to the old system. Then in the beginning of 1999, the ward went back to the "three-module model" again. The six-week period in the monitoring room

cultivated again, this time into a three-week period, which is still in use and has been commonly accepted as an established solution. The original idea was to have different patients in each of the three modules. The interviewees only mentioned the monitoring room as a room for a certain type of patients, and our interpretation is that the rest of the patients are mixed into the two other modules. This template seems impoverished.

Several other templates were also interpreted as being *impoverished*. The two most common ones mentioned in the interviews were the issue about cooperation with other wards and the problems in the ward's office. We saw two other templates as impoverished and our interpretation is that those impoverishments were related to the overall changes in the hospital. The practice of the intermediate shift between morning and evening has disappeared. The ward has received new staff and the shift has possibly become unnecessary because of this. In the Change Laboratory project, a template about a system for receiving the patients that come from the other wards was created. For some reason that template impoverished as well. Some interviewees told that it was experienced as too task-oriented a practice in the ward, which had to assimilate patient-centered care at the same time as a new attitude.

The researchers in charge of the Change Laboratory project were also interviewed. Their interviews were not analyzed and used in our study but we had several in depth discussions with one of the two. She mentioned that the idea of "the three-module model" was almost entirely the researchers' own idea, which they tried to introduce to the workers in the meetings. The idea of the three different patient types in three different modules was primarily theirs. Our interpretation is that the workers produced their own version of the ideas over the years. The original monitoring room module remained and its practices were improved one at a time. The office of the ward was involved in some of the discussions in the project and the workers tried to improve it on the basis of the analysis of the videotapes, but the ideas were not maintained and the office is still not fully functional. The Change Laboratory project was altogether so concentrated on the problem solving of the issues in the monitoring room that not much time was left to discuss or model other issues. Expansive learning has taken place in the practices of the monitoring room, where the new practices have truly been consolidated and diffused.

The change process required cultivation of the original ideas over time. The workers interviewed did not accept the ideas from the 'top down' straight away. They did their own 'grass root' innovations and needed time to adjust to new solutions. Our interpretation is that it was in fact a good thing that the project concentrated on the monitoring room, which was the real problem of the ward. The project was very focused and had a clear object: the improvement of the monitoring room. This made the changes possible and sustainable, at least to a degree. The workers realized the essential problems in their work. The essence of work became redesigned. Through the change process, the work and the emotions related to it had become more controlled and rational. The new head nurse of the ward has supported the maintenance of the presented templates. According to the interviewees, she takes a positive attitude towards development and has worked hard in order to bring more staff and facilities

to the ward. The management of the hospital has also taken a more active attitude towards employees' initiatives during the last years than during the original project.

We have been in contact with the ward and are told that they have used the story-map (figure 1) in their ward meeting to outline the current challenges they have at work. We have also visited the ward in order to do some participant observation of the work in the monitoring room. We feel that the interviewees were able to remember the Change Laboratory project fairly well. The changes in the ward, especially related to the monitoring room, were very practical and concrete in nature. Our interpretation is that this localization and concreteness of the consequences has increased the recollection of the change project.

Discussion and Conclusions

The paper focuses on the social creation and destruction of knowledge in organizational change efforts that were carried out in the past. The social creation and destruction of knowledge are studied in acts of remembering that take a narrative form. The concept of organizational memory captures the substance of organizational change efforts. A practice-based approach, in particular cultural historical activity theory, provides the conceptual frame for conceptualizing organizational memory. Organizational memory was studied as mediated by culturally and historically accumulated artifacts and interactions realized in social actions. Temporality was considered an aspect for studying change efforts in the past. Time was understood as 'lived time' involving actualized presents with real pasts and anticipated futures. In this section we will discuss our findings in terms of the substance of organizational memory, temporality, and the act of remembering past change efforts. On these bases, we will suggest conclusions on the social creation of knowledge in organizational change efforts.

By providing a relational, interactive and participative approach to knowledge creation, the conceptual approach provided by the practice-based approach to organizational memory depicts an enriched portrayal of the organizational life within change efforts. Our analysis provided traces of organizational memory in material forms, work practices, ways of working, future challenges and agency. The meta-level tool, the story-map, crystallized the elements of organizational memory, while the conceptual tools *consequentiality, template, cultivation, impoverishment* and *maintenance* deepened the knowledge of the consequences of a change project that was carried out in the past. These findings meet the needs recognized by Casey and Olivera (2003) for the study of processes by which the organizational memory is formed or the ways in which it affects organizational phenomena. Casey and Olivera (2003) pointed to the predominant worldview of functionalism in studies of organizational memory. On the basis of this analysis, we suggest that the practice-based approaches provide a good alternative to the objectivist paradigms in studies of organizational memory. We suggest also that practice-based approaches are also promising for gaining a deeper knowledge of long-term consequences in change efforts at work, as pointed out by Pettigrew (1995).

According to Casey and Olivera (2003), space and time are seldom seriously considered in articles of organizational memory. In our study, the space, the monitoring room, acted not only as an important material trace of previous (and also on-going) change, but also as a means for recollecting memories in the employees' interviews. However, temporality emerges implicitly in our findings as 'lived time', which is non-linear and unarticulated. The time passages between different actual times seem fascinating in the ways that the nurses bridge different temporalities in their narratives. But a challenge of future analysis is to provide more precise empirical findings on temporality conceived as 'lived time'.

In our study, the narrative form of knowledge captured organizational memory 'in action' in acts of remembering. The method provides useful instruments for studying knowledge creation and its consequences.

In conclusion, we suggest that practice-based approaches and the narrative method provide an alternative to the predominant worldview in theories of organizational memory and the social creation of knowledge. However, the method needs further elaboration, in particular, temporal analysis requires more specific analytical instruments.

Acknowledgements

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Endnotes

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[4] These findings have been reported in greater depth in Kajamaa (2005)

Writing learning stories: The case of Telcotech

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Introduction

Countless publications on the future of management education and on qualifications needed at the workplace emphasize the need for learning from experience, (Smith, 2000). While practice can be viewed as a rich source of new knowledge and learning about management (Kim, 1999), the learners' active participation in learning is essential to capture the learnings occurring in job assignments (Ulrich/Greenfield, 1995).

Experience based learning

Experience-based learning aims at learning from these work-based experiences to prevent the repetition of specific failures and to help generalize learnings from specific challenging situations (Smith/Morphey, 1994). By pushing the application of knowledge towards the solution of actual workplace problems in which learners can see the results of their decisions (Fulmer, 1997), experience-based learning occurs within the context of an application and not in an abstract, decontextualized way (Renkl/Mandl/Gruber, 1997). Learning then becomes problem-oriented, providing developmental outcomes that can be applied in the work setting (Bunning, 1996.). Additionally, the active involvement of the learner in the learning process increases the likelihood that the learning will be retained as mere participation in management tasks and action is not enough for management learning to occur (McKenna, 1999).

Aim of this work

The aim of this work is to introduce a method to realize collective learning from experiences by taking a narrative based approach. The case writing method developed in this work unites components of organizational learning theory with theory about organizational storytelling and case learning. It focuses on organizational actors' understanding of organizational experiences, including the subjective meanings attached to these experiences and how these can be used as a basis for collective learning.

The following paragraphs will quickly introduce the specific perspective on organizational learning taken in this work. In a second part the narrative approach will be introduced explaining why a narrative approach seems to be particularly appropriate to foster collective learning.

Approach to organizational learning in this work

Organizational learning enables organizations to build a new understanding and interpretation of their environment, which results in associations, cognitive systems and memories that are developed and shared by members of the organization. The current

literature on organizational learning focuses on four key elements to enable organizational learning: The existence of multiple interpretations, reflection, dialogue and shared mental models. For collective learning to take place, organizational members have to go through the following phases:

Recognizing multiple interpretations

By confronting organizational members with multiple views of their organization and its activities that capture a different reality (and are also plausible), organizational members recognize that their own vision of reality is not necessarily the only and the "right" view, but the result of interpretative processes.

Joint reflection

Reflection is a sense making of information, analyzing and understanding what happened and what can be learned from it by relating the observations to a known framework of understanding, or by creating a unique framework of its own.

Reflection turns experiences into learning, resulting in a change in meaning structures and the externalization of knowledge.

Dialogue

By making mental models explicit and creating joint meaning through dialogue, learning can be spread from an individual to a collective level. In the process of dialogue, organizational members "build communities of understanding". Such dialogue presents the base for the joint development of shared mental models (Boyce/Franklin, 1996; Senge, 1990).

Development of shared mental models

Learning occurs when individual members of the organization jointly construct understanding – their mental models – of the organization and the environment. The ability to amend or update shared mental models based on experience is viewed as a critical element of organizational learning (Dixon, 1997). Changing shared mental models alters the organizational members' assumptions (Francis, 1997), thereby enabling double-loop learning to take place (McGill/Slocum/Lei, 1992).

The current study is based on an interpretive, narrative approach to organizational learning. The interpretive perspective focuses on how people understand and interpret events and how this understanding is transferred to a shared organizational level. It assumes that individuals construct knowledge through interpretive interaction with the social world which they experience (Billett, 1995). Learning is seen as an interpretive process in which new meaning is constructed. Organizational learning can therefore be viewed as encased in how people

recount and interpret their organizational experiences, which are manifested in organizational stories[2]. Media such as language, text or metaphor are viewed as reflecting the processes of sense-making and learning by organizational actors (Boyce, 1996). The analysis and interpretation of these media can reveal organizational members' learning.

Stories in organizations

The following paragraphs give a short overview of the particular functions of stories in an organizational context.

Teaching of culture, norms and values

Most of data shared in an organization comes from organizational members' stories of what is happening. Stories are often a means of implicit teaching[3], implying the hidden rules and acceptable standards of behaviour (Forster et al., 1999). Organizational stories are part of the information processing system in and around the organization (Boje, 1991). By summing up a company's core values (Pike, 1992), providing orientation as to how things are and should be done (Hughes, 1995) and conveying role models and organizational norms, stories are carriers of corporate culture (Stewart, 1987).

Metaphors play in important role in the teaching of norms and values: Being part of an organization's knowledge system, they describe the way of doing things in an organizational context. The use of specific metaphors implicitly passes a value judgment and prescribes a mode of appropriate behaviour (Tsoukas, 1991; Jordan, 1996)[4].

Enhancing deep understanding

Storytelling can lead to a deep understanding in ways that are meaningful and relevant (Kaye/Jacobson, 1999; Collison/Mackenzie, 1999). First, stories are qualified to tap into intuitive and emotional components of understanding. They have the capacity to connect on a personal level. In this context Hughes (1995) stresses that stories represent a way of experiencing someone else's reality, thereby "transmitting perceptions".

Second, stories are well-positioned to capture the diversity and complexity present in organizations (Barry/Elmes, 1997). The sanctioning of ambiguity and paradox is one of the unique and most important characteristics of stories, since it allows the simultaneous holding of two opposite viewpoints (Czarniawska-Joerges, 1995). In that sense stories present an ideal medium to hold irreconcilable alternatives in suspension (Boyce, 1995), to uncover contradictions, dilemmas and paradoxes (Hawes, 1991) and hold them up for critical interrogation.

Through storytelling the individual makes retrospectively sense of past events (Schneider/Dunbar, 1992). This act of sense making is not limited to an individual's personal experiences, but enables the embedding of individual experience into a bigger context of organizational processes and relationships.

Organizational members produce a shared, intersubjective understanding of reality through talking, providing themselves with a scheme for making sense of that reality. Organizational members, who share the same meaning, and thus the same reality, share a set of interpretations about the real world which becomes the basis for joint action to emerge. Stories are a device for creating and sustaining this shared meaning and for constructing a collective sense (Boyce, 1995).

A specific consideration of metaphors

Metaphors deserve a special consideration, since they exhibit unique characteristics such as the transfer of meaning from a familiar to a different and unfamiliar domain, the understanding through other and the revelation of hidden beliefs. The following paragraphs give a short summary of these characteristics and summarize in how far they are relevant for learning to occur.

Revelation of experience and creation of understanding

Metaphors imply a way of thinking that reveals how people see the world. Lakoff and Johnson (1980) demonstrated that the conceptualization of the world is largely dependent upon interlocking systems of metaphors that permeate language. The authors therefore emphasize the importance of metaphors in theory building, since they not only structure language, but also one's conceptual system. Metaphor is a basic structural form of experience through which human beings engage, organize and understand their world (Morgan, 1983). They assist organization members to assign meaning to things they experience. In this sense metaphors assume the function of cognitive lenses by making sense of situations. In this process of sense-making the social world is continuously re-constituted through linguistic and symbolic means (Morgan, 1980; Weick, 1979) that bind the various parts together in meaningful wholes.

Since people's cognitive maps of the world are shaped by language, an awareness of the images and metaphors used provides a useful means for understanding life within organizations (Forster et al. 1999). As Marshak (1993) points out in this context, a common metaphor provides a shared understanding within an organization while differing unexpressed metaphorical reasoning may be preventing people from really understanding one another. When the underlying metaphors used by organizational members differ, conflict over what to

do and how to do it is common. By revealing the implicit imagery that guides the thinking, discussion can be initiated on what needs to be done.

Understanding through other

Metaphors involve the transfer of information from a familiar domain to a different and relatively unfamiliar domain, thereby asserting similarities between the source and the target domains in an implicit manner (Tsoukas, 1993). When transferring meanings from one domain to another (Manning, 1997) metaphoric thinking maintains a "double vision" (Brown, 1976) by simultaneously regarding an object from multiple points of view. This unique characteristic of metaphor enables the transformation of implicit meanings across linguistic boundaries.

Revelation of hidden beliefs

Individuals view and interpret events through a set of beliefs and assumptions which are often subconscious and rarely examined or questioned. These underlying, usually unarticulated understandings about a situation, are often shaped and revealed metaphorically[5] (Marshak, 1993), resulting in a particular vision of reality and in potentially appropriate actions within this framework. Thinking of an organization in terms of a machine metaphor invites thinking about organizational change in terms of something "breaking down" and therefore "needing repairs" (Marshak, 1993). In this sense, metaphors are not only descriptive but also constitutive of social situations[6].

Marshak (1993) found that the metaphors and imagery used to understand and describe change differed within the same organization, depicting change as developmental, transitional or transformational. The difference in metaphors revealed a distinctively different sense-making of what was going on in the organization. By choosing certain metaphors over others, a certain perception of reality is not only described, but it is simultaneously prescribed as the way in which reality ought to be viewed and evaluated (Tsoukas, 1991). Paying attention to the metaphors and images used, can help to diagnose unarticulated assumptions and beliefs by which organizational members perceive, think and decide (Hughes, 1995).

Becoming aware of the metaphorical assumptions from which an organization is viewed, opens up the option of consciously choosing another angle from which the organization can be viewed. Brink (1993), for example encourages the formulation of metaphors that facilitate organizational development. In a similar consideration Marshak (1993) suggests the use of congruent and appropriate metaphors to prepare and align people with the nature and requirements of change.

Having thus far focused on functions of narratives and metaphors, the focus now shifts to exploring how narratives can become a device for organizational learning, what type of knowledge can be gained through stories and how this knowledge can be externalized.

Organizational learning through narratives

The following paragraphs focus on how stories can lead to individual and organizational learning. The argument is divided into four main aspects which focus on descriptions of how: Firstly, stories can alter perception thereby contributing to collective learning. Secondly, stories can lead to learning through the joint construction of a new narrative. Thirdly, learning can be derived from the deliberate reflection on the learnings implied in various narratives. Fourthly the externalization of implicit knowledge is made possible by making use of a story's figurative language.

Confronting the differences in narratives

Organizations can be understood as complex sets of multiple, often conflicting interpretations, reflecting the different ways of how people make sense. If members of an organization make sense of organizational experiences in a different way, they will have different versions of the same events. These different interpretations are expressed through different stories[7].

By explicitly surfacing conflicting definitions of a situation and exposing the perspectives of a wide range of organizational characters apparent in different narratives, the discussion of the apparent differences can be initiated. Acting as mirrors of human experience, stories thereby facilitate a shift in perspective, showing people how to look at reality in a different way or suggesting alternative realities (Forster et al., 1999) which can result in new learnings (Cash, 1997). The confrontation of narratives can therefore help reveal new lines of thought and generate alternative responses to the future (Gold, 1996).

Altering perception through narrative

According to Tomm (1987) the particular story that prevails in giving meaning to events "to a large extent determines the nature of our lived experience and our patterns of action." This statement is noteworthy since it turns around the prevailing idea that experience is only *reflected* in stories, by claiming that the stories told determine the potential range of experiences. As a consequence, changing an organization's stories means changing the organization (Stewart, 1986)[8].If organizational members better understand how they construct themselves and their organization, they will be better able to address their problems (Barry, 1997) and collectively enact change through the use of stories.

Joint construction of a narrative

To bring about learning the multiple interpretations of organizational events have to be taken into account. Confronting the different interpretations, testing one's own and determining the controversies between various sides of a story leads to a shared understanding

of the problems and possibilities inherent in an organizational situation. In the course of discussion organizational members can negotiate a mutually agreeable definition of the events recounted, finally moving to a synthesis and a new jointly developed reality. This integration of the different perspectives serves as a basis for new meanings and cooperative actions to emerge (Harmon, 1990). The emerging joint meaning can be collectively created and expressed in a jointly told story that involves a multitude of tellers, with each organizational member relating bits of the story line that in their ensemble conveys the full story.

Reflection on narratives

Stories connect the storyteller and his/her audience to their *own* experiences (Gold, 1996). Through reflection on the events recounted in organizational stories narrative can be a valuable source of insight into organizations. By determining the learning linked to the recounted event and by interpreting how and why the learning took place, stories help to reflect on experiences (Kaye/Jacobson, 1999). This involves examining in detail how the events unfolded towards success or failure and what factors relate to the outcomes. Through reflection on past events and their inherent learnings, people look for hidden principles to make the story transferable and applicable to other situations. Learning from examples is fostered by defining such patterns through the interpretation of experiences[9].

The learnings drawn from narratives can then be transferred in various ways: Pike (1992) reports on the transfer of learning in story form through the writing up of stories as one pagers, retaining all personal elements and adding the moral as the key lesson to be learned. IBM uses shared storytelling as an effective approach for reflection on prior organizational learning and considering its relevance for the present (Boyce/Franklin, 1996). Using the stories to procure large contracts the company reassembles the people who worked on a deal and asks them to relive their story. The lessons of their successful deal are afterwards shared as best practices (Stewart, 1986)[10].

Externalization of tacit knowledge

Tacit knowledge can be described as a subjective, highly individualized store of knowledge and practical know-how (Nonaka, 1994; Polanyi, 1958). It resembles a form of intuition (Smith, 2000), and is therefore sometimes also referred to as practical or intuitive understanding. By being produced in the context of application (Eck, 1997), tacit knowledge is learned independently of direct instruction and is based on the cumulative experiences of an individual's involvement in a specific context (Polanyi, 1966; Raelin, 1998)[11].

The process of translating tacit knowledge into explicit knowledge is critical. Since tacit knowledge is mostly taken for granted (Smith, 2000), and sometimes not even recognized by its holders, it is difficult to formalize or to communicate to others (Nonaka/Konno, 1998)[12].

The use of figurative language, metaphors and narrative help reveal such hidden aspects of organizational life that other, more traditional, research methods fail to identify, thereby

fostering the externalization of implicit knowledge (Hartfield/Hamilton, 1997; Nonaka/Konno 1998). By formulating questions that require the members of assumptive networks to answer self-reflectively with narratives rather than with codes or jargon, the insider's specific understanding is surfaced in the story told. Through the translation of knowledge into narrative accounts, the prevailing assumptions of a particular organizational group are made accessible and thus discussible (Hawes, 1991). This process of rendering implicit knowledge explicit, enables the subsequent questioning of the group assumptions (Roth/Kleiner 1998). By questioning the validity of these assumptions, the group's self-consciousness is enhanced, which can lead to the revision of the group's established customs and practices. As already mentioned in the section on metaphors, metaphors assume a particular role in uncovering the "underlying usually unarticulated understandings about a situation" (Marshak, 1993). Organizational members often intuitively use metaphors, while the reason for the choice of a specific set of metaphors becomes only clear after further reflection on the similarities between the metaphors and the target domain described. A conscious examination of metaphors and their meaning allows a shift from the unconscious and tacit to the conscious and explicit (Oswick/Montgomery, 1999), thereby giving voice to previously tacit perceptions.

Overview on the empirical part

The case writing approach developed in this work consists of three phases, namely the descriptive, the reflective and the critical phase. In the first descriptive phase, organizational stories about the implementation of a knowledge management initiative at the telecommunication equipment division of Telcotech, a big European multinational[13], were collected through narrative interviews from a variety of organizational members. Each organizational narrative conveyed a different perspective and evaluation of the Telcotech knowledge management project. These different organizational narratives represented the basis for a collective reflection by the interviewed Telcotech employees, on their organizational stories and the meanings of these stories, including similarities and differences as well as contradictions and inconsistencies. The outcome of this reflective investigation was a joint definition of the learnings from the narratives through Telcotech employees and a new jointly written narrative about the Telcotech project. In the third and last phase of the process, a critical evaluation was made to examine the potential learning effects generated from the case writing method. This phase comprised an analysis of the lessons learned as defined by organizational members in the reflection phase as well as a discourse analysis of the jointly created organizational case narrative about the Telcotech project.

The following chart summarizes the three phases involved in the research process:

Phases		Case writing Process		Methods
				Evaluation and triangulation:
Critical		Reflection on the process itself		- Discourse analysis
↑		↑		-Lessons learned
Reflective		Joint reflection on the different organizational narratives => Definition of learning => New jointly told narrative		Reflection workshop drawing on organizational learning literature
↑		↑		
Descriptive		Organizational learning encased in organizational narratives		Narrative interviews drawing on organizational storytelling literature

Research questions

The current study focused on the following research questions:

- What are the different stories that organizational actors tell about the knowledge management initiative at Telcotech, and in which aspects do these stories differ?
- What learning can be derived about the Telcotech project from the comparison of the different organizational stories?
- What learning effects can be attained through the projects team's joint reflection on the differing narratives?

The following chapter briefly introduces the case company Telcotech. The description provides the basis to understanding the motives for the creation of their knowledge management initiative and depicts the setting of this project.

The Telcotech Company

Telcotech is a large electrical engineering and electronics company comprising eight business units. The current study focuses on Telcotech's Information and Communication Network business unit. The unit employs about 7000 people and aims to provide diverse corporate and carrier network clients with solutions for data and telecommunication applications.

As a consequence of increasingly sophisticated customer expectations and shorter product cycles Telcotech realized that value in sales was increasingly associated with developing

knowledge-intensive individualized solutions for their customers. Solutions were increasingly jointly developed with the customer and required substantial resources. This radical industry transformation from being a "Box Mover" that sells pre-specified telephone systems, towards being a "Solution Provider" that focuses on the provision of highly individualized knowledge-intensive data and telecommunication solutions, meant that Telcotech had to come up with timely solutions to customers' complex problems by tapping its spectrum of knowledge and experience.

Knowledge Management at Telcotech

Recognizing that the management of organizational knowledge was a precondition for future growth and competitive dominance, the unit had to ensure that selected core service activities, such as the timely provision of complex, integrated portfolios of products and services, would be shared. This implied that the sharing of localized knowledge took place across sales regions. The envisaged benefits to be gained from preventing the "re-invention of the wheel" in the provision of solutions, included reduced time to market, increased quality by avoiding past mistakes, and better customer service.

Telcotech's top management decided to set up a task force mechanism, called the Knowledge Networking (KN) team, to foster knowledge sharing between the sales regions. The aim of this task force was to develop and implement a conceptual apparatus for knowledge sharing[14]. While the full scope of the knowledge management initiative was set to embrace all 7000 employees at the Telcotech Communication Networks division, the KN team focused for the development of the initiative on the German market and its six sales regions as a pilot project.

This study uses Telcotech's experiences of the KN project to apply and test the case writing method described in the introductory chapter. This means that the two year history of the KN implementation was subjected to the various phases of the case writing method detailed in the following paragraphs.

Methodology

The following sections describe the methodological approach and the various data collection methods used for the employment of the case writing method at the Telcotech organization.

Interviews

To elicit the experiences and perceptions from the various Telcotech employees involved in Telcotech's knowledge management project, individual narrative interviews were conducted with twenty employees who had been involved with the project. To ensure the inclusion of stories from a great variety of organizational actors[15], interviewees were selected

from a broad range of functions within Telcotech. This included individuals with high and low organizational status, employees at the centre and at the periphery of the Telcotech organization[16].

The interviews were conducted by a team of two researchers, with one researcher assuming the role of interviewer and the other assuming the role of note taker and process observer. Each semi-structured interview lasted between 45 and 60 minutes. Permission to record the interview was granted in most cases.

The overall interview structure covered the context, process and content of the Telcotech knowledge management project. Each interviewee was asked to tell the story of this project. Questions focused on the project in general (What happened? Why did this happen?), the interviewee's role in the project, the difficulties faced, the learnings and potential conclusions from the projects[17]. Interviewees were told that potentially opposing views held by different interviewees would be described in the reflection workshop without disclosing the identity of the holder of these views. The interviewer did not ask people about their use of metaphors or prompt them in any way to use metaphors. However, the open-ended questions allowed metaphors to appear naturally while people spoke about their project experiences.

The generation of themes

To generate themes from the gathered interview data, the current work adopted a grounded theory approach (Glaser/Strauss, 1967). The distillation process took place in several phases. The data analysis started with a phase of initial coding in which the expressions and metaphors describing actions and changes perceived by the interviewees were identified. The actual words of the interviewees were used as substantial codes[18]. The initial coding was followed by a process of open coding by paragraphs of the interview narratives into as many concepts as possible to ensure full coverage[19]. The descriptions and definitions were refined through comparison across all interviews. In the following phase relationships among concepts were discerned, leading to the grouping of the various concepts into clusters. In the last phase of "axial coding" (Strauss/Cobin, 1990), themes were defined from the various groupings.

The six themes evolving from the interview transcripts with Telcotech employees are briefly described in the following sections. The issues for reflection and discussion stemming from these themes are represented in the indented questions following each theme.

Theme1: Obstacles to the implementation of the KN initiative

Interviewees referred to the organizational structure and culture as "not conducive" to the implementation of the KN initiative. They additionally reported that in spite of the KN initiative there was no general change of consciousness in terms of organizational sensitivity towards knowledge.

- How can the Telcotech culture be described and what repercussions does this have in terms of knowledge sharing, acceptance of knowledge from other parts of the organization and interaction with the management?
- What structures and organizational principles hinder the implementation of the KN initiative?
- Can something be done about the identified obstacles?

Theme 2: Implementation difficulties

Interviewees were occupied with the question of why, in spite of the KN team's efforts, the KN initiative did not gain momentum. Explanations for this phenomenon ranged from the reluctance of the sales and service employees to collaborate with the KN team to the lack of user-friendliness, and the KN team's lack of knowledge about the needs of the sales and service employees in the regions.
- Do the different user groups have specific traits and if so, how do they impact on the KN implementation? What promotes receptiveness to the KN initiatives?
- Why was the cooperation with the sales and service employees in the regions so difficult? How could the apparent mutual frustration between the KN team and the field have been prevented?

Theme 3: Communication

The communication theme surfaced in different contexts in all interviews. One part of the comments focused on the difficult communication between the KN team and management, while the other remarks described a lack of communication of the KN initiative to the Telcotech employees in the regions.
- Why did communication between the KN team and management break down?
- Why was there ignorance or confusion about the KN initiative in the field?
- Why was the KN initiative not perceived as successful by management even though it realized many of its aims?

Theme 4: The implementation approach

The interviews revealed different perceptions concerning the appropriate implementation approach for the KN initiative. The two main positions vacillated between a standardized top-down approach aiming at a broad recognition of the importance of knowledge management, and a differentiated bottom-up approach aiming at specific focus groups and their needs. The discussion of the temporal order of the launch of the four initiatives was also part of this theme.
- What would be an appropriate implementation approach for the KN initiative?

Theme 5: The KN team and leadership

Major issues exposed by the interviews were the various changes in the KN team composition and their implications for the overall KN project.

- What effects did the discontinuity of leadership have on the KN team and on the project?
- How should the team responsible for the implementation of such a knowledge management initiative be managed and staffed?

<u>Theme 6: Internal competition</u>

While the Knowledge Networking initiative had been the first knowledge management initiative at Telcotech, a group of other knowledge management projects had evolved within the company over time. The theme of dealing with these "rival" initiatives surfaced in different contexts in the interviews.

- What effect did the emergence of other knowledge management initiatives have on the KN project?
- How can an organization deal with various initiatives pursuing the same aim?

The following table summarizes the central themes and issues described above.

Central theme	Issues
Theme1: Organizational obstacles	• Culture • Strategy • Politics
Theme 2: Implementation difficulties	• Incentives • Cooperation KN team with the field
Theme 3: Communication	• Top: Expectations of management, communication breakdown • Down: Confusion or ignorance about the initiative
Theme 4: Implementation approach	• Top-down vs. bottom-up approach • Launch pattern: Parallel or consecutive
Theme 5: KN team and leadership	• Staffing • Personal discontinuities
Theme 6: Internal competition	• Management and coordination of "rival" initiatives

The themes and questions were taken up in the following phase of the reflection workshop. They formed the basis of the joint definition of the KN case learnings in the form of lessons learned as well as the writing of the case narrative by Telcotech employees.

Reflection workshop

The following stage of the case-writing process was a one-day workshop with the interviewees aiming at a critical, reflective inquiry into the KN project[20]. In the introduction to the workshop participants were told that the focus was on generating insights through a joint confrontation of and reflection on the development of the KN project. It was emphasized that the aim was to generate a real dialogue on the themes emerging from the individual narratives. This implied that behaviours such as mutual blaming, defensive routines or refusal

to talk about sensitive issues had to be minimized. To support the reflection process, the author and a trained Telcotech insider who had not participated in the KN project, assumed the role of moderators. Participants of the workshop were additionally guaranteed that *individual* opinions expressed in the workshop would be kept confidential within that group.

At the start of the workshop participants were exposed to the themes generated by the interviews. Issues that had surfaced in the interviews, the nature and the context in which these situations occurred, were analyzed in order for them to understand the different meanings of the KN project. The participants then analyzed the themes and the different, predominant perspectives linked to these themes. They reflected on the new understandings of the situation that could be derived from the different, individual stories that had surfaced in the interviews[21].

The focus then shifted to improving practice through reflection and dialogue. With their increasing understanding of the different perspectives, participants identified causal links between the narrated events and KN project outcomes. They then developed explanations based on the surfaced differences in the narratives. As an outcome, lessons learned and their implications for management practice were jointly defined.

Writing

The aim of the writing phase following the reflection workshop was to give the collective sense making of the reflection workshop a means of expression by the joint construction of an organizational narrative. Narrative events and project issues that had surfaced in the interviews and had been discussed in the workshop, evolved into story themes indicating the collective sense making of the group.

The writing phase made use of a double format: While participants wrote a *case* narrative to describe their actual experiences in the project, their *teaching note* abstracted from the particular KN project and summarized the general learnings that could be drawn therefrom[22].

Results of the case-writing method

The following chapters analyze the outcome of the case writing method and evaluate the learning generated through the case writing method. The analysis consists of two components: The first component is the narrative analysis of the interviews and the case narrative written by Telcotech members. The second component is the analysis of the lessons learned as defined by the Telcotech employees themselves. While the lessons learned describes learnings that have been explicitly defined by the Telcotech employees themselves, the narrative analysis focuses on revealing hidden aspects of the KN initiative that are implicitly conveyed through the use of language and metaphors.

Metaphorical themes

Narrative is an effective means of revealing hidden organizational dynamics that other, more traditional, research methods fail to identify (Sköldberg's, 1994). By paying attention to symbols, tales, legends and myths that organizational members use to describe their experience, a researcher can tune into operative dynamics that would otherwise remain covert and inaccessible (Smith/Simmons, 1983). By interpreting organizational texts, themes can emerge that go beyond surface meanings, possibly uncovering non-rational explanations, or purposes other than the stated ones.

The aim of the narrative analysis of the Telcotech organizational narratives was to gain an understanding of the different reality versions developed by various organizational actors in the course of working on the Telcotech project. Based on these different constructions, the implications thereof for the KN project are discussed. The analysis furthermore considers to what extent the different theme categories reveal contradictions, tensions and dilemmas inherent in the KN project.

The following four theme categories were identified in the interviews and case narratives[23]:
- The description of the KN initiative
- The different approaches to implementation
- The role of the regions and the local organizations
- The perceptions of the KN team

Each theme category contains at least one set of distinct metaphors. The following sections describe and analyze each of these themes in detail, focusing on the implications of the metaphors for the development of the KN initiative.

The description of the KN initiative

When organizational members use metaphors to describe a specific concept or circumstance, the most dominant attributes of the metaphor are projected on the denoted object (Oswick/Montgomery, 1999). In the case of Telcotech, the organizational members used a variety of metaphors to describe knowledge and the KN initiative. After sorting out the most dominant attributes of the metaphors chosen, the material revealed that there was no single coherent set of metaphors describing how knowledge in general, and the KN initiative in particular, are perceived within Telcotech.

Three main groups of description categories were identified: The first category attached positive connotations to knowledge and the KN initiative. The second category depicted knowledge and the initiative in a negative way. The third category was more descriptive without clearly classifying the initiative as either positive or negative.

To gain more insight into the use of the different metaphors and to search for an explanation for this observation, a further form of categorization was undertaken[24]. Two

coders - the author and another researcher - independently classified all knowledge metaphors according to the attitude they conveyed towards the KN initiative, namely positive, neutral or negative. The two researchers established an inter-rater reliability of 96%. Through the classification it became apparent that organizational group membership is the major factor of correlation in explaining differences in attitude. While the Telcotech management and the KN team used positive or neutrally classified metaphors to characterize the initiative, the regions depicted the KN project with metaphors expressing a negative attitude. The following paragraphs introduce the various metaphors found for each category, and discuss the implications of these disparate visions for the KN project.

Positive connotations of KN

Among the positive connotations of knowledge and the KN initiative, three main sets of metaphors could be identified. At the beginning of the KN initiative, the KN project was described by the KN team as the "spearhead" of knowledge management at Telcotech, emphasizing its leading position in dealing with the new issue. KN played a trend-setter role, giving it an exposed position within the organization, high visibility and a considerable amount of attention.

The management additionally depicted the KN initiative as part of the Telcotech strategy, calling it "one of its indispensable pillars". The demand that KN should be integrated into the Telcotech strategy was underlined by statements such as: "The management of our knowledge assets constitutes not only an indispensable pillar of our business, but should be seen as the central element of our strategy at Telcotech". This statement represents the KN initiative as a fundamental, stabilizing element for Telcotech. As such, the initiative is depicted as being of critical importance to the organization's strategy[25].

The Telcotech management and the KN team both engaged in an economic discourse about knowledge by comparing knowledge to an economic "good". In this discourse the recognition of the richness of employees' experiences is depicted as the basis of the initiative. "Practically every employee at our company possesses a rich portfolio of knowledge and experience. This resource can only be put to use with his or her active and voluntary collaboration." The portfolio comparison creates stock market associations. Similarly to stocks, knowledge and experience are depicted as valuables that generate return[26].

In line with the economic discourse, the Telcotech employees in the regions, regardless of appeals by the KN team, treated their knowledge as a valuable that they did not want to give away easily. Descriptions such as "Employees still tended to hoard their knowledge to the detriment of the company, rather than sharing it", testify to the fact that knowledge was treated as any other scarce input resource. Sales representatives are described as guarding themselves against "predatory colleagues" by hoarding their valuable knowledge, or by only sharing it through long-established contacts with colleagues within their region.

Confronted by this hoarding behavior in the field, the KN team developed a variation of the economic discourse which expressed their powerlessness to force knowledge sharing. With reference to the particular character of knowledge, the KN team described knowledge as a "resource locked in the human mind". Elaborating on this statement, they point out that "the most valuable aspects of knowledge – often tacit in nature - are locked in the human mind". Depicting knowledge in such a way implies the insight that "knowledge sharing could neither be supervised nor forced". It additionally portrays the difficult situation in which the KN team found itself. Even though it could offer help to facilitate knowledge management, KN team members ultimately did not own "the key" to unlock the knowledge stored in the human mind. This implies a dependence on the voluntary collaboration of broad parts of the organization. In terms of speech acts[27], this description represents a justification for the difficulties encountered with knowledge sharing in the regions. It implies that the KN team cannot be blamed for the natural tendency of knowledge to remain locked in human minds. The description of knowledge as "locked", implies a connotation of distance and unassailability between the team's possible actions and the realization of knowledge sharing across Telcotech regions.

Commenting on these metaphors containing positive connotations of knowledge, it is noticeable that the metaphors used were not in line with the behavior postulated by any of the parties involved. While the Telcotech management claimed that knowledge management was part of the Telcotech strategy, this claim did not manifest itself in an alignment of the entire organization with this part of the strategy. The KN team similarly claimed that knowledge was valuable, but did not really consider treating it as an economic "good", since it expected the field to share this value freely. It was only at a much later stage of the implementation process that it introduced an organizational incentive system that acknowledged efforts at knowledge sharing. Mere appeals to participate for the good of the whole organization, such as "my knowledge pays for Telcotech", did not convince the Telcotech members to engage in the KN initiative.

Negative connotations of KN

The Telcotech employees in the field, i.e. the targeted KN users in the regions, employed four main metaphors when describing the KN initiative. It was variously described as old wine, a luxury, an appendix and a green-field design. The following sections describe these metaphors in more detail and discuss their implications for the KN initiative.

The comparison of the KN initiative to "old wine in new bottles", attributes the KN initiative with a lack of innovation and newness. The comparison implicitly depicts the KN initiative as being deceptive, since it is seen to pretend newness whereas it is just disguised practices of knowledge sharing that already exist within Telcotech. As a consequence, the KN initiative did not arouse any special attention or interest in the field.

The "luxury" and "appendix" metaphors are additional expressions of this vision. Both metaphors depict KN as not really necessary. The luxury metaphor suggests that KN is an additional project which is not crucial for the survival of the organization, but an additional gadget that the organization can afford. This vision is in sharp contrast to the management's vision of the KN initiative as a "pillar" of Telcotech's future success.

When comparing the images of a pillar, a spearhead or an economic good as used by the management and the KN team, with the appendix, luxury and old wine metaphors used by the Telcotech employees in the field, it becomes clear that the KN initiative failed to effectively communicate the value proposition proposed by the initiative. As a consequence, the initiative was neither seen as new or innovative (old wine), nor as useful and efficient (appendix, luxury).

Another metaphor which provides further insight into the lack of enthusiasm for the KN initiative from the field, can be found in the description of the initiative as a "green-field design". This refers to the way in which the KN initiative was developed. Starting from a "green field" depicts the initiative as being developed "from scratch". It implies that the initiative was constructed from the perspective of a "tabula rasa", without considering any established practices, or pre-existing customs to be found in the field.

The image alludes to the fact that the field, i.e. the potential users, was not sufficiently integrated into the design of the initiative[28]. From the perspective of the employees in the regions, the KN initiative had been developed at the headquarters, and did not sufficiently consider their regional concerns. This lack of formal involvement by the field in general, as well as the lack of input from the regional sales personnel regarding crucial features of the KN initiative in particular, led to the perception of KN as not meeting the users' needs. The initiative was consequently seen as a "luxury" or "an appendix".

All four metaphors used by the employees in the regions depict a negative attitude towards the KN initiative. The descriptions range from hostility to indifference towards the KN project. The contrast in metaphors between employees and management reflects the difference in attitudes about the initiative and foreshadows the difficulties encountered during the KN implementation.

Other descriptions of KN

Two other discourses that could not be classified as clearly expressing a positive or a negative attitude towards the KN initiative also emerged from the metaphor analysis. The "networking" discourse describes the KN implementation in terms of the building of an organization-wide network, while the discourse of "care and education" depicts the KN initiative as a child-raising activity. While the former metaphor had been used by both the Telcotech management and the KN team, the latter discourse was only employed by members of the KN team. Both images share a very person-oriented approach towards knowledge management.

Knowledge Networking as a network

Driven by the vision that knowledge should be shared universally, the vision of building a network of knowledge sharing that would embrace all Telcotech employees, was created at the very beginning. The Telcotech management emphasized the objective of the project by stating: "Practically every employee at our company possesses a rich portfolio of knowledge and experience. We need to get our colleagues to build a network of knowledge sharing. The objective of knowledge networking is to create a network of knowledge sharing among all employees at Telcotech. We need to connect everybody with everybody else".

The image of the knowledge management initiative as a network emphasizes the interaction and connectedness between all Telcotech members. The network metaphor suggests that Telcotech employees share common interests which link them and create a certain degree of nearness and closeness between them. As illustrated by the internal knowledge sharing practices within the individual Telcotech sales regions, trust is an important factor if a network is to function successfully. The use of the network metaphor implicitly assumes the existence of such an underlying mutual trust among the organizational actors. Additionally, the implication of the network metaphor to include the entire Telcotech division alludes to a standardized approach to implementation. Without anticipating the analysis of the implementation theme, a consistence between the groups of metaphors and organizational groups can be recognized: The network metaphor was used by the same organizational actors, in this case the Telcotech management and the KN team, who also opted for a standardized approach of implementation.

Looking at the context in which the network metaphor is employed, it is noteworthy that the Telcotech management uses the network metaphor in connection with the economic good discourse: "Practically every employee at our company possesses a rich portfolio of knowledge and experience. We need to get our colleagues to build a network of knowledge sharing". The motivation for knowledge management in these two discourses is, however, very different: While the economic discourse focuses on knowledge management for profitability, the networking discourse emphasizes knowledge management to help employees to assist each other by establishing personal contacts.

The employment of these two diametrical opposed discourses in the same context, leads to the hypothesis that the credibility of the network discourse is diminished through its overshadowing by the economic discourse. As the description of the existing knowledge sharing practices within individual sales regions suggests, knowledge management in the regions functions through long established personal contacts of trust. It can therefore be assumed that Telcotech employees working in the field are more susceptible to the network metaphor than to the economic metaphor. The employment of the economic discourse may thus have been detrimental to the network metaphor in as far as it did not carry much weight.

Knowledge Networking as child raising

The second theme in this category of descriptions is the care and development theme depicting the KN initiative in variations of a child-raising metaphor, and used predominantly by a majority of the KN team members. The case narrative picks up this imagery and compares the KN initiative directly to a child-raising activity: "Both processes (i.e. child-raising and implementing the KN initiative) were essentially preoccupied with giving birth to, promoting and nurturing a baby – often in environments that are not conducive to the development of a child". Additionally, interviewees and the case narrative refer explicitly to different stages in the development of the child, talking about birth ("Two and a half years after its birth, the knowledge management initiative at Telcotech was in the middle of its puberty"), a baby ("These tensions contributed to the loss of momentum of knowledge management at Telcotech, and provided the impetus for a critical reflection on the birth and adolescence of the knowledge management baby"), infancy ("In a time when knowledge management was still in its infancy, top management at Telcotech was quick to realize that the intangible character of knowledge had to be considered.") and adolescence ("What would the adolescence of the KN baby look like?"). The consideration of the various stages of the KN initiative, accounts for the KN team's awareness of the initiative's developmental character, which highlights different needs and predominant issues at different stages of its development.

Turning to the interpretation of the child-raising metaphor, the following analysis focuses on the implications of the metaphor for the definition of the KN team's role in the initiative: The KN team's use of the child-raising metaphor suggests that it is they - as the team responsible for the KN initiative - who assume the parent role. This characterization of the initiative implies two aspects: Firstly, the image of the team as the actual child raisers of the KN initiative, points to the strong emotional involvement implied in the commitment of the KN team. The KN project is not perceived as a mere task or a job, but involves a crucial emotional commitment. Secondly, speaking of the KN initiative as child raising denotes the initiative's educational character. Picking up on the child-raising metaphor, the former KN team leader is explicit about the hard and soft factors involved in this education process: "As in raising a child, you need to educate by explaining and developing an understanding, just as much as you need to sometimes punish. Successful KN demands corollary incentives, e.g. in the form of financial royalties for knowledge sharing"[29]. The attribution of the parent role to the KN team depicts the team in a position of educational authority. As such an authority, it applies educational measures and decides how to instruct the rest of the Telcotech organization on the necessity of knowledge management. The imagery implies that the potential users of the KN tools are the addressees of the KN team's educational measures, denoting the KN team's intellectual superiority above that of other organizational members.

As seen during the development of the KN initiative, the child-raising metaphor is problematic in two aspects: The first aspect is that the metaphor breaks down when the parental authority of the KN team is examined. In terms of the educational measures at its

disposal, the KN team broadly explained and communicated the KN initiative to sensitize organizational members to knowledge management. However, unlike a parent, the KN team only utilized force of persuasion and incentives to make Telcotech members participate in the initiative, but could not sanction any organizational members' "misbehaviour". Since the KN team had no penalty it could apply for failing to participate in the KN initiative, the team's parental role broke down when faced with the critical situation of getting the sales managers of the regions to provide time for presentation of the KN initiative. Unlike a parent, the KN team could not oblige addressees of their educational measures to follow their instructions.

The second problematic aspect of the child-raising metaphor lies in its implicit connotation as belonging to its parents. To point out a lack of support by other organizational members, the KN team depicted problems in the implementation phase of the initiative by pursuing the child metaphor: "While everyone wanted to stroke the KN baby, nobody wanted to change its nappies". This description refers explicitly to the reluctance of sales managers to provide time for presentations of the KN initiative in the regions. It implicitly claims that the "nappy change" could not be done by the KN team alone, but that it was a collaborative task with other parties, in this case Telcotech members working in the regions. Yet, by positioning the initiative as belonging to "parents", e.g. a specific group within the organization, the full responsibility for the initiative's success was attributed to the KN team. The image consequently suggests that the baby's parents, i.e. the KN team, were to assume the task of changing the nappy. This implicit child-parent role attribution may have contributed to the impression that the involvement of others was not necessary, or even appropriate.

The implications of the child-raising metaphor anticipate a lesson that the KN team learned later in the implementation process and defined afterwards in the reflection workshop: The lack of integration of Telcotech employees into the initiative from its infancy, i.e. the conceptualization phase onwards, resulted in the Telcotech employees being neither ready nor willing to assume the parental role, since they felt that "it was not their baby", thus not their responsibility to take care of the KN initiative.

The following diagram summarizes the various metaphors used to describe the KN initiative and attributes the metaphors to the different organizational groups using them:
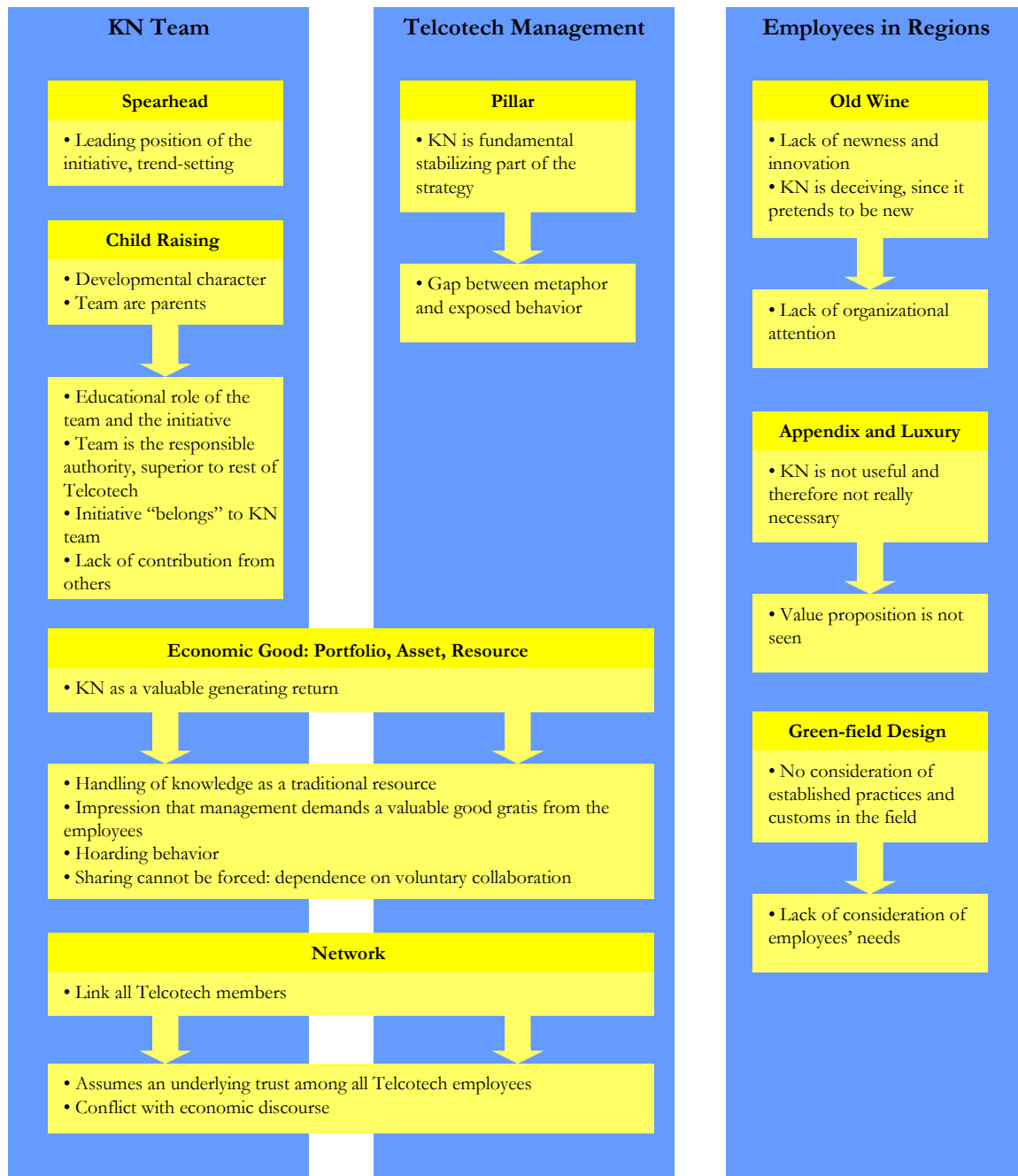
Figure. *The KN Initiative*

The different approaches to implementation

The examination of the interviews and the case narrative revealed two different approaches to the implementation of the KN initiative. Each approach is described by a distinct set of metaphors. The first approach, opting for a standardized implementation, is broadly depicted by religious metaphors. The second approach, opting for a focus on specific small target groups, is described by war and illness metaphors. The following sections describe these two different approaches and discuss their implications for the Telcotech organization.

The standardized approach

The standardized approach describes the implementation of the KN initiative as a broad communication of the same KN idea throughout the whole Telcotech organization. This approach does not differentiate between different groups of target customers within the organization. The following citation from the Telcotech management illustrates this position: "KN means evangelization of all employees, changing the mindset of the lethargic masses, and not cherry picking the individual groups". The following sections examine three aspects of the religious metaphor theme: The way in which the KN initiative is depicted, the role the KN team had to assume according to this perspective, and the impact thereof on the team's interactions with the rest of the organization.

The comparison between the expansion of the KN initiative and the spreading of a religion is picked up in the Telcotech management's discourse on the KN implementation. Expressions such as "spreading the word of the initiative" or "spreading the KN message" surface in the management's discourse. Following this religious metaphor, the KN initiative is equated with the "good message" or the gospel. As is applicable to the gospel, this approach implies that everybody had to be confronted with the same message, thus the "standardization approach", since this message represents a universal truth.

The use of religious metaphors to depict the KN initiative, suggests that knowledge management has a mystic connotation. By comparing the initiative to the word of God, the initiative is up valued to something sacred, implying that this "God-given" word should not be questioned. As in a religious conviction, the KN initiative was seen as something that went beyond mere rational reasoning. Expanding the religious metaphor, the belief in knowledge management seemed to be driven by a power beyond a provable raison d'être, implying the necessity to believe in it unquestioningly in order for it to take full effect.

The role the KN team was supposed to assume in the standardized approach, was that of "preachers" and "knowledge evangelists" preaching the importance of knowledge sharing throughout the organization and evoking the benefits and promises of the KN gospel. Slogans such as "my knowledge pays for Telcotech" and other "evangelical appeals" were part of this approach in attempting to make employees realize that "any career advantages of hoarding knowledge were obliterated in the knowledge economy". The missionary character of the initiative suggested by the religious metaphors furthermore implies that organizational members needed to be "converted", since they are implicitly depicted as thus far ignoring "the truth". Such imagery denotes a certain superiority on behalf of the KN team who, in contrast to the rest of the organization, understood and knew the KN message.

The implications of the religious implementation approach are far-reaching: By implicitly depicting the content of the KN initiative as something beyond discussion and critique, the KN team is portrayed as an ultimate authority on the KN subject. Due to the dogmatic character of the initiative, the team seems to enjoy an implicit protection against criticism. However, the employment of the religious metaphors may have contributed to the problems of justification and acceptance as later faced in the field from some of the targeted users of the

initiative. The religious implementation approach of broad proselytization inherently carries the risk of misperception and lack of acceptance by the rest of the organization. The gospel in particular and religion in general, are not collaboratively negotiated concepts, but are based on commandments and dogma. Treating the KN initiative as the gospel, excludes a joint construction of the "good message", i.e. the KN initiative, by both the KN team and the field. A behaviour in accordance with the religious metaphors precludes a collaborative effort with the field, e.g. in the form of discussion and input from other parts of the organization, in the conceptualization of the initiative. By revealing a behaviour in accordance with the role of knowledge preachers, the KN team contributed to the later perceived lack of fit between the needs of the field and the initiative as conceptualized by the KN team.

In a retrospective, self-critical comment the KN team members in the interviews referred to the religious conviction and missionary character by which the KN initiative was driven: "We wanted to convert everybody to Catholicism. The credo was everybody needs KN. However, there seemed to be fundamentally different needs and expectations within individual organizational groups as to what exactly KN would be needed for." The use of the credo metaphor expresses the strong conviction that the KN team attached to their actions, implying that the appropriateness of the approach was not questioned at that time. The comparison of the KN initiative to a missionary effort of trying to render everybody Catholic fits into the aforementioned strategy of evangelical appeals to convert organizational members. Such appeals represent general statements which do not focus on specific groups of audiences. This means that the question of immediate individual utility is not answered by these appeals[30]. This lack of differentiation in the overall KN message led to a lack of recognition as to what extent KN was also a "good message" for the individual employee. A result was that the KN team faced a lack of motivation by those in the field to utilize the KN tools.

Looking at the evolution of the KN project, it is important to point out that there were significant changes in the use of the religious metaphors over time. While the religious image for the implementation approach was coined by the Telcotech top management, and picked up by the KN team vocabulary at the beginning of the initiative, the KN team members changed their perspective of key success factors of the KN implementation. They moved from a standardized approach to a customized, focused approach of implementation. This change in the implementation approach was reflected by a change to a different set of metaphors to characterize the different way of implementation. However, while the KN team altered its perception of the appropriate implementation approach, the Telcotech management's outlook on the initiative did not change. The management continued to speak about the initial vision of the KN implementation as in an "evangelization approach", and did not adapt the new metaphors. The increasing divergence in the use of metaphors for the implementation approach reflects the problems of communication that surfaced at a later stage of the implementation between the management and the KN team[31][32]. The problem was aggravated by the fact that the KN team's shift in the implementation approach was not an explicit issue of discussion between the KN team and the management. A careful examination and

deconstruction of the distinct sets of metaphors could have contributed to a better understanding of the differences in the visions of the implementation.

The customization approach

During the further progress of the KN project, the KN team's language shifted to the use of a different set of metaphors depicting a much focused implementation approach. Two themes describe this approach: The first is an illness theme describing the KN implementation in terms of a "virus infection", while the second is a war theme comparing the implementation of the KN initiative to a "guerrilla warfare tactic". The following sections describe each theme and then discuss their implications for Telcotech and the KN project.

The "virus infection" theme likens the KN initiative to an illness that spreads consecutively. As the former KN team leader suggested, the KN virus should focus on small teams and their specific needs, referred to as "hubs of the total KN strategy". The hub metaphor suggests that the specific needs of these small teams were the means of connecting them to the KN initiative. To infect a team with the KN "virus", meaning to motivate and inspire organizational members to use and appreciate KN, they needed to be confronted with the concrete benefits of knowledge management for their particular circumstances. Once the benefits for a specific target group had been realized, the infected teams themselves were to subsequently "infest other organizational members with the KN virus". Taking advantage of existing networks of collaboration, the virus was supposed to spread across teams that were already cooperating naturally and connect these until the whole organization was integrated "to finally link all 7000 sales employees in the knowledge sharing initiative".

In contrast to the standardized approach, the "virus infection" approach implies a stepwise implementation. Compared to the standardized approach, this process is more self-organizing, since it takes advantage of promotion through others. This stepwise implementation process is, however, slower in the beginning due to the time lag resulting from having to wait until concrete results are generated with the first initiatives. The process is then supposed to gain momentum and accelerate as a result of the growth of the "virus cells" throughout the organization.

Following the virus infection metaphor, the vision of the KN initiative and the role of the KN team are discussed in the following sections.

The virus infection metaphor attributes positive characteristics to something which is generally perceived negatively. While in everyday usage the notion of a "virus infection" has the negative connotation of spreading an illness and therefore representing a threat to human life, it was, in the context of KN implementation, the KN team's deliberately chosen approach to deal with the Telcotech organization. The negative connotation usually attributed to the use of an illness metaphor is reversed, presenting the spreading of an illness as something good for the organization. This turning of a negative connotation into a positive vision of the illness, implies the implicit superiority inherent in the KN team. The organization had to be infected

for its own good - which is known to the KN team. The passing on of the virus was based on the KN team's conviction that it would result in a positive outcome for the organization. As a result of such an infection, organizational members were to change established patterns of behavior with regard to knowledge sharing and exchange[33].

Following this image, the KN team assumed the role of infectors who passed the KN illness on to the rest of the organization. By infecting the first teams with the virus, i.e. by motivating a specific target group to apply knowledge management, the KN team acted as an initiator of the initiative, but left the responsibility of spreading the initiative to other members of the organization. By attacking one specific target group in the organization, and trying to make this group susceptible to the KN illness, the KN team's role in this instance was far more focused in comparison to that of the "knowledge preachers" of the standardized approach.

The other theme used for the focused implementation approach, is that of guerrilla warfare. The following paragraphs discuss this theme, focusing on the self-image of the KN team as guerrilla fighters and their stance regarding the rest of the organization.

In contrast to the peaceful, non-violent and preaching approach of the standardized implementation strategy, guerrilla warfare represents a violent underground activity which needs small groups of fighters, in this case the KN team members, to succeed. Following this image, the KN team implicitly assumed the role of guerrilla fighters. Waging guerrilla warfare, similarly to implementing the KN initiative, has a connotation of being a dangerous enterprise for the participants. Their organizational mission, to change organizational attitudes and behaviour towards the treatment of knowledge, was seen as unpredictable and risky. In terms of the approach to waging this war, the guerrilla image implies that there were few rules or guidelines that could be followed to guarantee the survival, and thus the success, of the KN initiative.

The warfare image depicts the rest of the organization as hostile: they were potent adversaries who had to be defeated by guerrilla tactics. The description furthermore indicates the minority position of the KN team within Telcotech. It presents the KN team as a small troop of fighters who could not count on much help from other parts of the organization. Following the guerrilla war metaphor, the "landscape", i.e. the organizational surroundings, is characterized by the unpredictability thereof.

The war imagery suggests that in order to fulfil the KN mission, a high degree of violence against members of the own organization was inevitable. The implementation work of the KN team is compared to specifically aimed attacks on the Telcotech organization, aiming to defeat hindering forces in the organization. Simultaneously the use of the guerrilla warfare metaphor suggests functions of justification and legitimization. Portraying themselves as small group of brave fighters in a difficult situation when compared to the preponderance of the rest of the hostile organization that did not share their ideas, the KN team insinuated that any means to ensure survival had to be thought permissible.

The evolution of metaphors from an evangelizing metaphor to the virus infection and guerrilla warfare metaphor reflects the KN team's changed awareness of how to implement the KN initiative successfully. It also implies a shift from "soft" to "hard" measures. This evolution reflects the insight of later having to offer "hard", tangible and concrete benefits to motivate Telcotech employees to participate in the KN initiative. The preaching approach that focused on persuading the Telcotech members to participate through an appeal to their empathy and understanding was therefore replaced by violent measures of infection and war-like attacks[34]. However, in spite of the use of violent figurative language such as warfare, the KN team did not possess tangible measures of force that could have obliged the Telcotech employees to participate in the initiative.

In summarization of this chapter on the different implementation approaches, it can be concluded that the two sets of metaphors used to depict the implementation of the KN initiative, describe two distinctively differing approaches. The virus infection and the guerrilla warfare metaphors both depict a specific stepwise, concentrated, bottom-up approach of implementation that is focused on specific groups, while the evangelizing metaphor implies a broad, top-down approach that aims to simultaneously convert different groups of the organization to an identical KN message.

The metaphors not only reflect these different approaches. At the same time the different sets of metaphors draw attention to the parallel existence of two incompatible metaphorical themes employed by two different organizational groups, namely Telcotech management and the KN team. They foreshadow the difficulties in communication between these two groups, since they "do not speak the same language". The difference in metaphorical systems and vocabulary indicates that the two groups do not refer to the same codes, or share the same frame of reference. Besides, the different visions of the implementation approach are manifested in the differences in the marketing of the initiative throughout Telcotech.

The following table summarizes the themes used to describe the KN implementation approach, and attributes the metaphors to the organizational groups using them:
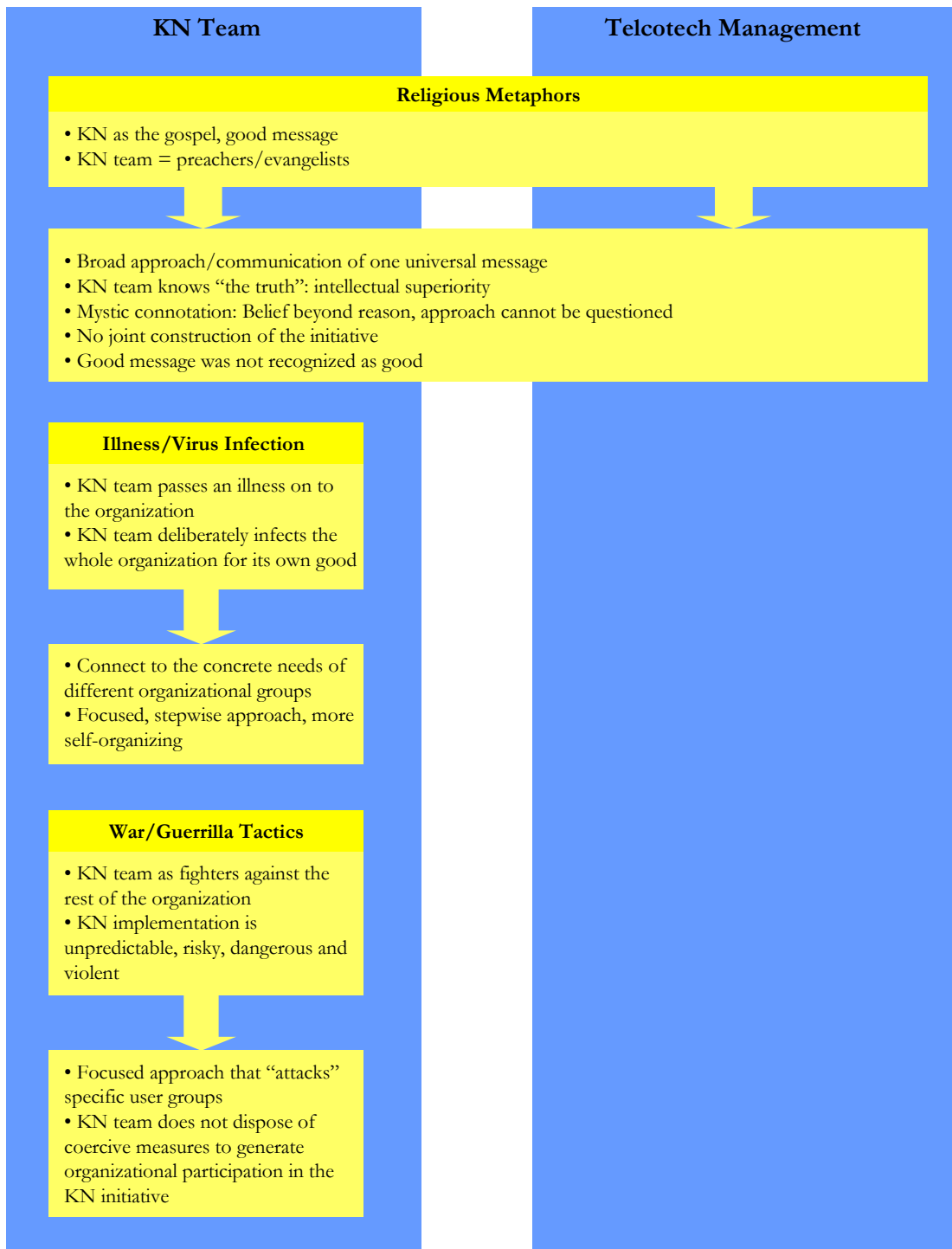
Figure. *KN Implementation Approach*

The role of the regions and local organizations

The KN team - region interactions represent a major theme of the case narrative. The theme is characterized by a specific set of metaphors employed by the KN team to depict the Telcotech employees in the regions: Referring to the different sales regions and local sales organizations within the regions, the KN team described the Telcotech organization as "a

variety of discrete knowledge duchies". The use of the term "knowledge duchies" points to the autonomy and sovereignty enjoyed by the different regions within the Telcotech structure. At the same time it indicates a strong demarcation when it comes to issues of knowledge management, especially with reference to knowledge sharing.

The problems encountered in motivating the regions to participate in the KN initiative are expressed by the KN team's description of the sales managers and employees working in the regions. They were seen as "a bunch of dukes and duchesses who rule their duchies with near-to absolute sovereignty. Gone for good is the managerial hegemony that is needed to get them to share their knowledge". This is a strongly negative depictment of the employees in the regions. Describing the activity of sales managers as that of "ruling", points to their absolute power as well as a certain extravagance. The ironic description of the regional employees as "dukes" and "duchesses" implies a vision of the regions as revealing arrogance due to an alleged "noble", and therefore better, origin. The lack of control over the regions, as evoked by the duchy metaphor, seemed to be disturbing to the KN team. As initiators of the KN project, the team was concerned by the fact that their initiative did not enjoy a certain "managerial hegemony", thus giving priority to the demands of the KN initiative above other regional concerns. The term "hegemony" implies the demand that the employees in the regions recognize the KN initiative's superiority.

In terms of a speech act the description of the regions does two things: By portraying the sales people in the regions in this way, the blame for problems encountered between the regions ("duchies") and the company headquarters is implicitly attributed to the headstrong wilfulness and unwillingness of the regions to collaborate with one another as well as with the Telcotech headquarters. The reason for the lack of acceptance of the KN initiative seems to lie in the regions' high degree of independence. According to the KN team, the "relative sovereignty traditionally granted to them [the regions] led to an inappropriate commitment to the KN initiative". Additionally, the description of the regions as separate duchies implies a lack of a united doctrine among the regions. The underlying assumption that the regions lack coherence and collaboration among themselves supports and contributes to the perception that it is in general very difficult to deal with the regions. This becomes evident later in the case when it is stated that "valuable customer solutions provided in the Hamburg-duchy were not reapplied in the Munich-duchy, and the wheel was reinvented over and over again. This situation was commonly bemoaned as "if Telcotech only knew what Telcotech knows". This description alludes to a lack of efficiency in the attitude of the "duchies", resulting in a loss of innovation and additional costs. The "duchies'" attitude is depicted as so ludicrous that it is "commonly bemoaned".

Yet, in spite of the KN team's negative perception of the regions, it faced the challenge to "access the knowledge where it was accumulated, namely in the various local organizations, the duchies", and to make it available to other regions where similar projects were undertaken. This implies the KN team's dependence on the collaboration of the regions. Since the duchy metaphor implies that any coercive measures to force the participation of the regions would

have led to resistance, it has to be questioned whether the KN approach to winning the "duchies'" support was appropriate in the light of the connotation attached to the local organizations: Following the duchy metaphor, it can be asked what the appropriate treatment of a duke or duchess would be. A treatment acknowledging the "noble" nature of the "duchies" would have implied, in the first place, recognition of their independent position. Yet, the KN team refused to literally approach the regions with the submissive attitude demanded for interaction with "nobles". As the team did not want to deal with the stubbornness and unwillingness to collaborate which they attributed to the regions, the "dukes and duchesses" as the targeted users of the initiative were not integrated into the design of the initiative. This implies that some of the needs of the "dukes and duchesses", i.e. the regions, were not addressed.[35]

The lack of regional integration into the design of the KN initiative cannot be explained by a perception of the regions as generally incapable of knowledge sharing. Focusing on the high level of trust and feeling of belonging within the "duchies" themselves, the KN team members recognized that "the sales employees within a given duchy shared knowledge through informal or long established contacts and friendships". However, the KN team did not pick up on these levers and existing channels of knowledge exchange to gain access to their focus group, and to foster acceptance or understanding of the KN initiative.

In conclusion it can be noted that due to the sovereignty of the regions, it should have been anticipated that the KN initiative would be seen as interference in the regions' autonomy. The KN team members' metaphors to describe the regions depict the sensitivity and foreshadow the problems of the KN team-region interaction. However, the images expressing the negative perceptions of the regions may have contributed to some major difficulties of the initiative, such as a lack of acceptance. Finally, even though the KN team recognized the challenges in dealing with the regions, it did not treat the regions according to the duke and duchess metaphors the team itself employed.

The following diagram gives a short summary of the analysis of this section:

KN Team

Duchy

• Regions are autonomous, sovereign, powerful, extravagant
• Employees in the field are "dukes and duchesses", i.e. they rule and are arrogant and stubborn, lacking united doctrine among themselves

• The blame for the difficult relationship between the KN team and the regions is put on the regions
• The KN team did not treat the regions in a way corresponding to this metaphor
• Lack of collaboration, no integration into design of the initiative

Figure. *Image of the Regions*

Perceptions of the KN team

Even though most of the metaphors describing the KN team have already implicitly surfaced in other sections of the narrative analysis, an exclusive focus on the perceptions of the KN team is useful for the following two reasons. Since difficulties of understanding and interaction between the different organizational groups were major issues in the KN project, this section on the differences in perceptions addresses and explores this issue exclusively. Secondly, comparing other organizational groups' differences in perceptions with those of the KN team represents an opportunity to check for coherence with previously described differences according to the organizational group membership.

As the KN team is a central actor in Telcotech's knowledge management activities, the narrative surfaced various roles that were attributed to the KN team: The focus of the following analysis is a comparison between the self-image of the KN team and the image depicted by other organizational actors.

As seen in descriptions in previous sections, the KN team depicts itself using three main metaphors: guerrilla war fighters, virus infectors and child raisers. Other self-descriptions describe the KN team as "turning around organizational mindsets" and as "orchestrating" the introduction of knowledge management at Telcotech. While these metaphors are distinctively different in terms of the degree of violence involved, all the metaphors convey a notion of

activity, involvement and forcefulness: As combatants in a war and infectors, the KN team brings about change to the entire organization through stepwise, violent acts. As child raisers the KN team members nurture and give the KN initiative direction. The change of mindsets depicts the team as exercising a major impact on the thinking patterns of the Telcotech employees. By its "orchestrating" the KN team co-ordinates and reconciles different organizational voices. All these metaphors share a notion of general strengths and authority. The KN team is characterized as having the power to change things and knowing what to do.

In contrast to this self-description, the Telcotech management attributes the role of preachers to the KN team, thereby suggesting a more supervisory and passive role that is less focused on one particular subject. The mismatch between the powerful self-image of the KN team, and the image employees in the regions had about the KN team, underlines the polarized attitudes towards the KN team by means of a sharp contrast: A sales manager's cynical observation on the appropriateness and usefulness of the KN initiative: "I become sceptical when a blind person speaks about colours twice", reflects the field's view of the KN team as lacking understanding of and insight into the organizational practices in the field. Picturing the KN team as "blind", conveys a vision of the team as lacking competence and contact with the field. It implies that employees in the field did not have confidence in the usefulness of the initiative for their needs. The contrast is heightened by the contrast in the comparison itself, namely the use of the words "blind" and "colour". The sharp contrast between the self-image of the KN team and its image in the regions reflects the difficult interaction between these two groups. The regions' vision of the KN team as "blind" corresponds to the field's negative perceptions of the KN initiative as expressed in the section on negative connotations of knowledge networking.

The following table illustrates the differences in the metaphors used to depict the KN team:
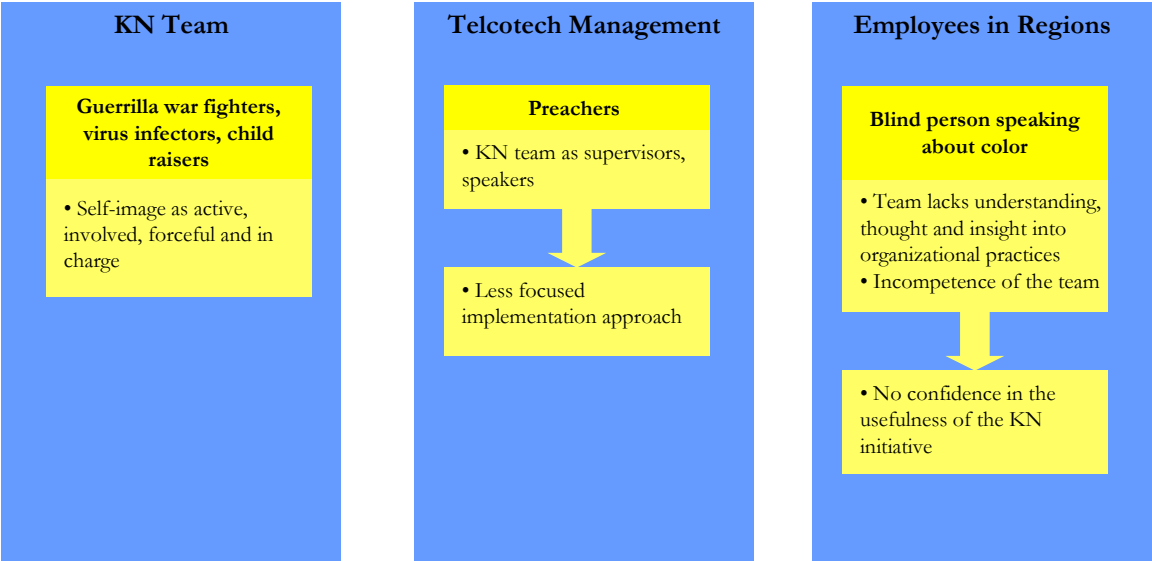
Figure. *Perceptions of the KN Team*

2. Evaluation of the narrative analysis

The chapter concludes with an evaluation of the extent to which the figurative language found in the narrative anticipates the project outcomes and reflects the lessons learned from the KN initiative.

Reflection of project developments

As shown in the previous analysis the different groups of metaphors correspond to the distinctively different perceptions of the initiative by particular organizational groups. The differences in connotations of the metaphors reflect the conflicting attitudes towards Telcotech's knowledge management initiative. This observation is consistent with the distinct differences in the depiction of the KN team. The metaphors used to characterize the KN team are as widely polarized between different organizational groups as the description of the initiative itself. The same organizational group that reveals a negative attitude to the KN initiative also expresses a critical perception of the KN team. The conflicts between different Telcotech organizational groups are reflected in the metaphors with which they give voice to their attitudes, experience and perceptions.

The change in the KN implementation approach is reflected by the change in metaphors used by the KN team to describe the implementation. The KN team's new attitude towards the regions is accompanied by a language change labelling the regions "customers" instead of "duchies".

Anticipation of the lessons learned

By revealing the contradictions in metaphors, organizational tensions and project difficulties can be anticipated. Pointing this out to organizations may enable them to make more conscious decisions about using metaphors to enhance effectiveness (Cleary/Packard, 1992). Several examples of the anticipation of the lessons learned through the prevailing metaphors can be found in the Telcotech case: The KN team's use of the duchy metaphor to characterize the sales regions indicated the team's critical perception of the regions. Knowing that the KN project necessitated a high degree of interaction between these two groups, the difficult interaction between the KN team and the "duchies" could have been anticipated. Similarly the change of metaphors used by the KN team to depict the customized implementation approach, could have anticipated the difficult communication between Telcotech management and the KN team, since both groups no longer "spoke the same language".

A regular examination of the surfacing metaphors from an early stage of the project onwards would have foreshadowed later project developments, and would have left room for the implementation of measures to monitor those developments.

Learning through metaphors

The metaphor analysis of the Telcotech KN initiative also provides an additional benefit: The detected metaphors help to reveal hidden dimensions of the KN project, allowing hypotheses, based on these dimensions, to be formulated about otherwise tacit dynamics of the project.

In Telcotech's case there are three hidden categories of insights that can be gained from these unarticulated issues. Firstly, metaphor analysis can help sensitize Telcotech employees to the detrimental effects of certain metaphors on organizational effectiveness. Examples of this would be the hypothesis that the child-raising metaphor as used by the KN team might have been detrimental to gaining commitment from a wide range of organizational members, since it depicts the initiative as "belonging" to the KN team. Similarly, the use of religious metaphors to characterize the implementation approach might have hindered a collaborative definition of the KN initiative. Finally, the management's use of two contradictory discourses (the economic discourse and the networking discourse) may have been counterproductive. Based on the recognition of the implications of certain metaphors, measures can be formulated for a better communication strategy with more coherence.

Secondly, metaphor analysis can help reveal inconsistencies between talk and behaviour. An example of this is the Telcotech management's claim that the KN initiative was a pillar of the company strategy, while signalling through their behaviour that this was not the case. Another example is KN team's labelling of the regions as "duchies", while not treating them that way, or the KN team's sharp criticism of the regions' hoarding behaviour and protectionism, while the team was simultaneously trying to protect itself from other "rival KN initiatives". The revelation of the gap between the organizational actors' theories in use and their espoused theories offers the potential for double-loop learning.

Finally, metaphor analysis can contribute to the revelation of hidden, underlying organizational forces and their impact on the organization. In Telcotech's case the KN team's choice of implementation metaphors, implying a high degree of violence might have been used to trigger a discussion about Telcotech's organizational culture and why the KN team referred to violent measures when wishing to generate change.

The following part analyses the learning generated in the reflection workshop from the joint definition of lessons learned about the KN initiative. It focuses particularly on the discussion of the content of learning generated by this method, its type and level and sustainability[36].

Evaluation of the lessons learned

The lessons learned as defined by the Telcotech members in the teaching note, evolve around the six themes identified in the individual interviews. The specifically formulated lessons learned can be found in the annex.

As the detailed analysis of the lessons learned shows[37], the case writing method is appropriate for producing self-reflection and self-critique. The level, on which this self-reflection occurs, differs. It can either occur as single-loop learning, or as double-loop learning.

The case writing method generated a series of double-loop learning lessons leading participants to question themselves, or important principles of their work. Examples of this type of learning include the KN team's new perspective of the Telcotech employees in the regions that has grown from seeing them as addressees of headquarters' ideas to partners in the design of the KN initiative, or the questioning of the initial KN implementation strategy that aimed to convert the entire Telcotech organization. These lessons question fundamental assumptions about the organizational functioning, e.g. how to implement change or what the recipes for success actually are[38].

Other lessons from the KN project are expressions of single-loop learning that focus on optimizing certain tasks of the KN project without questioning the task itself. Examples of this would be the optimization of the launch pattern, the focus on higher regularity of staffing patterns, or how to improve communication with Telcotech management. Such lessons evolve around optimizing behaviour without questioning the prevailing frame of reference. This can be illustrated with examples from the aforementioned lessons: neither the approach of selling high to management, nor of dealing with the KN project in a team setting is questioned.

A critical examination of the insights of single-loop learnings can become the basis of double-loop learning. This can happen in three ways: Through the revelation of the hidden perceptions and mental models implicit in the single-loop lesson, through the detection of defensive reasoning and through the detection of hidden contradictions.

Single-loop lessons can form the basis of the revelation of implicit perceptions and mental models. An example of such a potential for double-loop learning would be the questioning of the single-loop lesson about the communication with Telcotech management. Such questioning reveals the implicit negative perception of management as having to be deceived to grant support and thereby provides the potential for a close examination of the roots of this perception. Another example is the regions' lack of involvement in the design of the KN initiative which bespeaks of a hierarchical organizational culture that does not value feed-back from the bottom of the organization. The detection of these traits implicit in the descriptions can depict attitudes, mindsets and behaviours that are deeply rooted in the organizational culture. Being aware of these traits can give hints about potential barriers to change that are rooted in the culture. At the same time the analysis of such descriptions can become the basis for detecting defensive reasoning. For example, the implicit depicting of management as being unable or too stubborn to change the implementation strategy, in spite of the field's need for a differentiated implementation approach, implicitly attributes blame to management. The confrontation of this implicit meaning can represent a first step towards further critical introspection and a close examination of the relationships among different

organizational groups. Potential changes of mental models about the self and other organizational groups can be triangulated with a change of language[39].

The detection of hidden contradictions can form the basis of the realization of unconscious contradictory behaviour and the questioning of its roots. For example, while on the one hand some case descriptions suggest a more centralized, coercive organizational structure, other descriptions on the other hand simultaneously stress the importance of the voluntariness of knowledge sharing. This apparent contradiction regarding the appropriate strategy to promote knowledge sharing deserves further consideration and explicit discussion among different organizational groups. Additionally, the analysis of the lessons learned revealed another implicit contradiction: While the KN team condemned the regions' refusal to collaborate with one another, the team recommended that, due to the competition provided by "rival" knowledge management initiatives, they keep their distance from these. The revelation of such similarity of protective behaviour can form the basis of the realization of contradictory behaviour and the questioning of its roots.

Even though such statements do not provide an exact scale for measuring the degree of learning, it clearly indicates that the case writing method in general, and the reflection workshop in particular, provided the basis for collective double-loop learning. The recognition of the necessity of disclosing one's true thoughts and the insight into own mistakes indicate a readiness for non-defensive reasoning and for questioning one's thoughts and actions. With the participants having undergone a process of self-reflection, their statements bear witness of an enhanced knowledge of themselves. This supports the hypothesis that the case method is appropriate for the enhancement of collective double-loop learning, since the reflection workshop included features, such as the joint reflection and dialogue about the KN project. When such a reflection process has taken place, and the cognitive modification of the organizational functioning is transformed into abstract knowledge and thereby made explicit – as it happened in the lessons learned- it is usually accepted that learning has occurred (Boyd/Fales, 1983).

Final evaluation of the method

In terms of the generic results attained through the case-writing method this study demonstrated that the case writing method enables the generation of lessons learned from an authentic project. As shown in the narrative analysis these metaphors can then become the basis for the revelation of inconsistencies between organizational talk and behaviour and other hidden, undiscussed aspects of the examined project. Through an examination and comparison of the metaphors surfaced in the various organizational narratives hidden meaning can be externalized. These interpretations can become the base for a process of collective sense-making and learning in which organizational members jointly refine their vision of organizational reality.

ANNEX

The lessons learned are presented according the following pattern: The first paragraph puts the lesson learned into the project context; the second paragraph is the copy of the lesson learned as formulated in the joint reflection phase while the last indented paragraphs represent the author's analysis of the formulated lesson.

Lesson 1: Communication with Telcotech management

While there had been regular feedback between the KN team and Telcotech management at the beginning of the KN initiative, this dialogue broke down during the later stages, resulting in damaging consequences for the entire project: Over time it had became obvious to the KN team that the initial claims about the potential of the KN initiative were too optimistic, yet management's outlook was still dominated by the very ambitious claims of the conceptualization phase. Since the top management's perception was not synchronized over the different phases of the implementation process, its view of the initiative became increasingly anachronistic as the initiative matured. The result was a widening gap between the management's perception and the initiative's reality.

Participants of the case writing method formulated the following lesson:

"Top management is a critical stakeholder in the management of knowledge. The successful implementation of knowledge management requires the formal consideration and management of the perception of the top management. It is thus important to "sell" knowledge management to this stakeholder, thereby evoking its benefits for the entire organization. To succeed in selling knowledge management to management, a good standing with top management, as well as credibility among employees on the shop floor is essential.

However, the quantification of the added value of knowledge management in general and the KN initiative in particular, is problematic, since the attempt to render knowledge management's worth tangible is often an elusive goal. Nevertheless, it is vital to communicate tangible benefits to top management, even if these benefits are only rough estimates and approximations, in order to obtain the legitimization and support of top management for knowledge management.

The continuity of communication is a decisive factor in the relationship with management. If the expectations raised in the initialization phase prove to be too ambitious, it is especially crucial to synchronize management's expectations and perceptions of the initiative with the individual phases of the implementation process."
- Telcotech members recognize the faults committed regarding the management of their relationship with the Telcotech management, self-critically commenting on their failure to synchronize the management's outlook on the KN initiative with their own.

- However, in spite of the acknowledged risk of raising expectations about the initiative too highly, the lesson learned represents a clear recommendation to nurture high expectations in management in order to get momentum for the initiative. This implies a conscious suggestion to first deceive management about the potential of knowledge management and then to correct management's distorted outlook in a stepwise process.
- In terms of learning evaluation, the lessons learned regarding the communication with the Telcotech management are examples of single-loop learning.

Lesson 2: Communication with Telcotech employees

Putting knowledge management on the top management agenda made the initiative a highly politicized issue. Telcotech employees consequently formally pledged their co-operation with the initiative. However, the initiative later proved to lack support from its target customers, due to a lack of true belief in, and thus commitment to, the initiative in the field. After the launch of the KN tool implementation, the field expressed concerns about the utility of the KN tools. Furthermore, since they had not been included in the conceptualization of the KN initiative, they did not feel any obligation to support the spreading and the promotion of the initiative.

Participants of the case writing method formulated the following lesson:

"Establishing communication with the field early on in the knowledge management initiative ensures the inclusion of the specific needs and concerns of the targeted groups and thus diminishes the risk of neglecting important features of the designed knowledge management tools. As a result, the probability of acceptance, and thus of return of the provided tools, is significantly increased".

- The mere description of the targeting of specific organizational user groups is an expression of single-loop learning by detailing how communication with the field can be done more efficiently.
- However, the self-reflective recognition of having badly managed the relationship with the field, questions the predominant attitude with which the Telcotech members in the regions had been treated. Instead of adhering to a hierarchical top-down approach that considers the gaining of top management's support as sufficient, and then driving the initiative through to the bottom of the organization, the KN team admits that this fundamental assumption about organizational functioning has to be questioned. This new vision implies a significant change in the perspective of how to implement change in the regions successfully.

Lesson 3: Implementation approach

Even though the overall global KN message was generally appreciated and understood throughout Telcotech, it did not lead to willingness by the Telcotech employees in the field to accept and implement the initiative there.

Participants of the case writing method formulated the following lesson:

"The initial aim of the knowledge management initiative, namely to develop a standardized KN approach that could be used by virtually everyone for virtually every purpose, implies a risk of a lack of customer focus. This means that the value propositions of a standardized approach are too undifferentiated and do not pay enough attention to the specific everyday needs of the different focus groups. On the other hand, a customized approach implies a risk of fragmenting the overall knowledge management initiative into a portfolio of highly specialized projects that seemingly lack a united doctrine with a low name recognition. The dilemma of the implementation approach thus evolves around the trade-off between accommodating the needs of individualized clusters of target customers versus the merits of a standardized approach with a higher overall organizational visibility".

- The discussion of the two fundamentally opposed approaches to implementation is an expression of a process of double-loop learning. While at the beginning of the initiative it had been taken for granted that a standardized approach, as stipulated by the management, was the correct way of implementation, this basic assumption, and recipe for success, was increasingly questioned following the reactions from the field. The result was a different frame of reference on how to deal with the regions.
- Yet, the lesson does not include an explicit reflection on the reasons for management's attitude or the implicitly negative perception attached to this attitude.

Lesson 4: Concentration on specific target groups

With the progression of the KN initiative, the KN team became conscious of the fact that within individual groups of the sales and service force there were fundamentally different needs and expectations as to possible KN applications.

Participants of the case writing method formulated the following lesson:

"To successfully implement knowledge management initiatives, it is crucial to focus on meeting the needs of the different target groups of employees in a custom-made way. This implies offering knowledge management solutions to individual clusters of employees by taking their individual conditions into consideration. As these individual clusters represent groups that already work together and share a particular professional interest, knowledge

management initiatives in such a limited scope can additionally benefit from the feeling of mutual trust prevailing within these groups".

- The questioning of the initial assumption that employees in the field are a coherent group who share the same universal needs indicates a change in mental models of Telcotech employees in the field.

Lesson 5: Design of the initiative

Since the KN initiative did not solicit the input of actual users of the knowledge management tools in the design of the initiatives, the initiatives later proved not to fully address the needs of the target customers.

Participants of the case writing method formulated the following lesson:

"To tailor the KN initiative as closely as possible to the needs of the different target groups, the integration of representatives from each group into the design thereof is crucial. This has two effects: Firstly, it provides an understanding of the real needs of the potential users and thus increases the chances of constructing the most useful offer. Secondly, it creates ties between the KN initiators and their focus groups, thereby increasing the commitment of both parties, which is crucial for the implementation phase".

- While the KN team first relied on the hierarchical pressure to support the KN initiative team members recognized that authority-driven measures had to be replaced through a careful consideration of the users' needs and concerns.
- The lesson implies a change in the KN team's self-perception and in their perception of other organizational groups.
- However, the lesson does not discuss the organizational culture underlying the initial lack of integration of employees in the field.

Lesson 6: Tangible benefits

The KN team realized that without the communication of concrete, tangible benefits to the targeted customers, KN was difficult to implement and sustain. While several promotional activities were under way that gave incentives for sharing knowledge, their positive effects were often limited in duration.

Participants of the case writing method formulated the following lesson:

"To guarantee commitment by the various organizational user groups, knowledge management has to be connected to the day-to-day problems and needs of the individual employee. By addressing the concrete problems occurring on the shop floor, knowledge management offers its target customers direct, tangible benefits instead of some abstract

message without an immediate connection to everyday practice. Initiators of a knowledge management initiative thus first need to listen to their targeted user group and focus on constructing immediate benefits for this group. If the immanent value proposition of the knowledge initiative is understood, the individual employee will be more receptive to his/her role in the overall knowledge management process. Since this sensitization is more difficult to attain if there is no actual or latent dissatisfaction within a potential user group, initiators of knowledge management should first address target groups with a high potential leverage for knowledge management measures."

- o As an expression of the shift in the relationship with employees in the field, the targeted employees are now designated as "customers". This changed mental map regarding the Telcotech employees in the regions and the role the KN initiators should assume in the implementation of the KN initiative, can be seen as the result of a "transformation in meaning perspectives" (Rigano/Edwards, 1998) leading to a redefinition of the self representation and the representation of others.

Lesson 7: Incentives

As the KN team recognized during the progress of the implementation process, target groups differ greatly with respect to their susceptibility to KN.

Participants of the case writing method formulated the following lesson:

"A consequence of the differentiation between the various target groups of the knowledge management initiative is to examine how the different target groups differ in terms of motivational factors for the support of the use of the KN tools. This implies adapting the communication strategy and incentive systems accordingly, instead of assuming a universal functioning of the field".

- This lesson learned regarding incentives is a logical consequence of the shift in the perspective on how to deal with the target customers in the field.

Lesson 8: Launch pattern

In the case of the KN initiative, four different tools were launched and implemented simultaneously. This resulted in confusion and misinterpretations among beneficiaries as the specific aim and focus group of each partial initiative was not clearly differentiated.

Participants of the case writing method formulated the following lesson:

"Designing a set of knowledge management initiatives under a common roof, a critical question is whether to launch these consecutively or simultaneously. By approaching the

implementation of knowledge management as a phased sequence of interventions, the dynamic inherent in project phases can be exploited. Projects typically witness several phases: initially growing to a certain peak of organizational attention, then dropping in employees' perceptions. By juxtaposing the s-curve "peaks" of the different KN initiatives, the likelihood is increased of sustaining high levels of attention from both top management and the beneficiaries. The additional merit of a consecutive launch lies in communicating the KN message more clearly, since each single launch is accompanied by an explanation of the specific aims of the respective initiative."

- The lesson learned regarding the launch pattern is another example of single-loop learning from mistakes.

Lesson 9: Organizational structure as an obstacle

The Telcotech structure was found to be based on a model that proved anachronistic for the disclosure and re-deployment of knowledge.

Participants of the case writing method formulated the following lesson:

"Knowledge management requires the alignment of organizational structures to favour intra-organizational cooperation with the sharing of knowledge. An extremely decentralized structure of disparate independent regions is not conducive to an organization-wide knowledge sharing across regional and local boundaries".

- While this lesson formulates a single-loop learning insight about the necessity of aligning the organizational structure with knowledge management, it does not question the underlying assumption of this insight. The lesson explicitly attributes responsibility for project difficulties to others, in this case the regional organization. The lack of commitment to the implementation of the KN initiative by the regional sales managers is therefore seen as rooted in the freedom granted to the sales regions. This description implicitly suggests that a more centralized and coercive treatment of the regions, e.g. the Telcotech management ordering the regions to support the initiative, would have facilitated the KN implementation. This hidden, hierarchical top-down understanding of management expressed in the case description, is in sharp contrast with the explicit statement of the case that knowledge sharing cannot be ordered or mandated, but has to occur voluntarily since "knowledge is locked in the minds of the organization's employees". It indicates that in spite of the explicit recognition of the voluntary nature of knowledge management, there is still a prevailing, hidden assumption about the power of the hierarchy to bring about behavioural change.

Lesson 10: Organizational culture as an obstacle

Since the top management strongly promoted the topic of knowledge management at the beginning of the initiative, everybody seemed thrilled by the broad potential and pledged their co-operation. However, past structures, systems, policies and practices fostered behaviour that obstructed knowledge management.

Competition among regions hampered cross-regional collaboration, inasmuch as the regions were protective of their knowledge assets and concerned about the consequences of losing power through knowledge sharing. Sales representatives were keen to protect themselves against "predatory colleagues," by hoarding their valuable knowledge, or by only sharing it with long-established contacts with colleagues within their respective region.

Participants of the case writing method formulated the following lesson:

"An organization's reformulation of its strategy to that of a more formal consideration of knowledge, necessitates a realignment with attitudes and behaviours required to foster knowledge sharing practice. To instill such new attitudes and new mindsets, organizational structures, managerial processes, and cultural artifacts have to be geared towards the formal accommodation of knowledge.

The implementation of knowledge management initiatives therefore requires formal consideration of organizational structures, mindsets, and processes. If these are not conducive to the accommodation of knowledge management, inappropriate structures and attitudes need to be amended. By implication a careful consideration needs to be made of the depth and scope of the change necessary, and the resources required to engineer such change need to be provided. Without formal consideration of this change management aspect, the management of knowledge is likely to be impaired".

- The descriptions indicate that no culture change has occurred. Employees in the regions perceive knowledge as power. While there are indications, for example through the practice of knowledge sharing within the regions, that trust is crucial for knowledge management to work, mistrust prevails. The lesson does not discuss that the lack of trust is not limited to the regional level, but is implicit between the Telcotech management and the rest of the organization: With reference to the politicized character of the KN initiative due to the priority it was given on managerial agendas, it can be assumed that either the rest of the organization had not dared to criticize the communicated vision that the Telcotech management had had about knowledge management or the criticism had been ignored by management.

- The reference to organizational culture as a hindering force of the KN initiative, points to circumstances and collective patterns of behaviour that are beyond the reach of a single Telcotech employee, or even a single group of the organization. The situation as described in the lesson learned, shifts the responsibility for problems encountered in the initiative to parameters of organizational life that lie beyond an individual's scope of

change, thereby exempting specific organizational actors of blame for problems encountered. The lesson indicates a consciousness among Telcotech members that a broader scope of change in attitudes, mindsets and behaviour needs to take place to succeed with the KN initiative.

Lesson 11 Management of the KN team

The lesson regarding the management of the team responsible for a knowledge management project evolves around two main insights: The need for personal continuity and commitment, and the necessity to cover different roles within the team.

Participants of the case writing method formulated the following lesson:

"To grant stability to a long-term project such as the design and implementation of a knowledge management initiative, the continuity of key personnel across the different project phases is crucial. This necessitates a careful consideration of the availability of key figures over the whole implementation process so that they may be retained. It implies that the number of temporary team members should be minimized to ensure a long-term commitment and dedication to the project. Continuity should also be maintained regarding roles in the implementation phase."

- Telcotech members cited staff discontinuities in the KN team in general, and a change of KN team leadership in particular, as reasons for the communication breakdown between the KN team and Telcotech management. The lesson defined from these experiences is a single-loop learning insight on how to avoid such disruptions in future. However, a Telcotech outsider may wonder why in the time of leadership transition the remaining KN team members did not talk directly to the management themselves. The fact that this alternative was neither discussed nor suggested points to distinct aspects of the Telcotech culture. As the option of approaching the Telcotech management directly was not considered feasible, it can be deduced that the degree of hierarchy and formality of the Telcotech culture is relatively high. Therefore direct communication with the management across hierarchical barriers, would have constituted stepping outside the established frame of organizationally accepted behavior. However, the joint reflection on this issue, neither recognized these barriers, nor questioned their utility or behavioral consequences. This implies that regarding the issue of team management double-loop learning did not take place.

Lesson 12: The management of rival initiatives

In the case of Telcotech, the KN initiative was increasingly surrounded by a myriad of progressively emerging knowledge management projects, both on departmental and corporate

levels. Coincident with this emerging competition, the conceptual and practical value proposition boundaries of the various initiatives became increasingly blurred. It thus became increasingly difficult for the target customer to detect the differences in target and scope between the various knowledge management projects. The result was a considerable confusion about the relevance and applicability of the different knowledge management offers, thereby detracting attention from the KN initiative.

Participants of the case writing method formulated the following lesson:

"The implementation of knowledge management initiatives requires formal anticipation and recognition of related projects that could develop into "competitors". In turn the pre-empting of interference by rival knowledge management initiatives requires co-ordination on a corporate level in order to provide a clear-cut value proposition of each initiative. If such co-ordination is absent, great care has to be taken to position, and clearly communicate, the individual value propositions of a given initiative relative to competing projects in order to sustain a "competitive space" for each".

- The lesson regarding the management of rival initiatives focuses on the mistakes made in the past, and suggests measures such as coordination on a corporate level and clear communication, to prevent such mistakes. Looking at the descriptions of other knowledge management initiatives, the overriding impression is that a rather hostile image is painted of these initiatives. They are seen as "competitors" or even "rivals". Such descriptions depict the prevailing competitive thinking and internal rivalry among employees working for different knowledge management initiatives. Simultaneously these descriptions remind one of the KN team's description of the Telcotech regions' behavior as similar to that of closed "duchies" focusing on their self-interest. While the KN team heavily criticized the regions' behavior as being stubborn and uncooperative, their own comparable attitude displayed towards their own "internal competitors" was not self-reflectively admitted.

Endnotes

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[2] To explore the organizational learning that occurred in the YWCA between 1946 and 1970, Boyce/Franklin (1996) used a method of shared storytelling with former YWCA leaders. In the course of their study the authors show that organizational learning can be surfaced in the stories being told by various organizational actors.

[3] Studies confirm that using textbooks rewritten in a narrative style result in a significantly higher recall rate, allowing up to three times more information to be remembered (Shanahan/Maira, 1998).

[4] In an exploratory study, Kendall/Kendall (1993) identified the metaphors used in systems' development processes, determining which metaphors were articulated in different user groups. By comparing the language of information system analysts in 16 different organizations, the authors extracted a group of main metaphors. The analysis revealed that different kinds of systems' development methodologies entailed distinctly different principal metaphors, differing in terms of goal orientation, and vision of the environment. The choice of metaphors spelled out how systems analysts should interact and proceed as well as telling analysts how to think about an organizational situation. By guiding the analysts on the appropriate ways to interact and behave, the set of metaphors used presented opportunities for action as well as constrained the analyst from seeing and enacting alternative possibilities (Kendall/Kendall, 1993).

[5] Srivasta/Barrett (1988) argue that metaphorical language is superior to literal language, since it captures experiences and emotions better and can therefore communicate meaning in complex, ambiguous situations where literal language is inadequate (Palmer/Dunford, 1996).

[6] An excellent example of how conception is based on the implicit metaphorical systems used to comprehend and engage reality is given by Smith/Simmons (1983). The authors conducted research in an organization described by its members as a "Rumpelstiltskin" organization. Following this tale imagery, the researchers started to retrace characteristics of the fairy tale in the researched organization, attributing organizational actors to the roles in the fairy tale. As developments unfolded, they could identify various phases and processes in the organization's history that paralleled the tale. Yet, as the authors emphasize, the Rumpelstiltskin metaphor did not merely *reflect* the events occurring within the organization, but it also *contributed* to the creation of the company reality. Assuming the mental reality implicit in the Rumpelstiltskin tale made the group leader the repository of the group's mutual projections (Smith/Simmons, 1983). By using the Rumpelstiltskin image the authors conclude that organizational members had become "victims of their self-created reality" which was implicitly built on the Rumpelstiltskin assumption.

[7] Brown and Jones (1998) describe alternative interpretations of the failed introduction of an information system in a UK hospital. Their analysis highlights the differences between the explanations offered by different groups, which are reflected in alternative narratives. While the first group of narratives attributed failure to the occurrence of particular events which were described to have led to the inevitable failure of the IT project, the second group of narratives attributed the failure to the deliberate actions of specific groups or individuals within the organization, claiming that conspiracy was the real source of failure. As shown by this example, the labelling of success or failure and their respective sources is not inherent in the events themselves, but a result of the storytelling process and an interpretation of the storytellers (Rhodes, 1997).

[8] Shanahan/Maira (1998) apply this insight by suggesting working backward from a concrete statement of the future to the events that created it. Organizational members tell a story identifying exactly what had happened in each proceeding stage, making the next step plausible. By spinning the narrative backward from the envisioned end-point to current reality, new patterns of thinking are encouraged, making participants of the storytelling exercise aware of and receptive to the anticipated events. Additionally, the stories developed provide clearer images of the changes that need to take place than survey numbers do (Boje, 1991a).

[9] Akin/Schultheiss (1990), for instance, apply storytelling to reveal what constitutes "good work" in a specific department of an organization. By comparing the individual stories of department members about outstanding accomplishments in the their department, the group engages in a joint reflection and interpretation of these stories, thereby sorting out the circumstances and actions that led to the success.

10 The overall condition for the described insights to occur is for the reflection process to be free of particular types of power inequalities. This implies participants' readiness to question themselves. Otherwise, as Hughes (1995) points out, just reflecting on one perspective could lead to the manipulation of stories which, in turn, will prevent the acceptance of new ideas and impair the ability to change.

11 Even though individuals might know that they dispose of tacit knowledge to accomplish a specific task such as recognizing a pattern, they often do not know how they do it and are thus not able to articulate it directly. Examples of tacit knowledge would be riding a bike, recognizing a face or saying a grammatically correct sentence in one's native language (Ellerman, 1999).

12 Every culture or profession, for instance, codes its operations by tacitly assuming a rather extensive network of information and experience that has been acquired through and is grounded in the extensive experience of the membership of the aforesaid group (Mitchell, 1996). In a similar way, different organizational groups share different "networks of assumptions" which are not accessible to others, since the assumptions are coded by their members as common sense and located in silence. As a result each network of assumptions, i.e. each distinct group, shares different realities (Hawes, 1991).

13 The company will be named Telcotech throughout this work to protect the identity of the researched organization.

14 The KN task force designed the encompassing knowledge networking initiative as a portfolio of four intranet-based initiatives.
   • KN "Yellow Pages" were designed to identify people with an expertise in a specific field and resulted in a directory of expert employees.
   • KN Service Knowledge aimed to provide individualized customer solutions, including tips and tricks for service employees and a virtual discussion forum.
   • KN Competitive Intelligence focused on the leveraging and re-deployment of knowledge regarding product and service solutions with specific features and information on competitors' offerings.
   • The KN Knowledge Workshops were designed to detect new areas of intervention and monitor Telcotech employees' needs in the domain of knowledge management, serving as a convenient platform for spreading the overall KN message.

15 The seeking of different meanings held by different organizational members seems especially important to prevent a pro-management bias (Boyce, 1996). Guba and Lincoln (1989) speak in this context about a "maximum variation sample".

16 Nine of the interviewees were members of the knowledge networking task force, while eleven were other Telcotech employees, either Telcotech managers assuming the role of mentors (three persons) for the Telcotech project, or Telcotech employees working in the various sales regions (eight persons).

17 The questions asked by the interviewer were aimed to influence the interviewees as little as possible. For clarification purposes, or for illustration with examples, follow-up questions were asked that aimed at eliciting more narrative while providing as little direction as possible. To ensure that the meaning conveyed by the interviewees was understood accurately, the interviewer applied the active listening technique whereby the interviewer periodically summarized what she believed the interviewee had told her. Being aware of the potential biases of case study interviewing, both in terms of researcher effects on the site and of site effects on the researcher (Miles/Hubermann, 1994), the interviewer made a special effort to avoid phrasing leading questions (Easterby-Smith, 1991).

18 The initial coding served less for the definition of themes, but represented a substantial element of the metaphor analysis.

19 The purpose of this phase was to develop and describe concepts that could serve as categories according to which the data could be indexed, constituting the basis of descriptive theory building.

20 The underlying assumption of this approach is that organizational members have expertise about their organization and thus what is needed to improve it. Much of this knowledge is tacit and not easily accessible. A structured process of in-depth reflection and dialogue can surface this tacit knowledge that the organization needs to articulate to improve itself (Keating/Robinson/Clemson, 1996).

21 A similar study approach is well documented in Boyce (1995). In this application the researcher organized a so-called storytelling event where individual employees' stories of experiences in a particular organization were told. In a second phase participants identified the central themes of these stories and then jointly interpreted their meaning.

22 In this context the inherent danger of a joint narrative construction has to be addressed. Brown and Jones (1998) point out that the wish to produce a coherent narrative can lead to an unjustified simplification of events in order to avoid personal responsibility and to preserve self-esteem. In such a case, success is

attributed to own actions whereas failure is exclusively attributed to external forces (Brown/Jones, 1998). However, since the Telcotech interview process and the reflection workshop aimed at encompassing the entire spectrum of perspectives on the KN project, this risk was minimized. As the later analysis shows, the Telcotech case story retains the different versions of the same events and does not eliminate the inherent paradoxes of the KN project.

23 A procedure of sorting per paragraph was followed, after which the collected metaphors were sorted in coherent theme groups clustered around recurring main metaphors.

24 This analysis follows the methodology documented in Taylor's (1999) study on organizational change. Focusing on the question of what the differences are in the way in which people make sense of organizational change, Taylor (1999) reports different perceptions about an organizational transformation being apparent in various organizational narratives. Coding each story as to whether change was described as discontinuous or continuous, the author found the correlation between the perception of continuity level and level of management confirmed at a rate of 87%. While senior managers told stories of discontinuous change, individual employees merely told stories of incremental change.

25 However, this did not manifest in a top-down drive by management to implement KN as would otherwise have been the case in strategy implementation. Employees were therefore also not obliged to engage in the KN initiative.

26 Other descriptions, such as "facilitating the exchange of service-knowledge", or "leverage and re-deployment of the knowledge assets" fit into this economic discourse of knowledge as a valuable object that has to be exploited for Telcotech purposes.

27 A "speech act" is the use of a language statement in order to *do* something without explicitly saying so (Austin, 1962), e.g. by saying "It is raining" the other person is implicitly asked to take the umbrella. The meaning of speech acts depends on the actual context in which they are embedded (Brodsky/Lacour, 1992).

28 The lack of integration of the actual users into the design of the initiative was jointly defined as an important lessons learned in the reflection workshop.

29 This citation is drawn from one of the interview transcripts.

30 It may even seem to organizational members that statements such as "My knowledge pays for Telcotech" may primarily represent a "good message" for Telcotech, but much less for the individual Telcotech employee himself/herself.

31 As later pointed out as a lesson learned by the KN team, a major challenge of the successful KN implementation was the widening gap between the management's perception of the initiative and the KN team's perception in terms of the implementation approach.

32 As reflected in the previous statement of the KN team members, the change in the implementation approach was mainly due to the recognition that the standardized approach favored a large scope, but ignored the specific needs and expectations of individual organizational groups.

33 This, however, further implies that the "KN virus" could have been perceived as a threat by some organizational members, since it attacked established patterns of behavior and required a culture change in terms of treatment of knowledge.

34 The change of metaphors from non-aggressive to a rather high degree of violence, combined with a hostile connotation attributed to the rest of the organization, might also indicate an increasing degree of frustration felt by KN team members at this stage of the project.

35 The KN team retrospectively recognized this circumstance as a major weakness of the initiative.

36 The original version of the lessons learned as well as a description of the respective context can be found in the annex of this work.

37 See annexe

38 Boyce and Franklin (1996) describe this ability to change shared mental models through reflection and introspection as an important skill of organizational learning.

39 E.g. the labeling of the employees in the field as "duchies" changed to their being labelled "partners".

Language as a *vehicle of thought*
Constructing knowledge through language and meaning

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Introduction

"...temperature must be equal to or greater than 53°F (12° Celsius) at launch" (Engineers' recommendation on the eve of the launch of the Challenger Space Shuttle, Vaughan, 1997, p. 291).

Although it was known that low temperatures would affect the performance of the materials used and the engineers expressed their knowledge of this concern, the Challenger was launched at an ambient temperature of 36°F (2° Celsius). 73 seconds later a fireball erupted and the Challenger vanished in a cloud of smoke gaining notoriety in US aerospace history.

The paper explores the role of language in constructing knowledge. Language is commonly understood as a tool to describe and report on reality. However, this is a limited view of language since language is not only content; it also provides context and a way to recontextualize content (Boje et al., 2004, p. 571). We do not only describe and report with language but we create with it. Language provides the context within which we are able to know. The paper applies the theoretical findings to the Challenger accident. It analysis how the engineers and managers involved in the Challenger accident constructed or better destructed knowledge through language and meaning. It is not the difference of national languages but the difference in language context and its meanings which matters. The core issue of the paper is the ambivalent, situation-dependent and active role of language while sharing and creating knowledge. It is argued that language significantly influences *how* we construct knowledge while interacting with each other (Berger & Luckmann, 1975). Words expressed through language and meaning influence how we perceive and interpret the world around us. Language affects our thinking. While constructing knowledge, we are processing cognitions through language. Therefore, language is considered as a *vehicle of thought* (Dummett, 1993, p. 151).

This paper emphasizes the role of language in constructing knowledge, i.e. integrating different elements of knowledge; it considers the context-dependant nature of knowledge: how do people interpret the situation; what tasks have to be accomplished; which knowledge do they consider important; etc. Firstly, the paper outlines its assumptions on *epistemological issues*, i.e. the knowledge concept and the role of language and meaning in constructing knowledge. Secondly, referring to *discourse theory* the paper sheds light on the use of

language, highlighting interactivity, context dependency, the functional, and creative nature of language (Potter & Wetherell, 1987; Alvesson & Kärreman, 2000; Potter, 1997). It will be shown how groups of people develop and cultivate their own language through *language games* (Wittgenstein, 1958; Roos & Krogh, 2002; Krogh et al., 1996). Thirdly, for the purpose of illustration the theoretical findings on language and meaning will be applied to the case of the Challenger accident and interpreted accordingly.

Epistemological issues

In order to be able to understand the role of language and meaning in knowledge construction it is necessary to deal with epistemological issues, i.e. how we share and create knowledge. The paper draws upon an interaction-based concept of knowledge which will be outlined briefly in the first part. Secondly, theoretical foundations on language and meaning as the means of social interaction are presented.

Interaction-based concept of knowledge

Knowledge is highly personal and includes an act of integrating explicit and tacit elements of knowledge. Knowledge always contains a highly individual component (Polanyi, 1962, p. 17). Polanyi who introduced the concept of tacit knowledge emphasizes the personal element of knowledge:

> „… into every act of knowing there enters a passionate contribution of the person knowing what is being known, and .. this coefficient is no mere imperfection but a vital component of his knowledge (Polanyi, 1962, p. viii)."

While sharing and creating knowledge individuals integrate the various elements of knowledge in the light of a particular context. Thus, the particular context is of vital importance. The context provides meaning to it and allows for sharing and creating new knowledge. Every act of knowing inherently includes an individual's appraisal of the context. Individuals decide upon the meaning they apply to the particular context. Here, the ability to see the difference and draw distinctions comes into place.

> "…*knowledge is the individual ability to draw distinctions within a collective domain of action, based on an appreciation of context or theory, or both*" (Tsoukas & Vladimirou, 2001, p. 979).

The ability to draw distinctions is based on how individuals perceive and process what they experience. Individuals create and share knowledge among each other while interacting. They are not passively transferring knowledge like commodities but are actively sharing knowledge and integrating it with the existing knowledge base (see for example Berger & Luckmann, 1975; Renzl, 2002). Knowledge construction therefore depends on the participants involved and how they are perceiving, processing, and interpreting meaning in the particular situation. For example the expression of a "disastrous impact" of temperature falling below the limits

shows the room for interpretation of meaning. "Disastrous" is commonly understood as something dangerous and clearly signalling danger. However, as shown below in the Challenger case, the expression "disaster" is commonly used in aeronautics and therefore the signalling effect is reduced tremendously (Vaughan, 1997). The role of language in constructing knowledge and meaning will be explained in the following.

Language and meaning affecting knowledge construction

Knowledge is socially constructed is almost an accepted truth. However, how knowledge is constructed and what sustains it is less commonly understood. Language and meaning plays a crucial role in knowledge construction. In analysing the role of language and meaning in knowledge construction three issues may be pointed out: (Stein & Ridderstråle, 2003, p. 64):

- we know more, than we can tell (Polanyi, 1983);
- we say more, than we know, and
- what is said, will be interpreted differently.

Knowledge construction involves an ongoing process of integrating existing explicit and tacit elements of knowledge (Polanyi, 1969, p. 156). It is a highly personal process depending on the particular situation and people's perception of the situation (Polanyi, 1962, p. viii). The ambiguous, metaphoric and context-dependant role of language is crucial for constructing meaning (Alvesson & Kärreman, 2000, p. 137). We reduce, compile, and/or condense knowledge depending on the meaning we ascribe to it. Values and beliefs are affecting how we assess the meaning of particular elements of knowledge. In organisations people develop collective values and beliefs affecting meaning and language used.

As already mentioned, language is traditionally seen as a communication tool consisting of words in order to be able to describe reality and its objects. However, the role of language in constructing knowledge is more far reaching and goes beyond the "objectivist function" of language (Polanyi, 1962, p. 17). Over and above language serves as a "vehicle of thought" (Dummett, 1993, p. 151) and carries meaning, which we ascribe to words. It is the highly personal aspect of meaning, which is articulated through language and which is of significant importance to knowledge construction (Polanyi, 1962, p. 17; Tsoukas & Vladimirou, 2001, p. 979). Language allows for articulating knowledge and integrating various dimensions of knowledge coherently (Potter & Wetherell, 1987).

Language is of vital importance in communicating knowledge because it carries the context which allows for meaning and recontextualisation. Language is composed of words and notions, which allow for articulating meaning. "Desk" as a word communicates eventually the meaning of work and links it to pen, computer, paper, etc. In Organizational Theory the notion of Organizational Learning depicts learning of and in organizations; however, it also assumes that employees in organizations are learning; it is regarded rather as a collective process of learning; it includes a particular way of understanding organizations, etc. Usage of words allows for drawing distinctions (Luhmann, 1990, p. 124); referring to the

examples above a desk can clearly be differentiated from a chair; organization and employees are symbolizing distinctive concepts. According to a postmodern and poststructuralistic perspective language is a system of distinctions, which is based on suppressing hidden meanings (Cooper, 1989; Deetz, 1992). Each attempt of articulating something clearly and indubitably is based on individual meanings. It is necessary to deconstruct individual meanings in order to be able to understand it. Employee contains for example the concept of peer to peer versus employer.

People interact and communicate with each other through language. Meaning arises in interaction. Meaning links the distinctions between various expressions. Language allows for describing oneself and the circumstances of one's existence (Maturana & Varela, 1998). The ability of describing oneself is only possible through language. Language is the prerequisite for phenomena like reflection and consciousness. Interaction through language constitutes identity and social adaptation (Maturana & Varela, 1998). Based on language we are able to categorize our experiences and ascribe meaning to it. We ascribe meaning to each word. It is the meaning what the word is there for.

„… tacit knowing is the fundamental power of the mind, which creates explicit knowing, lends meaning to it and controls its uses" (Polanyi, 1969, p. 156).

Meaning is a core element of knowing and evolves through language. It is through language that we are able to draw distinctions and categorize. Language and meaning are something that has to be learned. For example it takes some time until we are able to adapt and fully understand routine expressions and procedures etc. in organisations. We have to learn the organizational language in order to be able to understand organisational activities. Definitions, unique terminologies, codes, acronyms, characters as well as symbols and metaphors form together part of the unique culture of an organization (Evered, 1983, p. 125f). In constructing meaning the ambiguous, metaphorical, and context-dependant role of language is highly significant (see Alvesson & Kärreman, 2000, p. 137 and 141). This point of view is raised in discourse theory, which will be presented in the following.

Discourse analysis

Theoretical foundations

Discourse analysis sheds light on the role of language in social interaction; it deals with the use of language in the social context (see Potter, 1997; Potter & Wetherell, 1987). Discourse analysis draws attention to the interactive, context-dependant, functional, and creative nature of language. We use language to persuade, engage, motivate, discipline, criticize, express emotions, clarify, unify, identify ourselves, etc. We construct our reality through language, which is strongly related to a particular situation. For example "it will be nine o'clock soon" eventually expresses an accusation (your are late!), a signal to start a meeting, and/or an answer to a question, etc. The context provides the meaning of it. More complex examples can be found in management research for instance, leadership, decentralization, hierarchy,

strategy, motivation, participation etc. (Alvesson & Kärreman, 2000, p. 142). What matters is meaning. We ascribe meaning to concepts through interaction as a discourse process.

> "discursive perspective places meaning centrally on the research agenda … meaning now is understood to be not just in the mind, in the way people think. It is rather manifested in the way people act." (Tsoukas, 2005, p. 98)

Discourse contains all sorts of verbal interaction, informal and formal , and written texts of all kinds (Potter & Wetherell, 1987, p. 7). Discourse analysis studies language in social contexts. As mentioned above, language is not only regarded as a medium for communicating but also as a vehicle of thought. Language is fundamental to social interaction and thus for knowledge construction, "one cannot arrive at knowledge without having travelled some distance in a discursive space" (Xu, 2000, p. 428).

Discourse analysis allows for a better understanding of social interaction. Research in discourse analysis, for example Potter and Wetherell (1987), Potter (Potter, 1997), or Edwards and Potter (1992) emphasize the productive, functional, interactive and context-dependant role of language in social interaction. Function, construction, and variation have been identified as core elements in discourse analysis (Potter & Wetherell, 1987, p. 32f):

- *Function*: "… people use their language to do things: to order and request, persuade and accuse" (Potter & Wetherell, 1987). The function aspect of language is evident. However, function cannot be interpreted in a mechanical way. Language is not only used explicitly but also unconsciously. Considering knowing the functional aspect of language demonstrates that knowledge can be articulated in regard with meaning. For example, "temperature is below the limits", may induce particular measures to be taken.
- *Variation*: Language varies according to its function, emotions, and/or the individuals involved in the conversation, i.e. technical knowledge has to be communicated differently to technicians and to managers for example.
- *Construction*: People are using language to construct reality and versions of the social world. We actively select through including some expressions and omit others. Considering knowing the selection and integration of various knowledge aspects is crucial for sharing and creating knowledge.

Table 1. Summarizes the three core elements of discourse analysis and shows examples:

	Core questions	Examples
Function	What shall be communicated? What shall be expressed and caused through language?	„It will be nine o'clock, soon." Informing about the time, f. ex. starting a meeting which has been scheduled at nine.
Variation	How shall it be communicated? Which forms of language expressions are used depending on the people involved?	„It is already nine o'clock." The manager is annoyed by the employee being not on time.
Construction	What is actually communicated? What has actually been communicated according to the people involved and their relationships among each other?	„It is already nine o'clock."– „A few minutes late are okay, aren't they", an employee's reaction to the manager.

Table 1. *Core elements of discourse analysis*

Language varies depending on the social context and individual differences in meaning. In the following the discourse process will be analyzed in the light of the following aspects: social perception, self-presentation, cognitive dissonance, and speech accommodation (Potter & Wetherell, 1987, p. 36ff):

The aspect of *social perception* is crucial for the construction of meaning. Perceiving the world around us is part of a discursive interactive process depending on social relationships. "Discourse is what constitutes our social world. … So discourse is first and fundamentally the organizing of social reality" (Chia, 2000, p. 517). Studies like Duncan's (1976) have shown that people provided with the same kind of scenario will describe that scenario quite differently. Duncan presented in his experiment students with a film in which either a black or a white man shoved another person. It was exactly the same action in each case, all that changed was the race of the protagonist. The respondents, who were white students, then had to assess this scene into for example "playing around" or "aggressive behaviour". The respondents were much more likely to describe the event as aggressive behaviour when it was the black who was doing the shoving. If it was the black person, who did the shoving, it was in 75 % of the cases considered aggressive behaviour. If it was a white person, who did the shoving it was only in 17 % of the cases considered aggressive behaviour. Additionally in the case of a black protagonist the behaviour was considered as based on his personality whereas in the case of the white protagonist external environment was considered to be the cause. Apparently, stereotypes effect the perception of events. This example of social perception demonstrates how facts which we assume to be objective are affected by socially constructed values. Perceiving an event happens through observing, identifying and categorizing and by that we appraise the situation. The appraisal is the basis for the meaning we ascribe to it. Identifying and categorizing is considered as recognizing an appropriate category. Prior

experiences form our categories as well as socially constructed components. Perception is highly dependant on context and prior knowledge.

The aspect of *self-representation* considers that people modify their behaviour according to different social contexts. The way people talk varies according to the social contexts. It is often a matter of saving the face and leaving an impression. For example, an engineer uses technical language and by that stresses his competence as a technical consultant.

Theories of *cognitive dissonance* show that people's desire to appear consistent to themselves and others. Here the issue of smoking is a frequently cited example: "I am smoking. Smoking causes cancer." To quit smoking would solve the dissonance, however, people tend to rationalize and neglect a direct causal relationships between smoking and cancer; "there are many smokers who nevertheless became very old" etc. The desire for situations being consistent is dominant. Inconsistencies produce tensions, which have to be reduced. The extent of the perceived tension is an individual matter and varies. Consistent and inconsistent perceptions are quite volatile phenomena which are developed in social contexts.

The aspect of *speech accommodation* shows the phenomenon that people modify their accent, dialect, and intonation pattern in different group contexts etc. We often modify our speech when talking to children for example. Discourse analysis includes here linguistic aspects in analysing functions of language. There are two levels of interaction through language:

- Language as the source: texts and dialogues as fundamental elements of group contexts
- Language as unit of analysis: language as a vehicle of thought in order to gain experiences, gather information etc.

Discourse analysis stresses the importance of language and its function, which has a high impact on knowing and knowledge construction. The group context as social framing is considered as significant. The construction of meaning as a crucial aspect within the language is considered in the following section.

Language games

In the course of time organisations develop their own language and can be considered as language systems. Using the term organisation means that organisation is distinct from anything else, for example organisation as an entity versus management. Language games is a term symbolizing that language is continuously cultivated and created anew (Wittgenstein, 1975 (1. Aufl. 1958), p. 19, Nr. 7). Words are not representations of reality but obtain meaning through its use. Language operates like a game. For example language and words can be thought of a chess game: If we want to explain the notion of a horse in the chess game it is not enough to explain the chessman as such. There are many variations of a horse and we could not even describe it in depicting the form or material of it. Nevertheless, all these figures are called "horse". The meaning of the notion of horse is not based on the figure itself

but on the usage of the notion. The terms of use are defining the notion within the chess game and ascribe meaning to it (Fischer, 1995, p. 269).

The meaning of words arises through its usage and is defined in the social context:

> „Every company has its own unique set of concepts and phrases – its own language – that cannot be easily translated or adopted by anyone else. Unless you are part of the conversations that made the language, and continually remake it, important meanings can be totally missed"(Roos & Krogh, 2002, p. 259).

Concepts are the basis of thinking, and concepts are expressed in words which derive their meaning form the way they are used in specific language games; thinking is a public affair. Language and meaning are continuously developed. This is particularly true for companies who are acting in turbulent environments. New words and/or new meanings are developed steadily, for example:

- Flexibility of language is shown if *existing terms are modified*, f. ex. the term "agreement" may be a legally binding contract or in another case an expression of a common interest; the extent of its binding character may vary.
- It is also possible to create a *new meaning to existing terms*, f.ex. Total Quality Management as an expression of a new management concept which was form with existing words.
- And *new words are created to articulate new meanings*, f. ex. wellness (combining well-being and fitness), edutainment (combining education and enterainment), transnational (sub-, inter-, and national at the same time), etc.

Language and meaning may be modified due to modifying existing meanings, and introducing new words, or combining both of these elements. Modification of words happens through social interactions in groups. It may be a small group or a team which creates its own terms or an organization or an industry, f.ex. the language in new media organizations differs considerably from traditional business language. Individuals may be at the same time members of different groups and varying social contexts. It is important to note that language is defined through its use and varies in different frames of references. In language games people adapt their language. Adapting language is a prerequisite for knowledge construction.

Language and meaning in the Challenger accident

In this paper the Challenger accident illustrates how language and meaning of the people involved is based on organisational structures and procedures, how social groups, information gathering, reaction upon events and activities significantly influences how and what knowledge is constructed. The case of the Challenger accident illustrates how language and meaning affect language usage and as a consequence knowledge construction. Within NASA risk and danger are communicated within a rather impersonal, technical, and bureaucratic language. Many technical terms and acronyms are used, f. ex. "action item", FMEA-CIL", "waivers". Since these expressions are routinely used terms within NASA they are not

signalling the possible danger attuned to it. For example the fatal result of the Challenger mission has been expressed in routine language as follows:

"Failure effect summary: Actual loss – Loss of mission, vehicle, and crew due to metal erosion, burnthrough, and probable case bust resulting in fire and deflagration" (see e.g. CIL documents reproduced in Presidential Commission, Report 1: 157, 239 cited upon Vaughan, 1997, p. 252).

In the following the paper first outlines the course of events in the Challenger accident and raises questions to be asked. Second, discourse within the Challenger launch decision is analysed. And third, the idea of language games is applied to the Challenger case.

Course of events in the Challenger accident

The plan was to launch the NASA Challenger space shuttle on January 22, 1986. The launch has been rescheduled several times, to January 23 the January 25 and finally the January 26 due to miserable weather conditions. The space shuttle should be launched from the Kennedy Space Centre, Cape Canaveral in Florida, USA. The decision to launch has been taken by the highest management level, engineers and managers. Due to unfavourable weather conditions again, the countdown had been stopped and the launch finally rescheduled for January 27. That day, countdown was proceeding normally when indicators showed that hatch-locking mechanism had not closed properly. As it was fixed again, the wind velocity exceeded the Launch Commit Criteria for allowable crosswinds at the Kennedy Space Centre runway used. The launch was scrubbed and rescheduled for January 28[h] at 9.38 EST (Eastern Standard Time). Figure 1 shows the course of events in the Challenger space shuttle launch in January 1986.
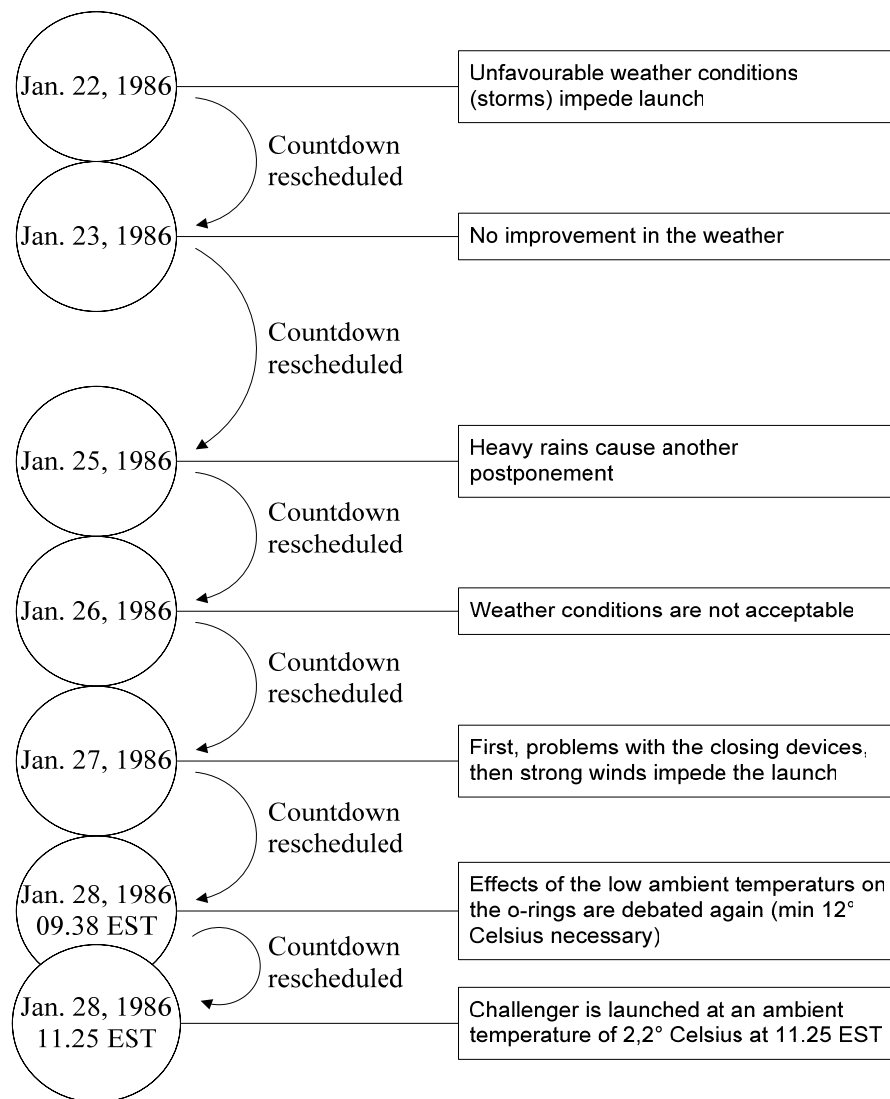
Figure 2. *Challenger space shuttle launch (data source: Vaughan, 1997, p. 283f)*

NASA personnel first became concerned about cold temperatures on January 27. The forecast for the eve of the launch predicted clear and extraordinarily cold weather for Florida. Due to the weather forecast the manufacturer of the Solid Rocket Motor (SRM) was asked for its engineers to review the possible effects of the cold on performance. On several prior launches problems arose with the surface of the rubberlike O-rings designed to seal the joints between the case segments of the Solid Rocket Boosters. The O-rings charred or sometimes even eroded when hot combustion gases were produced during launch. O-ring resiliency would be affected: the rings would harden to such an extent that they would not be able to seal the joints against the hot gases created and thus, increasing the amount of erosion and

threatening mission safety. The engineers checked the facts and composed the following recommendation, see figure 2.

MTI Assessment of Temperature Concern on SRM-25 (51L) Launch:

- Calculations show that SRM-25 o-rings will be 20° colder than SRM-15 o-rings
- Temperature date not conclusive on predicting primary o-ring blow-by
- Engineering assessment is that:
    - colder o-rings will have increased effective durometer ("harder")
    - "harder" o-rings will take longer to "seat"
        - demonstrated sealing threshold is 3 times greater than 0.038" erosion experience on SRM-15
- If the primary seal does not seat, the secondary seal will seat
    - Pressure will get to secondary seal before the metal parts rotate
        - o-ring pressure leak check places secondary seal in outboard position which minimizes sealing time
- MTI recommends STS.51L launch proceed on 28 January 1986
    - SRM-25 will not be significantly different form SRM-15

Figure 2. *Engineers' recommendation prior to launch (Vaughan, 1997, p. 326)*

In a conference call the manufacturer, Thokiol, recommended to reschedule the launch from morning to lunch time or even later. The minutes of the conference call were distributed to the NASA personnel responsible for the launch. It reported that the temperature of the o-rings has to equal at least 53°F (12° Celsius).

A fundamental debate was started within the NASA personnel. The checklist for the launch of the space shuttle did not contain any details on the booster-connection. If it would be necessary to add these criteria at the eve of the launch, the whole mission would have to be rescheduled several months ahead. The people involved debated this fundamental issue at length when it was finally required to come to a decision. In this debate management was asked to „take off his engineering hat and put on his management hat" (Vaughan, 1997, p. 316).

Although heavy concerns mentioned above were raised, finally it was decided to launch the Challenger. At 11.25 EST the countdown started. The space shuttle was launched at 11.38 EST. The ambient temperature at launch was 36°F (2,2° Celsius). The mission ended 73 seconds later, when the Challenger exploded into a fireball and disappeared in a huge cloud of smoke (Vaughan, 1997, p. 278ff).

What was the reason for the Challenger disaster? According to Choo (1998, p. 156) it is necessary to distinguish between

- the cause for the explosion: hot propellant gases flew past the aft joint of the right solid rocket booster, burning through two rubber O-rings; and
- the cause for the accident: failures in the decision to launch the Challenger, poor technical decision-making.

In the light of the Challenger mission outlined above several questions arise on how this disaster could happen; although engineers' concerns about the ambient temperature were raised, "ambient temperature has to equal minimum 12° Celsius", management decided to launch the mission at 2,2° Celsius. Knowledge about problems with the solid rocket motor at prevalent temperatures and its consequences has not been considered appropriately. Why has it not been considered? What was the problem in sharing the knowledge with the people who had to decide? Why were they not possible to share the existing knowledge? Have the consequences of this knowledge not been stated clearly enough? How were decision routines used to reduce complexity and uncertainty? Did risk averseness play a part and are there any differences between engineers and managers? In the following paragraphs the paper tries to answer these questions. The Challenger disaster is analysed in regard with knowledge sharing and creation using discourse analysis and language games.

Analysing the discourse between engineers and managers leading to the Challenger disaster

In order to analyse the failure of knowledge sharing between engineers and managers in the Challenger disaster the paper applies discourse theory. The decision to launch the space shuttle is studied considering discourse elements such as
- social perception
- self-reference
- cognitive dissonance
- speech accommodation

Considering *social perception* within discourse both groups those of the engineers and those of the managers have to be analysed separately. Through education and training engineers are not only trained in technical principles but also cultivate their own world way as a frame of reference. Each group draws on their own worldview and on their shared understanding. The engineering way of understanding also includes language use and how meaning is ascribed to particular signals. As an example of the Challenger case risk appraisal may be mentioned. NASA required for each production line a standard procedure for risk appraisal. Engineers have to pursue each anomaly causing potential danger. Information which signals possible deviations is considered to point out danger. This was the case in the unusually low temperatures at the Challenger launch. Engineer's decisions are clearly embedded in a standard procedure locating potential danger immediately. Opposed to the managers, engineers are familiar with these kinds of procedures.

Similar to the engineers managers are also disposed to their social context and way of understanding. Their world view includes sounding interests of technical feasibility, economic interests, reputation of the Challenger mission etc. However, managers perceived the signal of possible danger attached to the temperature limits differently. It is their task to sound varying interests and to effect a compromise. Managers do not realize the extent of potential danger with the signal of slightly exceeding the limits. Knowledge sharing involves the meaning attached to it. However, meaning and sensemaking are highly embedded into the social context. "Slightly exceeding the limits" does not ring the bell to the same extent at the managers' context as it does in the engineers' context.

> „Sensemaking in this view, is about contextual rationality, so the task is to expose the constraints, both hidden and explicit, both informal and formal, that act on decision makers." (Vaughan, 1997, p. 403; bzw. Weick, 1993)

Engineers and managers differ in regard with sensemaking. Engineers were not able to share their knowledge about the problems with the O-rings and its meaning for the whole mission with the managers.

Considering the element of *self-reference* in discourse analysis applied to the Challenger disaster the loss of face for the managers in regard with rescheduling the launch another time has to be taken into account. On the eve of the launch when debating the current problems managers mention reproachful that if everything is taken into consideration the launch has to be postponed another couple of months. Political aspects for example the image of the NASA in general comes into play here. Additionally the role of management as those who are actually making decisions has to be stated clearly, too. Decision making involves a certain extent of risk taking, which in this case means to deviate from the engineers' standard procedures. Management demonstrated its role as decision makers and risk takers.

Avoiding *cognitive dissonance* as the third element in discourse analysis can be seen in the following. For example engineers wanted to reduce dissonance between the materials problems and the belief in technical feasibility. A break down of the challenger mission due to problems with the materials was unthinkable. An unarticulated truth could be seen in the following, "technical feasibility has to be assured by the world leading NASA engineers, no doubt about that".

Speech accommodation in discourse is an issue in the following example: Engineers used a standardised language, which was appropriate to their standardized procedures however this language was not in the same way accommodated by the managers (see the recommendation in Figure 2). Standardized procedures within NASA only partially allowed for speech accommodation.

According to discourse analysis it can be concluded that in this case of the Challenger disaster engineers failed in sharing their knowledge with the managers. The language used by the engineer's was not completely understood by the mangers in so far as they did not ascribe the same meaning to it.

The use of language is decisive to operate appropriately. Language use defines the meaning of words and is the basis for any further interpretation of what is being said. As mentioned above, in the Challenger case two social groups can be observed, the group of engineers and the group of managers. Based on prior education and training both groups have their own world view which affects how they ascribe meaning. Potential dangers during the mission were known, so how could it happen? What was wrong that the alarm bells did not ring appropriately? What made them stick to the procedure after the problems with the O-rings were articulated?

According to theory a well-known phenomenon can be identified, which says that a way of understanding and paradigms may be sustained steadily although indications challenging it are increasing. For example the paradigm of the NASA as unbeatable leading organisation regarding space missions was prevalent. Paradigms have been developed and established during course of time. They have been developed based on prior experiences and are acknowledged accordingly. Paradigms affect standard procedures as well as the way we process information. Basic principles, cause-and-effect relationships, and codes of conducts are based on paradigms (Kuhn, 1991). In the Challenger mission the engineers' paradigm could have been formulated something like the following, "NASA is the leading organization in space missions and thus a firm belief in technical feasibility advisable." This paradigm might have caused the engineers neglect the problems with the O-rings in the way that they indicated the problems but they did not insist on breaking off the mission. They reported that the "temperature limits have been achieved" which might not have expressed the consequences clearly enough to the mangers.

Modifying the use of language draws upon the possibility to adapt language through a joint effort in such a way as

- Either modify the meaning of existing notions
- Create new notions in order to be able to express the problem anew
- Create completely new concepts in order to be able to communicate the meaning appropriately

Use of language develops in the course of time. Thus, it is difficult to modify language through lines of command within a relatively short time frame.

Résumé

Language and meaning are crucial in constructing knowledge. Language is not only a tool to report and describe objects in reality. Language is more than content it also provides context and meaning. Language recontextualizes content and serves as a vehicle of thought. This aspect of language is of significant importance for knowledge construction and particularly in regard with the tacit dimension of knowledge. The paper emphasizes the

significant role of language (Choo, 1998) and meaning for sharing and creating knowledge. Firstly, it draws on the underlying knowledge concept. It stresses the personal aspect of knowledge in making sense and ascribing meaning in order to integrate different knowledge elements. According to an interaction-based view knowledge is constructed among a group of people involved in knowledge sharing and creating. Social interaction is based on language, i.e. how people exchange their ideas, how they are able to communicate existing knowledge etc. Drawing on discourse analysis the paper outlines in the following sections interactivity, context-dependency, and the functional and creative nature of language. Discourse is the basis for social interaction and how people make sense and ascribe meaning to words and particular knowledge elements. The paper also shows that people use language games in order to create or modify the meaning of words. Finally the role of language and meaning in constructing knowledge is illustrated through the Challenger accident and its knowledge failure. Discourse theory is applied in order to analyse the core issues of the failure. Discourse among managers and engineers during the Challenger launch decision is studied in detail. The concept of language games adds another dimension into the way the engineers and managers differ in ascribing meaning to particular terms. Failures in knowledge construction occurred. Knowledge about the problems with the O-rings could not get across from the engineers to the managers appropriately. The potential danger was not expressed in such a way that managers were able to assess the danger properly. The aim of the paper is to demonstrate the central role of language and meaning in how knowledge is brought forth in organisations and other social contexts.

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Endnotes

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Inquiry into Quality Defects in Industry Seen as a Semiotic Process.

L'enquête en gestion de la qualité dans l'industrie: une approche sémiotique

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English Summary

Industrial quality control is an interesting domain for studying knowledge and knowing because it involves a strong theoretical dimension (mathematical statistics) together with industrial work practices. Methods for statistical quality control have been developed in the years 1920s to address the problems of mass production which made impossible the inspection of each product individually. To make those mathematical methods usable by ordinary workers on the shopfloor, graphical tools have been developed ("Shewhart control charts"), which translate formal statements into metaphorical representations drawn from ordinary life. Thus, "monitoring an industrial process" becomes, on the chart, "keeping a point within two limiting lines", the point being representative of a sample drawn according to a pre-defined procedure. This graphical tool is an artefact which endows the mathematical theory with a social life.

These statistical procedures are designed to be "optimal" from an economical point of view, for example by minimizing the cost of sampling to acquire a given amount of information, or by evaluating and balancing the risks of making a bad decision of type I as opposed to a bad decision of type II in a statistical test. These procedures thus appear to bear all the intelligence that is needed in the situation. We might thus ask what amount of intelligence is left to the worker's care in practice.

An answer resides in another aspect of quality control which I call "the inquiry" : it consists in finding the causes and remedies for quality defects observed during production. This aspect does not usually pertain to statistical theory, at least to the theory of sampling and hypothesis testing. Obviously, there is a lack of conceptual articulation between these two aspects of quality control.

In this paper, I propose to conceptualize the inquiry by means of semiotics, relying on work by Charles S. Peirce and Umberto Eco. In case of quality defects of significative importance according to statistical criteria, the control chart gives a signal which is an index, in Peircean terms. The inquiry can be conceptualized as a process of semiosis which enriches this index sign into full triadic signs. The semiosis develops mainly trough abduction, and we find useful work on this topic by Eco. As an example, this conceptualization helps to clarify the meaning of a management tool widely used in industrial operations management, known as the "Deming Cycle".

Introduction

Le management de la qualité dans les entreprises industrielles est une activité qui fait apparaître deux tensions intéressantes pour le propos du présent colloque : d'abord, celle qui se manifeste entre un domaine théorique très riche, celui de la statistique mathématique, objet d'investissement intellectuel pour de nombreux enseignants, chercheurs et spécialistes, et son domaine d'application en usine où règnent beaucoup de procédures, souvent bureaucratiques, de contrôle sur échantillon, de mise au rebut des produits défectueux, de renvois aux manuels de qualité. La liberté d'invention et le plaisir intellectuel des savants semble avoir pour contrepartie une diminution de l'autonomie des ouvriers et techniciens chargés de la production. A l'usine, les procédures de contrôle qualité sont d'ailleurs souvent moquées ou traitées en simulacre. La deuxième tension a lieu entre les facteurs visibles et invisibles de l'efficacité du contrôle de qualité : les facteurs visibles sont les procédures et routines standardisées, les facteurs invisibles sont les capacités du personnel à interpréter le résultat des précédentes, à construire un sens qui soit adapté à la situation et qui conduise à corriger les défauts ou dysfonctionnements.

Nous proposons dans ce papier une approche par la sémiotique inspirée très directement des travaux de Umberto Eco sur le rôle du lecteur (Eco 1979). Plus exactement, il s'agit d'étudier les procédures de contrôle de qualité de la même manière que Eco traite les textes, c'est-à-dire comment elles prévoient la coopération du lecteur pour actualiser leur propos (ou le propos de leur auteur). Telle est la perspective que Eco adopte pour étudier les textes littéraires. On pourra nous objecter qu'une procédure de contrôle qualité ne relève pas de la littérature, et que son actualisation par le destinataire dans une usine n'a rien à voir avec l'actualisation d'un roman par un lecteur. Certes il existe un fossé entre les deux domaines. Mais il reste vrai que les procédures de gestion possèdent une dimension textuelle, qu'elles comportent des structures discursives, narratives, actancielles et autres, qu'elles prennent sens par l'actualisation de contenus en référence à une encyclopédie, etc. Le détour par la sémiotique textuelle va nous permettre de faire fonctionner un vocabulaire et des concepts nouveaux sur ces objets déjà très étudiés par les sciences de l'organisation et de la gestion. En outre, considérer le concepteur de procédures comme l'auteur d'une oeuvre nous paraît très acceptable, au même titre que sont des oeuvres les productions des chercheurs scientifiques, notamment en mathématiques et en recherche opérationnelle (comme en témoigne la tradition d'éponymie consistant à baptiser un théorème du nom de son inventeur). Un deuxième intérêt de ce changement de regard est de mettre l'accent sur le travail qui est celui du destinataire de la procédure, invisible car considéré comme de pure exécution. La sémiotique du texte contribue à revaloriser le travail du lecteur en montrant toute sa richesse ; depuis les théories de la réception, ce mouvement est allé en s'amplifiant. Nous pensons que toute procédure nécessite un travail d'interprétation, travail qui n'est pas reconnu comme tel dans les entreprises. De nombreux chercheurs, notamment en sociologie du travail, se sont intéressés au travail dit d'exécution, mais l'approche de Eco nous permet d'étudier les modalités d'articulation des deux points de vue, celui de la conception et celui de la réception, sur cet

objet médiateur qu'est la procédure. Nous allons nous efforcer, avec l'étude des procédures statistiques, de restituer cette confrontation entre conception et interprétation autour d'outils de gestion incarnés dans des artefacts et des textes.

La surveillance de la qualité des produits fabriqués repose sur des procédures statistiques d'échantillonnage et des règles de décision calculées pour optimiser le coût du contrôle par rapport aux bénéfices qui en sont retirés. La gestion de la qualité est un processus organisationnel qui vise non seulement à arrêter les produits défectueux, mais aussi à identifier les défauts de qualité et à les corriger. Ces méthodes sont étudiées et développées dans les universités techniques, les écoles d'ingénieurs et les associations professionnelles. Il s'est constitué ainsi un vaste corpus de méthodes adaptées à une grande variété de conditions, tant au niveau de la nature des applications que de la protection contre les risques de non-qualité. Nombre d'entre elles sont standardisées sous l'égide de l'ISO.

Mais pour donner une réponse satisfaisante aux problèmes que pose la gestion de la qualité, il faut insérer ces méthodes dans une démarche plus générale que nous désignons par le terme *d'enquête*. Les méthodes statistiques apportent des moyens pour repérer les défauts de qualité, trier les bons produits et les mauvais, mais sont d'un faible secours lorsqu'il faut trouver l'origine des défauts et y remédier. Il faut employer d'autres méthodes spécifiques des procédés d'ingénierie utilisés en production. Elles peuvent être systématiques et routinières, de même que dans une enquête policière on vérifie les alibis de toutes les personnes impliquées, mais l'essentiel du travail consiste à interpréter des indices pour remonter aux causes des phénomènes observés.

La métaphore policière est d'autant plus suggestive en l'occurrence que l'on peut faire un rapprochement entre les méthodes statistiques de gestion de la qualité et ce que Michel Foucault appelle "système de surveillance" (Foucault 2004). Foucault distingue trois types de mécanismes de traitement du crime dans la société : juridico-légal, discipline, surveillance. Ces trois systèmes possèdent toujours des éléments communs mais diffèrent par leur dominante et par la nature des questions soulevées autour de la gestion du crime et de la répression. En résumant outrageusement, on peut dire que le système juridico-légal est dominé par la sanction, le système disciplinaire par la prise en charge du criminel et le souci de sa rééducation, le système de surveillance par une confrontation d'ordre économique, ou coût-bénéfice, entre le crime et la répression, par exemple : "quel est donc le coût comparé et du vol et de sa répression, qu'est-ce qui vaut mieux : relâcher un peu le vol ou un peu la répression?" (p.7). Or le domaine de la qualité des produits industriels a conduit à poser très exactement ces mêmes questions et à construire des développements théoriques considérables qui ont été repris dans les théories de la décision, en mathématiques et en économie, et ont probablement pénétré les réflexions sur les politiques publiques.

La théorie statistique du contrôle de qualité, en effet, formalise le problème consistant à trouver un compromis raisonné, sinon optimal, entre le coût des opérations de contrôle et le coût entraîné par des défauts non détectés dans les produits fabriqués. Nous avons donc exactement la double équivalence formelle défaut = crime, contrôle = prévention. On peut

également introduire une gradation calquée sur celle de Foucault : 1) repérer les produits défectueux et les éliminer (agir sur le crime) ; 2) repérer l'origine des défauts et faire en sorte qu'ils ne se reproduisent pas (discipline) ; 3) instaurer un système de surveillance qui génère des données utiles à l'enquête, systèmes de traçabilité (surveillance).

Dans la suite, nous traiterons séparément les routines et les processus d'interprétation (l'homologue du travail du lecteur). Cette séparation n'a qu'une valeur analytique car, en réalité, il ne peut y avoir utilisation d'une routine sans interprétation, et ces deux composants sont articulés l'un sur l'autre. Mais elle nous oblige à porter notre attention sur les processus d'interprétation, en cherchant notamment comment ils se produisent, avec quels acteurs, à quels moments, en quelles circonstances, avec quels moyens. Elle permet aussi de souligner qu'il n'y a pas symétrie entre routines et interprétation : les routines font l'objet de formalisations scientifiques, de descriptions fines, d'incorporation dans des artefacts. La question des artefacts est devenue essentielle avec l'informatique et l'automatisation des opérations de surveillance : des automates peuvent contrôler une fabrication en détectant des produits qui ne correspondent pas aux normes et qui sont, de ce fait, probablement défectueux. L'automate peut faire un tri en faisant fonctionner des algorithmes de décision qui ont été incorporés dans ses programmes. Mais il n'est pas capable de faire face à des situations réellement imprévues ou auxquelles il n'a pas été préparé. Il n'est pas capable *d'émettre un jugement*, cette faculté restant le propre des humains. Il ne peut pas "se lancer" dans une enquête pour trouver l'origine du défaut, comme le ferait un technicien d'atelier aimant rechercher les pannes et y vivant à chaque fois une petite aventure. A la différence de l'automate, l'humain éprouve un désir de rechercher ce qui n'a pas bien fonctionné et qui expliquerait les défauts constatés sur le produit. L'humain rassemble des informations, part à la recherche de signes indiquant des dysfonctionnements, dans les machines, les matières premières, ou dans l'organisation et ses acteurs. Il interprète ce qu'il voit, il explore son environnement par la pensée aussi bien que physiquement, sa démarche est active.

Dans une première partie, nous étudierons les routines et les artefacts correspondants afin de mettre en évidence les principes qui ont guidé les calculs, en montrant dans quelles situations et préoccupations ils ont trouvé leur origine. Ces calculs sont ce que Donald A. Norman (1993) appelle des "précomputations", qui ont pour effet de formater des cadres pour l'interprétation, et notamment de *déplacer* le moment de l'interprétation, d'en *changer les conditions*. Mais en aucun cas les routines ne peuvent *éliminer* l'interprétation.

Dans une deuxième partie, nous reformulerons le processus d'enquête et d'interprétation avec des concepts de sémiotique pour bien faire apparaître la nature du travail qui s'effectue sur les signes. Nous détaillerons les modes de raisonnement par abduction généralement mobilisés dans l'enquête, en nous appuyant sur les travaux de Umberto Eco. Puis nous rassemblerons nos conclusions sur les modalités de coopération auteur-utilisateur prévues par la procédure.

Les calculs économiques au fondement des routines standardisées

Artefacts cognitifs et pré-computation

L'objectif de ce paragraphe est d'analyser des exemples représentatifs des routines standardisées du contrôle statistique pour mieux comprendre leur structure, les principes qui les organisent, et pourquoi ces principes ont été retenus plutôt que d'autres. Nous voulons également comprendre par quels moyens ces routines préparent un cadre pour l'interprétation par des humains, et comment ce cadre influence l'interprétation.

La notion d'artefact cognitif exposée par Donald A. Norman est ici essentielle. *"Un artefact cognitif est un outil artificiel conçu pour conserver, exposer et traiter l'information dans le but de satisfaire une fonction représentationnelle."* (Norman 1993, p.18). C'est par exemple la représentation d'une distribution statistique, telle que celle d'une caractéristique d'un produit fabriqué en grande série. Cette distribution statistique nous indique la valeur moyenne de la variable, des mesures de dispersion (écart-type, quantiles), l'asymétrie éventuelle de la courbe, etc. La statistique mathématique a développé un grand nombre d'outils qui aident à construire des modèles statistiques des phénomènes observés.

Une distribution statistique représentant une série de données numériques peut généralement être caractérisée par un petit nombre de paramètres mathématiques (on les appelle les moments, les 4 premiers sont liés à la moyenne, l'écart-type, l'asymétrie, l'aplatissement). Les statisticiens disent que ces paramètres constituent un résumé de la série de données numériques car on peut, à partir d'eux, reconstituer la distribution statistique. L'artefact cognitif qu'est la distribution statistique possède donc des propriétés mathématiques que ne possède pas la série de données. Si on choisit de représenter la série de données par sa distribution statistique, en abandonnant la série de données brutes, on franchit une étape dans un processus de computation. On a "computé" des propriétés de l'objet de départ (la série de données) et on représente les données initiales par les résultats de cette computation, par leur modèle statistique. Les avantages sont la simplicité et la légèreté des données computées, leur caractère synthétique, la possibilité d'effectuer des traitements mathématiques, des tests d'hypothèses, etc. Les inconvénients sont qu'on a éliminé une partie des données de départ, par exemple l'ordre dans lequel les valeurs sont apparues. Or cette information est importante si l'on veut détecter la dérive progressive d'un processus au fil du temps.

C'est un caractère général des artefacts cognitifs utilisés dans le travail, selon DA Norman, d'incorporer des calculs, qu'il appelle "pré-computations" dans la mesure où elles sont effectuées avant que l'artefact ne soit mis en oeuvre pour exécuter une tâche. Par exemple, la check-list des pilotes d'avion a été élaborée par un long processus impliquant des dizaines d'institutions ; la pré-computation se manifeste par la structure de la liste et la nature des opérations de vérification qui doivent être accomplies.

Sur l'exemple de la check-list, on voit bien comment l'artefact précomputé déplace l'interprétation par un changement de la tâche. S'il n'y avait pas de check-list, les contrôles seraient fondés sur l'expérience personnelle du contrôleur, sur sa connaissance de la situation

concrète, des matériels en cause, de la tâche à accomplir ; le contrôle serait très fortement lié à la situation. Avec la check-list, le contrôle se réfère avant tout aux opérations indiquées sur celle-ci. Le respect de la check-list est d'ailleurs une obligation réglementaire.

Le développement scientifique du contrôle statistique de qualité

Les problèmes de qualité des fabrications sont devenus préoccupants pour certaines industries dans les premières années du XXe siècle. Il s'agissait en fait de difficultés à fabriquer en grande série des produits respectant des tolérances très précises. WA Shewhart[2] a montré en 1924 que des fluctuations aléatoires se produisent inévitablement dans les conditions de fabrication industrielles, et que deux objets différents d'une même série de fabrication ne sont jamais rigoureusement identiques. Ce phénomène s'appelle la *variabilité* des produits et des conditions de fabrication, il ne peut être totalement éliminé. Il existe des limites à la précision que l'on peut atteindre dans la fabrication, et il faut en tenir compte lorsque l'on définit des spécifications.

Les premières publications sur ce sujet datent des années 1924-1930. Elles ont eu lieu indépendamment dans différents pays industrialisés (Allemagne, France, USA, Royaume-Uni) et s'attaquaient le plus souvent à des problèmes réels rencontrés dans la pratique. Les publications véritablement fondatrices de la théorie sont d'une part un article de Dodge et Romig (1929), d'autre part un livre de WA Shewhart (1931). Ces trois auteurs étaient membres des Laboratoires Bell appartenant à AT&T, où ils étaient chargés d'étudier ces questions.

Deux types de solutions scientifiques furent élaborées. La première, développée par Shewhart, consiste à rechercher les facteurs de variabilité les plus importants et à les éliminer, de façon que les caractéristiques des objets produits suivent des lois statistiques stables au cours du temps. On dit alors que le processus de fabrication est "sous contrôle statistique". Cette méthode s'appuie sur la technique des cartes de contrôle (control charts) et doit être complétée par une partie d'enquête et d'interprétation afin d'identifier et éliminer les facteurs de variation.

La seconde solution est le contrôle de réception par échantillonnage (acceptance sampling). La réponse traditionnelle à la variabilité des produits fabriqués dans les conditions manufacturières du XIXe siècle était l'inspection de la totalité des produits fabriqués. Mais cela devenait impossible pour des quantités fabriquées très grandes (les composants téléphoniques pour AT&T étaient fabriqués par centaines de milliers de pièces annuelles). Le contrôle par échantillonnage consiste à tirer au hasard un nombre déterminé de pièces dans un lot de pièces fabriquées. Cet échantillon est examiné et, selon les défauts trouvés dans l'échantillon, le lot est accepté ou rejeté. Des formules mathématiques ou des tables numériques permettent de calculer la taille de l'échantillon et les autres paramètres pour obtenir un niveau de protection donné. C'est par ailleurs la seule méthode utilisable lorsque le contrôle nécessite la destruction du produit fabriqué (cas des munitions, notamment).

Les artefacts cognitifs tiennent une place fondamentale dans ces méthodes. En effet, on demandait aux ouvriers de mettre en oeuvre des méthodes mathématiques qu'ils ne pouvaient comprendre. On a recouru à la précomputation : pour le contrôle de réception, on a établi des tables numériques indiquant la taille de l'échantillon en fonction de celle du lot et du degré de protection souhaité. Ces tables indiquaient aussi la règle de décision : le nombre de défauts tolérés dans l'échantillon, au delà duquel le lot devait être rejeté. Pour le contrôle de processus, la précomputation est plus complexe, associant un dispositif graphique avec des représentations numériques (voir plus loin).

Contrôle de réception : un calcul de minimisation des coûts

Derrière ces formalismes scientifiques et ces artefacts, il se trouve des enjeux économiques considérables. Un mathématicien américain[3] déclare ainsi en 1926 :

> *"The size of the sample is a question of great economic importance. At the present time a theory of small samples is in process of development which promises to be of the greatest value. Then the problem of making the most efficient use of data is an important economic problem. The cost of analysis of data is small as compared with the collection of the data."*

Par exemple, dit-il, si deux méthodes d'estimation sont équivalentes au point de vue du résultat, mais l'une demande un échantillon de 114 et l'autre un échantillon de 100, *"this is not a negligible economy when the total number of observations runs into millions."*

La méthode de Dodge & Romig suppose un fournisseur livrant à un client un lot de pièces. Un certain nombre de pièces sont tirées au hasard et inspectées. Si on trouve moins d'un certain nombre de défauts, le lot est accepté. Sinon, il est refusé. Le nombre de pièces à inspecter et le nombre de défauts tolérés sont déterminés par le calcul et consignés dans des tables numériques. La méthode se caractérise en outre par les points suivants :

- elle minimise le coût de l'inspection tout en respectant un niveau déterminé de protection du client (appelé risque du client)
- le client choisit lui-même le niveau de protection qu'il souhaite (risque du client)
- le coût de l'inspection est supporté par le fournisseur
- les pièces défectueuses trouvées lors de l'inspection sont remplacées par des bonnes
- un lot "refusé" est inspecté en totalité, les pièces défectueuses sont remplacées par des bonnes, et le niveau de qualité final du lot est alors très bon.

Examinons maintenant ce qui, dans la structure de cette procédure, est lié aux situations industrielles où elle a été conçue.

C'est la direction de l'entreprise, nous l'avons vu, qui avait donné aux chercheurs des Bell Labs la mission d'élaborer des méthodes de gestion de la qualité, en précisant que leur approche devait couvrir l'ensemble des activités de l'entreprise, "a company-wide view", et pas seulement les aspects de fabrication. Ceci amena Dodge et Romig à étudier le contrôle de réception sur des chantiers de montage de centraux téléphoniques. C'est là notamment qu'ils

prirent conscience de l'importance de pouvoir livrer des pièces à l'utilisateur, plutôt que de renvoyer le lot défectueux à l'usine au risque de paralyser le chantier ; de là provient l'idée importante de trier les lots en remplaçant les pièces défectueuses.

On peut apprécier l'originalité de cette idée en comparant avec un travail français de la même époque (Dumas 1925). L'auteur a développé une théorie très pertinente du contrôle de réception, mais traitée dans l'abstrait, sans référence à une situation réelle ni à des interlocuteurs industriels. Il ne s'est nullement intéressé au destin du lot, supposant seulement qu'il était renvoyé chez le fournisseur. Or c'était une question extrêmement importante pour le cas traité, celui des munitions de guerre : pendant la guerre de 1914-1918, les munitions étaient de très mauvaise qualité, les épreuves de réception en témoignent, et pourtant les lots étaient acceptés et envoyés au Front. C'étaient les soldats qui en définitive recevaient les lots mauvais et faisaient le tri comme ils pouvaient. Il est probable qu'on aurait imaginé d'autres procédés de contrôle si on avait pris en compte cette situation.

Remarquons que l'exemple français porte sur des munitions, la difficulté étant que les essayer, c'est les détruire... Le remplacement des mauvaises munitions par des bonnes était tout aussi difficile. Dodge et Romig se sont placés dans des conditions beaucoup plus favorables : leur méthode venait se substituer à l'inspection en totalité, par rapport à laquelle elle était nettement moins coûteuse. Il a été également possible de comparer empiriquement les deux méthodes : pendant toute une période, les lots ont été inspectés avec les deux méthodes, ce qui a permis de constater les performances satisfaisantes de la nouvelle. Vue sous ce jour, l'inspection sur échantillon apparaît comme en continuité avec l'inspection en totalité : elle s'y ramène si la qualité se dégrade. On peut la voir comme une forme allégée de l'inspection en totalité, adoptée principalement pour des raisons d'économie et de rapidité.

Le concept de risque du client formalise une notion de tolérance aux défauts : le client peut, au moins en théorie, évaluer le coût qu'entraîne pour lui l'acceptation et l'utilisation d'éléments défectueux, et donc évaluer économiquement la proportion maximale de défectueux qu'il peut tolérer. Cette proportion maximale est garantie en moyenne avec une probabilité de 0,9 ; il existe donc une probabilité non nulle qu'il reçoive des lots comportant plus de défectueux que cette valeur.

Une autre propriété importante de la méthode Dodge et Romig est que le coût de l'inspection est supporté par le fournisseur. Les dépenses d'inspection pouvaient être très élevées dans l'industrie américaine du téléphone car les produits étaient souvent inspectés plusieurs fois, par le fournisseur et par le client. Et s'ils n'étaient pas satisfaisants, le client réclamait au fournisseur le remboursement des dépenses d'inspection. La règle adoptée par Dodge & Romig crée un cadre régulateur des relations client/fournisseur sur le long terme. En effet, si la qualité du produit se dégrade, davantage de lots seront refusés pour être inspectés en totalité. Les dépenses d'inspection vont donc augmenter pour le fournisseur, ce qui l'incitera à agir pour rétablir un bon niveau de qualité. Le client, de son côté, est protégé par l'inspection en totalité et le remplacement des pièces défectueuses.

On voit donc comment les facteurs économiques sont inscrits dans la procédure à partir des demandes exprimées en situation d'utilisation. Outre les facteurs de coût sont aussi présents un facteur de disponibilité des fournitures, une garantie de qualité des lots reçus, mais sous forme probabiliste et non plus déterministe.

Le facteur économique du coût de l'inspection est devenu un objet théorique privilégié pour les mathématiciens et statisticiens académiques, avec la préoccupation de minimiser la taille de l'échantillon. L'un de ses développements les plus remarquables est sans doute l'analyse séquentielle, inventée par Abraham Wald pendant la guerre de 1939-45 sur demande du gouvernement américain, et qui a donné naissance à un courant important en théorie statistique de la décision.

Toutefois, on peut observer à cette occasion comment les conditions de la pratique viennent modaliser les propositions théoriques dans les situations de mise en oeuvre. Malgré son optimalité théorique, l'analyse séquentielle n'a pas rencontré un grand succès auprès des praticiens industriels. H.F. Dodge rapporte dans ses souvenirs (Dodge 1969) que les inspecteurs n'aimaient pas cette méthode qui "n'arrivait pas à se décider" : en effet, il faut tirer les pièces et les inspecter une à une, reporter pour chaque pièce le résultat sur un graphique, puis tirer une autre pièce si on ne peut pas conclure... La décision peut être assez longue à obtenir. D'autre part, il semble que la contrainte de tirer les éléments les uns après les autres ait été assez difficile à mettre en oeuvre : tirer des échantillons nécessite des manutentions (ouvrir les conditionnements, défaire des piles de caisses, etc.) et il est plus rapide ou moins coûteux de prendre toutes les pièces d'un seul coup.

Les praticiens, en revanche, appréciaient beaucoup la méthode dite "de l'échantillonnage double". Présentée de façon intuitive, la démarche est la suivante : un premier échantillon est tiré ; s'il est très bon, le lot est accepté ; s'il est très mauvais, le lot est refusé ; s'il est entre les deux, on tire un deuxième échantillon qui tranchera. On peut calculer tous les paramètres pour que la procédure assure un niveau donné de protection et des tables de valeurs numériques à employer ont été constituées. HF Dodge explique cet attrait par ce qu'il nomme la "psychologie de l'inspecteur" : du point de vue de l'inspecteur, cette procédure "donne une deuxième chance au lot". Un inspecteur n'aime pas refuser un lot car cela crée des tensions avec les départements de fabrication ; s'il doit le refuser, il veut que ce soit pour des raisons bien solides, et deux échecs successifs lui apparaissent comme une preuve suffisante. Dans les années 1930, sur les milliers de plans d'échantillonnage utilisés à l'usine Hawthorne, environ 70% étaient doubles, 25% simples (le reste étant encore d'une autre variété). Ce schéma d'épreuve en deux étapes était également connu en France, mais sous l'appellation "épreuve et contre-épreuve" : la contre-épreuve est "une épreuve inverse en vue de vérifier si les résultats d'une première épreuve sont exacts"[4]. Il correspond sans doute mieux que l'épreuve unique à une certaine intuition de l'équité.

Les procédures prescrivent donc un formatage, non seulement des données, mais également des actions, formatage qui est interprété en pratique selon des critères étrangers aux

raisonnements probabilistes : une épreuve, ce n'est pas assez ; une série indéterminée d'épreuves, c'est trop ; deux épreuves, c'est bien...

Ces procédures n'étaient pas applicables sans artefacts pré-computés, nous l'avons vu. La constitution de l'artefact (les tables, en l'occurrence) a représenté un gros investissement. L'article publié en 1929 indique des résultats, mais peu précis et d'emploi peu commode. Des tables numériques plus directement lisibles ont été constituées pour l'usage interne chez AT&T. Ceci a représenté, à l'époque, un investissement considérable en temps et en moyens de calcul. Il ne semble pas avoir été chiffré mais, d'après un témoignage (Juran 1997), cela a été tellement coûteux que les tables ont longtemps été gardées secrètes, pour ne pas en faire bénéficier les concurrents. C'est en effet seulement pendant la Deuxième guerre mondiale qu'elles ont été publiées, et sur l'insistance du gouvernement qui voulait en promouvoir l'usage.

Ces méthodes d'inspection par échantillonnage sont en définitive des stratégies optimales face à l'incertain. Elles sont calculées pour répondre de la façon la plus économique à une variété de situations représentées par des paramètres mathématiques. Ces paramètres sont en petit nombre, et on peut faire les calculs pour toutes les combinaisons envisageables. Ces calculs, faits "une fois pour toutes", permettent de construire des tables numériques (actuellement cette fonction est remplie par des logiciels). Le hasard paraît ainsi bien "domestiqué", selon l'expression de Ian Hacking (Hacking, 1990), mais seulement s'il accepte de rester dans la cage qui lui est proposée... La mise en situation réelle, dans un contexte de gestion, fait généralement apparaître des facteurs totalement imprévus au niveau du modèle. Pour les non spécialistes, les agents de production, ces tables ou routines informatiésées sont des "boites noires" qu'il est impossible d'ouvrir. La seule marge de manoeuvre possible est éventuellement un choix parmi différentes routines existantes dans l'entreprise ou sur le marché.

Contrôle de processus : un équilibre économique entre deux types d'erreurs

Les facteurs économiques sont beaucoup plus difficiles à appréhender dans la méthode des cartes de contrôle que dans le contrôle de réception. Cette méthode met surtout en avant une théorie physique de la variabilité des fabrications et propose des moyens pour l'étudier et la rendre régulière ("constante", dit Shewhart), mais cette démarche relève avant tout de l'ingénierie, les aspects économiques ne s'introduisant que secondairement. Nous allons préciser l'articulation des deux types de facteurs.

La théorie de Shewhart construit un objet complexe, le "système constant de causes", qui n'est pas directement perceptible aux sens et doit être appréhendé à travers des artefacts qui accompagnent la théorie. Par "système constant de causes", on entend l'état où se trouve un système physique, tel qu'une machine de production, lorsque que l'output du système est une grandeur aléatoire suivant une distribution statistique stable. En termes modernes, on dit "système stationnaire", ou "sous contrôle statistique" dans le vocabulaire de la qualité. La

méthode de Shewhart permet de déterminer si un système matériel se trouve en état de contrôle statistique et, s'il n'y est pas, propose une démarche pour l'y amener progressivement.

L'idée principale est que l'état de contrôle statistique est obtenu lorsque toutes les causes de variabilité existantes sont de même importance et additionnent leurs effets pour produire une régularité statistique résultant de la loi des grands nombres. Pour arriver à cet état, il faut identifier et éliminer les causes de variabilité les plus importantes, jusqu'à ce qu'il n'en reste plus aucune que l'on puisse distinguer des autres.

La procédure à suivre peut se résumer ainsi, sans entrer dans le détail des calculs :

1) déterminer la distribution statistique de la variable à contrôler, que l'on observe et mesure pendant un certain temps

2) en se servant de ces mesures, calculer ce qu'on appelle les "limites de contrôle", c'est-à-dire les limites entre lesquelles la caractéristique à contrôler doit se trouver avec une forte probabilité dans l'hypothèse où le système est stationnaire ;

3) dessiner les limites sur le graphique de la carte de contrôle (voir fig. 1, partie supérieure, "Average") ; la carte de contrôle est prête à l'utilisation

4) prendre un échantillon à intervalles réguliers ; à chaque fois, calculer la valeur moyenne de la variable et la reporter sur le graphique ; continuer tant que les points représentatifs restent entre les limites de contrôle ;

5) si, à un certain moment, un point tombe hors des limites de contrôle, cela signifie très probablement qu'une cause importante de variation est intervenue ; il faut alors la rechercher et l'éliminer.

Nous avons simplifié la description de la procédure, qui comporte aussi le suivi d'indicateurs de dispersion (écart-type ou étendue).
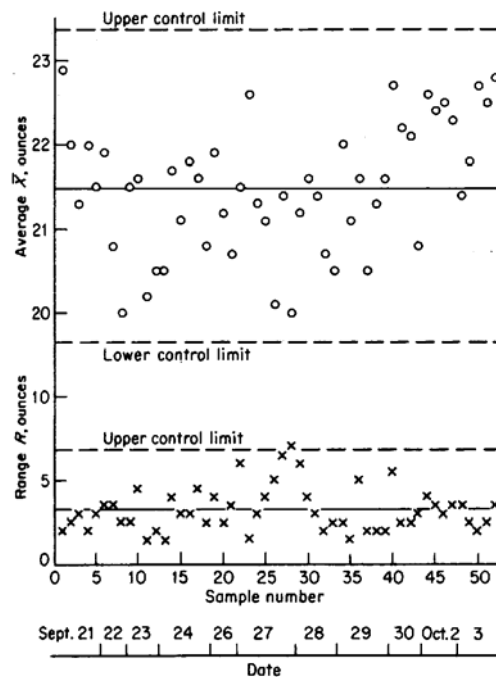
Fig. 1. *Carte de contrôle standard, en moyenne et étendue (range)*

Les précomputations et le formatage affectent ici l'ensemble des opérations prescrites par la procédure, puisque l'objet est totalement construit. C'est le cas, en premier lieu, de l'échantillon prélevé périodiquement. Bien que cette notion de petit échantillon soit intuitive, il a fallu attendre la théorie élaborée par Student (à laquelle fait allusion le mathématicien cité plus haut dans notre texte) pour pouvoir l'utiliser dans des calculs et des estimations statistiques. On voit encore ici une influence de la situation : Student, de son vrai nom WS Gossett (1876-1937), était ingénieur dans l'industrie, aux brasseries Guinness, et était confronté au coût économique de la collecte des données car elle nécessitait dans son cas l'immobilisation d'équipements de production. Jusque là, les petits échantillons n'avaient pas été étudiés par les statisticiens britanniques, remarque ES Pearson (Pearson 1970) à propos de Student, car ils travaillaient essentiellement dans des stations agronomiques ou biologiques où ils pouvaient obtenir des échantillons aussi grands qu'ils le voulaient. En partant de grands échantillons, on obtient une théorie asymptotique bien différente de la théorie adéquate pour les petits échantillons.

Shewhart s'est beaucoup appuyé sur la théorie des petits échantillons qui a constitué un tournant dans sa démarche. Dans une première période, en effet, il lui fallait des échantillons de milliers de pièces pour pouvoir déterminer les paramètres statistiques de la variable à contrôler, et cela ne permettait de suivre la production que mois par mois. Dans la version définitive de la méthode, la taille des échantillons est descendue à 4 unités, ce qui rend possible un suivi en temps réel et des interventions immédiates en cas de problème. Ajoutons que, pour arriver à ce nombre très petit, Shewhart a procédé à des essais systématiques avec un dispositif de simulation ; les séries de tirages aléatoires qu'il a obtenues sont d'ailleurs publiées en annexe de son livre afin de permettre d'autres expérimentations. Ici aussi, la pré-computation est l'objet d'investissements considérables.

Un autre aspect important de la pré-computation est le calcul des limites de contrôle. C'est ici que s'exprime le plus clairement un point de vue économique, sous forme d'un arbitrage entre deux types de risques, et donc de coûts. "La méthode statistique rend possible l'établissement de limites entre lesquelles la variation de toute quantité à laquelle la direction porte intérêt devrait être laissée au hasard. C'est seulement quand les variations dépassent ces limites qu'il est économiquement justifié d'engager une action."[5] Le risque associé à des limites trop serrées est celui de décider qu'un point hors limites traduit une cause de variation significative, alors qu'elle n'est qu'une variation aléatoire "normale" ; c'est le risque d'une fausse alerte, qui entraîne inutilement un coût de recherche de la cause supposée. Le risque de limites trop larges est celui, inverse, de ne pas détecter une variation significative, et donc de perdre l'occasion d'éliminer une cause de variabilité et d'améliorer la régularité du processus. La discussion de cette question par Shewhart a un intérêt plus théorique que pratique, néanmoins elle ouvre des voies de recherche en théorie de la décision.

Un deuxième type de risque économique intervient quand on prend en compte la variabilité acceptée par le client. A priori, en effet, elle est différente de la variabilité propre au processus de production. Différents cas de figure peuvent se présenter :

- la plage de variabilité acceptée par le client est plus large que celle du processus : il n'y a pas de difficulté à satisfaire le client, mais pas non plus de raison majeure de réduire la variabilité du processus
- la plage de variabilité demandée par le client est moins large que celle du processus : il y a problème. Plusieurs éventualités sont envisageables : soit on parvient à réduire la variabilité du processus, soit on négocie un arrangement avec le client, soit on trie les pièces fabriquées en éliminant les non-conformes, soit on change de matériel de production.

Le risque associé à un mauvais calcul des limites de contrôle n'est ainsi qu'un risque parmi d'autres, dans la pratique. Cela explique peut-être que les industriels appliquent toujours la même règle depuis Shewhart (la règle dite "des trois sigmas"), à l'exception des industries électroniques qui ont lancé depuis quelques années la politique dite "des six sigmas"[6]. Nous avons bien là une routine standardisée abondamment mise en oeuvre sans s'interroger sur sa pertinence. Les manuels d'enseignement donnent la procédure et des tables numériques permettant de calculer directement les limites de contrôle à partir de séries d'observations, ce qui tend à développer des automatismes chez les utilisateurs.

La statistique mathématique a ainsi contribué à un mouvement de rationalisation de l'organisation industrielle dans les situations où intervient l'aléatoire, par le biais de procédures de collecte d'information et de prise de décision s'appuyant sur des artefacts et des précomputations. La prise en compte du coût d'acquisition de l'information est une innovation considérable, qui conduit à rechercher un point optimum entre coût et bénéfice. Cet optimum est parfois calculable et parfois non, mais dans tous les cas une réponse est proposée sous forme d'un "one best way" dont le destin serait, en toute logique, de devenir une norme pour les acteurs de la production.

Situations de conception et lecteur modèle

Nous avons vu que les routines sont imprégnées de certains caractères des situations dans lesquelles elles ont été conçues. Nous sentons bien que cela va influencer l'interprétation donnée à la routine dans les autres situations où elle sera employée. Mais comment le conceptualiser dans le champ sémiotique? Un rapprochement avec la théorie du Lecteur modèle de Umberto Eco peut nous indiquer des pistes.

Tout texte, selon Eco, est incomplet, et le rôle du lecteur est de l'actualiser, c'est-à-dire d'expliciter (au moins pour soi) ce qui n'est pas dit dans le texte, qui n'est pas manifesté en surface mais présent néanmoins dans le texte. Dans un texte littéraire, le lecteur s'appuie par exemple sur des règles conversationnelles implicites, telles que : lorsqu'il y a deux personnages dans une scène, celui qui parle s'adresse à l'autre – à moins que le texte ne spécifie autrement. *"Le texte est un mécanisme paresseux (ou économique) qui vit sur la plus-value de sens qui y est introduite par le destinataire"*. L'auteur met en oeuvre des procédés qui s'efforcent d'anticiper l'interprétation par le lecteur : *"générer un texte signifie mettre en*

oeuvre une stratégie dont font partie les prévisions des mouvements de l'autre – comme dans toute stratégie."

Ceci reste valable pour l'auteur d'une procédure. Pour anticiper les "mouvements" du lecteur (ou destinataire), il s'appuiera sur son expérience, sur les situations qu'il a connues, et peut-être aussi sur des connaissances acquises sans expérience directe. Il supposera par exemple que le lecteur actualisera sans difficulté telle référence, comblera tel "blanc" avec sa propre expérience, etc. En bref, il fera des suppositions sur la manière dont le lecteur s'y prendra pour fabriquer un sens au texte.

La coopération textuelle concerne l'ensemble des procédés textuels mis en place par l'auteur pour faire en sorte que le lecteur actualise le texte dans des directions particulières. L'un des plus importants est le Lecteur modèle : le lecteur idéal du texte tel que le texte lui-même le dessine. Le style littéraire du texte est par exemple un moyen de sélection des lecteurs. Un texte bardé de formules mathématiques ne sera pas à la portée de tous et dessine un profil social de lecteur.

Un texte dessine également un Auteur modèle, logiquement corrélatif du Lecteur modèle si le texte est soumis à des exigences de cohérence (ce n'est pas nécessairement vrai des textes littéraires, mais c'est vrai des textes de gestion). Auteur et Lecteur modèles sont des stratégies textuelles, à bien distinguer de l'Auteur et du Lecteur empiriques, qui sont les personnes existant dans la réalité. Il est à noter une asymétrie fondamentale entre auteur et lecteur : l'auteur est engagé irréversiblement par son texte, donc pas les modèles qui s'y dessinent, alors que le lecteur n'est pas tenu de se conformer au Lecteur modèle qu'il perçoit. Il peut adopter par rapport au texte une position totalement imprévue par l'auteur, et transformer complètement le sens du texte.

Le concept de Lecteur modèle nous paraît fécond pour l'étude de la gestion. Il conduit à mettre en lumière ce qui, justement, figure dans le texte et ce qui n'y figure pas mais est présupposé par le texte. Il indique une certaine classe de "trous à boucher" dans le texte. Les ressources pour les boucher peuvent se trouver dans l'intertexte, dans l'encyclopédie partagée, dans des encyclopédies spécifiques, ou dans les répertoires pragmatiques des acteurs empiriques.

Au delà du Lecteur modèle, Eco analyse une variété de niveaux – même si le terme n'est pas adéquat – auxquels se situe potentiellement la coopération auteur-lecteur : structures idéologiques, structures actancielles, structures narratives, structures discursives, structures de mondes, prévisions et promenades inférentielles, extensions parenthétisées... Ce sont autant d'indications de pistes pour étudier les modalités de la coopération.

Prenons simplement l'exemple des structures narratives et actancielles. Un article scientifique à portée générale tel que celui de Dodge & Romig (1929) ne raconte pas l'histoire d'une mise en oeuvre. Il indique les conditions d'utilisation de la méthode de façon abstraite, non pas narrative. En revanche, dans les séances de formation pour les ouvriers, les formateurs présentent des exemples, des cas, qui sont bien "des histoires", sous forme narrative. Les acteurs empiriques sont même souvent invités à jouer ces histoires comme au

théâtre, donc à fabriquer eux-mêmes une trame narrative à partir des ressources actancielles qui leur sont proposées. Ces histoires sont considérées comme un bon moyen pour "faire fabriquer du sens" au personnel d'exécution.

Heureusement, les scientifiques laissent souvent des textes où ils exposent, cette fois sous forme narrative, le processus par lequel ils ont produit la méthode qui les a fait connaître. Il est intéressant de voir ce processus comme une interaction auteur-lecteurs, car cela amène à mieux comprendre comment une situation laisse son empreinte dans la méthode. Notre travail d'analyse a consisté à reconstituer les situations originelles, à construire une narration expliquant comment les auteurs Dodge et Romig ont pu passer de ces situations originelles à la procédure formelle telle que nous pouvons la lire dans l'article de 1929.

En premier lieu, les "lecteurs" peuvent contribuer à orienter les développements théoriques dans un sens ou dans un autre. L'exemple du critère "minimiser le coût de l'inspection" est démonstratif à cet égard. En effet, Dumas (1925) l'envisage un instant mais choisit d'en développer un autre, qu'il juge plus intéressant d'un point de vue mathématique. S'il avait eu en face de lui des industriels, il aurait peut-être eu une réponse qui l'aurait orienté différemment. Il suffit parfois d'une impulsion pour déclencher le développement d'une nouvelle branche théorique : la théorie de l'analyse séquentielle a été développée à partir d'une suggestion d'un officier d'intendance de la marine (Wald 1947, p.2).

Il arrive aussi que les "lecteurs" interviennent pour spécifier certains points de la méthode qui restent indéterminés par la théorie et qui suscitent des débats, pour des raisons que les "auteurs" ne savent pas conceptualiser en restant à l'intérieur de leur cadre théorique. C'est par exemple la "psychologie de l'inspecteur" vue plus haut. C'est aussi le choix d'une valeur de référence pour la probabilité associée au risque du client (en définitive 10%). Cette valeur a fait l'objet de discussions très longues et ardues, certains voulant 5%, d'autres 20%, alors que du point de vue théorique de la statistique, ces formules sont à peu près équivalentes. La mise en situation réelle est décisive pour la finition de l'oeuvre, car aucun esprit humain ne pourrait prévoir toutes ces objections et difficultés et y répondre par avance. C'est comme si l'oeuvre était élaborée et lue face à un cercle restreint, dont les remarques seraient intégrées avant une diffusion plus large.

Le signe "il y a un problème" et son interprétation

Nous allons maintenant aborder le versant interprétatif de l'enquête, qui consiste en une démarche de construction et d'enrichissement du sens à partir d'indices. Il s'agit d'analyser comment cette démarche s'articule avec l'artefact de la routine. Nous nous situons donc "du point du lecteur", pour considérer les moyens offerts à la coopération par le "texte" de la routine.

En 1924, sur le premier schéma présentant le principe de la carte de contrôle (fig. 2), Shewhart avait écrit : "This point indicates trouble", en désignant d'une flèche le seul point en dehors des limites de contrôle. Mais seule est signalée l'existence d'un problème : du

problème lui-même, très peu est connu. Il faut encore le diagnostiquer, comprendre la situation, acquérir des connaissances, trouver des moyens d'action. En utilisant des concepts de sémiotique, nous dirons que cette indication "il y a un problème" est un *signe* et que nous voulons en produire une interprétation. Peirce a conceptualisé ces phénomènes sous le nom de sémiosis, que l'on peut comprendre comme le développement de la signification du signe initial, à travers un processus d'engendrement de signes liés les uns aux autres tout en étant liés à leurs objets. Nos références théoriques sont en premier lieu Peirce pour la théorie du signe et de l'abduction, puis Umberto Eco pour l'approfondissement du concept d'abduction.
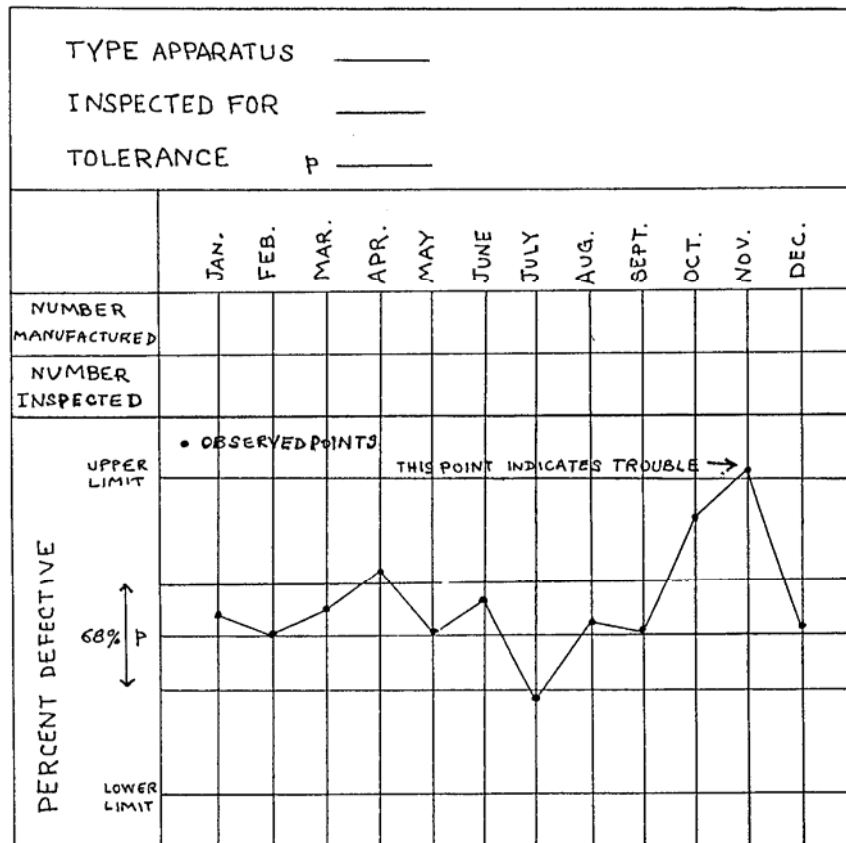
Figure 2. *Première forme de la carte de contrôle, 1924*

Nous analyserons d'abord le mode de production du signe "il y a un problème" sur la carte de contrôle, qui repose essentiellement sur les routines statistique standardisées, puis nous aborderons l'enquête à laquelle il faut procéder pour identifier le problème, notamment la recherche des causes assignables de variation dans la démarche de Shewhart.

Un signe composé

Le signe constitué par le point que souligne le commentaire "ce point indique un problème" (que nous appellerons plus simplement "problème") est produit par le dispositif graphique de la carte de contrôle. Nous savons que la carte de contrôle est conçue pour

enregistrer et représenter les résultats de la procédure d'échantillonnage périodique qui permet de contrôler le processus de production ; lorsqu'un échantillon est prélevé, l'opérateur calcule sa moyenne et sa dispersion et trace les points correspondants sur le graphique. Il y a "problème" si l'un des points tombe en dehors des limites de contrôle.

Considérons d'abord l'interprétation savante du "problème". Si le système de production est sous contrôle statistique, il est très peu probable (environ 3 chances sur mille) d'observer une telle valeur comme simple hasard de l'échantillonnage. Il est bien plus probable que la distribution statistique de la variable contrôlée ait changé. Dans le premier cas, l'événement n'est pas significatif d'un dérèglement du système de production, et il ne faut surtout pas intervenir car cela aurait pour conséquence d'augmenter la variabilité. Dans le deuxième cas, au contraire, une cause extérieure est venue perturber la régularité (statistique) du système de production, et la question se pose de la rechercher.

Le dispositif graphique de la carte de contrôle produit un formatage des données qui fait partie de la précomputation propre à cet artefact. Analysons plus précisément la structure de ce dispositif de formatage.

La carte de contrôle est un dispositif graphique complexe qui comporte quatre types de composants fondamentaux (voir fig. 1) : (1) l'échelle des temps en abcisse, (2) l'échelle des grandeurs de la variable contrôlée en ordonnée (moyenne et dispersion), (3) les points représentatifs des échantillons successifs, (4) les limites de contrôle positionnées sur l'échelle des grandeurs de la variable. Le formatage graphique permet donc de représenter dans le même espace les quatres concepts mentionnés.

Un deuxième formatage est opéré en représentant sur le même graphique des éléments descriptifs et des éléments normatifs. Les éléments descriptifs sont les points représentant les échantillons par leur moyenne et leur dispersion, ils sont des indicateurs de l'évolution du système de production au cours du temps. Les éléments normatifs sont les limites de contrôle, qui décrivent les exigences que la production doit satisfaire (statistiquement).

Le cadre graphique commun est constitué par les deux axes des abcisses (temps) et des ordonnées (grandeur de la variable contrôlée). Les normes sont indépendantes du temps (droites horizontales d'ordonnée constante), alors que les points décrivant le système sont de plus en plus nombreux avec le temps. Notons qu'au fur et à mesure de leur inscription, ils dessinent des "courbes" qui constituent une certaine représentation de l'évolution de la qualité de la production.

Dans le cas présent, la procédure prescrit à la fois les *procédures d'observation* (tirage des échantillons, taille, fréquence), les *catégories de la description* (moyenne, déviation), les *critères de jugement* (limites de contrôle). Il faut souligner que la statistique mathématique intervient dans ces trois types d'éléments, et sous-tend donc l'ensemble de la routine. La méthode de Shewhart constitue un ensemble cohérent qui fournit à la fois les éléments descriptifs et les éléments normatifs.

Cette propriété est assez générale pour les outils statistiques, comme le note A. Desrosières (1993, p. 9) :

"Les outils statistiques permettent de découvrir ou de créer des êtres sur lesquels prendre appui pour décrire le monde et agir sur lui. De ces objets, on peut dire à la fois qu'ils sont réels et qu'ils ont été construits, dès lors qu'ils sont repris dans d'autres assemblages et circulent tels quels, coupés de leur genèse, ce qui est après tout le lot de beaucoup de produits".

Les statisticiens industriels ont fait de gros efforts pour offrir des représentations intuitives correspondant à des pratiques sociales populaires (conduire une voiture sur une route bien tracée) et qui tendent à faire oublier le caractère théorique et construit des outils statistiques. On pourra remarquer que, ici, les éléments les plus faciles à comprendre sont les normatifs : la métaphore de la route à suivre ou de la feuille de température du malade est très intuitive. Par contre, les éléments descriptifs (moyenne, dispersion, échantillon représentatif) sont essentiellement des produits théoriques et nécessitent en pratique de suivre des procédures de calcul non intuitives.

Il semble que le principe de *superposition de deux représentations*, l'une descriptive, l'autre normative, ait été utilisé dans la pratique des affaires dans la première moitié du XXe siècle[7] : des graphiques représentant les performances (chiffres d'affaire, de vente, etc.) de plusieurs entreprises ou établissements pouvaient être comparés à une norme grâce à un "gabarit" dessiné sur un papier calque, qu'il suffisait de superposer aux graphiques dont les dimensions étaient normalisées. Il n'est pas impossible que le mode de représentation des limites de contrôle ait été inspiré par l'utilisation du papier calque, très répandue dans les bureaux d'ingénierie et les usines à cette époque.

Un signe indice à enrichir

Examinons d'abord la nature du signe "ce point indique un problème" d'un point de vue sémiotique, et ensuite la conceptualisation du processus d'interprétation.

Rappelons que, pour Peirce, un signe est "quelque chose qui tient lieu pour quelqu'un de quelque chose sous quelque rapport ou à quelque titre" (Collected Papers : 2.228)[8]. Un signe est une relation entre trois entités qu'il nomme *representamen, objet, interprétant*. L'objet est ce dont le signe tient lieu. Le representamen est la représentation de l'objet offerte par le signe, que Peirce identifie souvent au signe lui-même (le mot "signe" est employé au lieu de "representamen" et inversement). L'interprétant est un autre signe créé dans l'esprit de la personne à qui s'adresse le signe, et c'est "un signe équivalent ou peut-être un signe plus développé".

Interprétant, signe (ou representamen) et objet sont liés par une relation appelée "triadique", que Peirce caractérise de la façon suivante :

"[En bref, un signe est] tout ce qui détermine quelque chose d'autre (son interprétant) à renvoyer à un objet auquel lui-même renvoie (son objet) de la même manière, l'interprétant devenant à son tour un signe et ainsi de suite ad infinitum." (Coll. Papers : 2.303)

On voit qu'un signe est lié à son interprétant par la relation que tous deux ont à un même objet ; cependant l'interprétant "développe" le premier signe, et donc dit quelque chose de plus sur l'objet. L'interprétant est lui-même un signe qui engendre un nouvel interprétant renvoyant au même objet, dont la représentation se trouve à nouveau développée. Ce processus en chaîne est appelé par Peirce "semiosis" : c'est un processus d'interprétation et de fabrication de sens – en même temps que de transformation du rapport entre l'objet et les signes qui le représentent successivement.

En s'appuyant sur les définitions précédentes, l'interprétation du signe "ce point indique un problème" consiste à engendrer à partir de ce signe "pauvre" - au sens où sa seule signification est d'attirer l'attention sur un point représentant un échantillon - une chaîne de signes qui aboutisse à un signe "pleinement développé", c'est-à-dire qui nous donne une explication de l'événement qui satisfasse nos besoins. La production de cette chaîne de signes est le processus de semiosis. Il accompagne les actions menées par les agents de l'entreprise dans leur enquête, et il constitue la représentation sémiotique de cette démarche qui, évidemment, comporte toutes sortes d'actions : interroger d'autres personnes, examiner les machines, faire des analyses et des essais, consulter des documents, etc.

Cette démarche active peut être représentée dans le plan sémiotique, mettant l'accent sur le travail qui se fait au niveau des signes et de leur mise en relation pour construire une explication qui sera considérée comme finale, au sens où l'on ne jugera pas utile d'aller plus loin. Comme le souligne Eco, "la sémiosis est un phénomène, la sémiotique est un discours théorique sur les phénomènes sémiosiques" (Eco 1990, §4.1.1).

Remarquons pour terminer que, sur une carte de contrôle en usage réel, il n'est pas écrit "ce point indique un problème", et il n'y a pas de flèche sur le graphique pour attirer l'attention sur cet indice, et constituer ce "point hors limites" en indice de problème. Il faut donc que l'usager sache lire la carte de contrôle, c'est-à-dire sache y lire les signes qui s'y inscrivent automatiquement, par le seul fonctionnement de la routine. En définitive, c'est l'usager qui décide de voir là un signe. Ici, la routine automatique ne fait rien d'autre que pointer sur un événement qu'elle catégorise comme signe, mais comme signe vide, laissant à la charge des humains d'en construire une interprétation. De plus, comme ce signe construit n'est pas la trace d'un phénomène naturel spontané mais renvoie à un phénomène qui est lui aussi construit, la possibilité existe que ce couple ne soit qu'un fantôme.

La routine que nous étudions n'a pas une existence autonome : elle a été élaborée à partir de travaux savants, a été écrite sous forme textuelle dans différents manuels, a été enseignée aux agents de production. Elle renvoie à une encyclopédie qui permet de l'actualiser. Son existence est tissée de tous ces liens intertextuels avec d'autres niveaux de discours.

Le raisonnement par abduction.

Le terme "abduction" a été forgé par CS Peirce pour nommer un raisonnement par hypothèse, où la conclusion n'est pas certaine mais seulement probable. Pour Peirce, les opérations logiques sont de trois sortes : déduction, induction, abduction.

A son habitude, Peirce a multiplié les définitions et interprétations de ses concepts. Retenons celles, logicistes, se référant à la théorie classique du syllogisme et de l'induction (Peirce 1868). Si le syllogisme est la déduction d'un résultat à partir d'une règle et d'un cas, l'induction est l'inférence d'une règle à partir d'un cas et d'un résultat, tandis que l'abduction (ou l'hypothèse) est l'inférence d'un cas à partir d'une règle et d'un résultat. Seuls l'induction et l'abduction sont des raisonnements créatifs. Peirce l'a aussi exprimé simplement : "abduction is, after all, nothing but guessing" (C.P. 7.219, 1901).

Eco étudie trois types d'abduction qui permettent d'analyser plus finement les raisonnements mis en oeuvre dans une enquête. Quand on observe un phénomène ("résultat") dans certaines circonstances ("cas"), la question de l'abduction est de savoir quelle règle explique ce phénomène à partir de ces circonstances. Selon la définition logicienne précédente, ceci semblerait plutôt relever de l'induction, mais l'analyse de Eco montre en fait qu'il n'y a pas un clivage tranché entre induction et abduction.

   a) Hypothèse ou abduction hypercodée. Une loi existe, que nous connaissons : elle est déjà codée dans les connaissances ou habitudes culturelles. Nous observons un cas qui nous paraît explicable par cette loi, nous en concluons que la loi a joué. Ce mécanisme intervient souvent dans la vie quotidienne sans même que nous en ayions conscience, pour identifier et catégoriser des perceptions de toutes sortes.

   b) Abduction hypocodée. Une série de règles appartenant à la connaissance commune peuvent expliquer le phénomène, et toutes ces règles sont équiprobables. On sélectionne la règle la plus plausible, mais il n'y a pas certitude. L'explication est prise en considération en attendant des vérifications ultérieures.

   c) Abduction créative. La loi doit être inventée : Eco évoque ces découvertes "révolutionnaires" qui bouleversent un paradigme scientifique établi (Kuhn 1962). En gestion de la qualité, ce sera plus modestement une hypothèse radicalement nouvelle concernant une perturbation.

   d) Méta-abduction. Prolongeant la boutade de Peirce citée plus haut, Eco fait une place à l'abduction par pur "guessing", qui représente "le courage de défier sans vérifications ultérieures la faillibilité de base qui gouverne la connaissance humaine" (Eco 1990, § IV.2.3.2). En relève par exemple la conduite d'un agent qui affirmerait d'emblée sa certitude concernant l'origine d'une perturbation, sans attendre le résultat des premières vérifications expérimentales. C'est aussi "l'instinct" du dépanneur qui aime mettre immédiatement le doigt sur la panne et démontrer ainsi sa compétence.

Le matériau pouvant être utilisé par les enquêteurs de la qualité est a priori sans limites. Cependant, il faut tenir compte de l'accessibilité, du coût d'exploitation, des délais, de la

fiabilité des informations, etc. Cette enquête intervenant a posteriori, ils n'ont plus que des *traces* de ce qui s'est passé.

Un certain type de traces est produit par le graphique de la carte de contrôle : les points représentant les échantillons successifs dessinent parfois des courbes qui donnent des indications plausibles sur les causes de la perturbation. Ce type de traces est la seule aide que la routine standardisée offre pour l'interprétation du point hors limites. Par exemple, dans un usinage mécanique, si la moyenne des échantillons reste stationnaire mais que la dispersion augmente brusquement, cela peut signifier que la machine s'est mise à vibrer. On remarque assez facilement les tendances régulières ou cycliques, ce qui oriente vers certaines causes. De tels exemples figurent toujours dans les manuels de formation.

Les traces sont le principal matériau pour l'enquête. Les traces laissées sur la carte de contrôle ne sont pas fidèles, car elles comportent une part d'aléatoire par suite de l'échantillonnage. Aussi voit-on se développer dans l'industrie la constitution de traces systématiques : c'est ce qu'on appelle la traçabilité des fabrication. Il s'agit d'organiser des archives, telles que des informations sur les conditions de production et de contrôle, et parfois aussi des échantillons de produits (cas de la pharmacie), de façon à faciliter une enquête ultérieure en cas de "problème". C'est parfois une obligation juridique pour certaines industries et services (restauration), alors que dans beaucoup d'entreprises travaillant en sous-traitance, c'est le donneur d'ordres qui impose des modalités de suivi de la qualité compatibles avec son propre système.

Le cycle de Shewhart, une semiosis expérimentale

L'analyse de l'abduction par Eco révèle que l'hypothèse n'est pas toujours consciemment soumise à vérification expérimentale : elle peut sembler évidente, ou non contestable pour diverses raisons d'ordre social ou psycho-social, poids de la hiérarchie, argument d'autorité, charisme, influence, etc.

Dans sa théorie du contrôle de qualité, Shewhart a énoncé clairement la nécessité logique de la validation expérimentale de l'hypothèse, mais en traduisant le schéma classique des sciences expérimentales en termes de contrôle statistique :

- la formulation de l'hypothèse correspond à la *spécification* : c'est le moment où l'on définit le but à atteindre, c'est-à-dire les caractéristiques que l'on attend du produit à fabriquer ;
- l'expérimentation physique correspond à la *production,* moment où le contrôle statistique est envisagé en tant qu'opération matérielle ; ce sont les procédures d'échantillonnage, la définition des limites de contrôle, etc.
- le jugement sur l'hypothèse, ou conclusion, correspond à *l'inspection*, qui juge si la production effectuée est en état de contrôle statistique, c'est-à-dire s'il ne se manifeste pas de cause attribuable de variation.

Ces trois moments s'enchaînent en un cycle qui peut se répéter indéfiniment, produisant, dit-il, un *processus dynamique d'acquisition de connaissance* (Shewhart 1939, pp. 44-45).
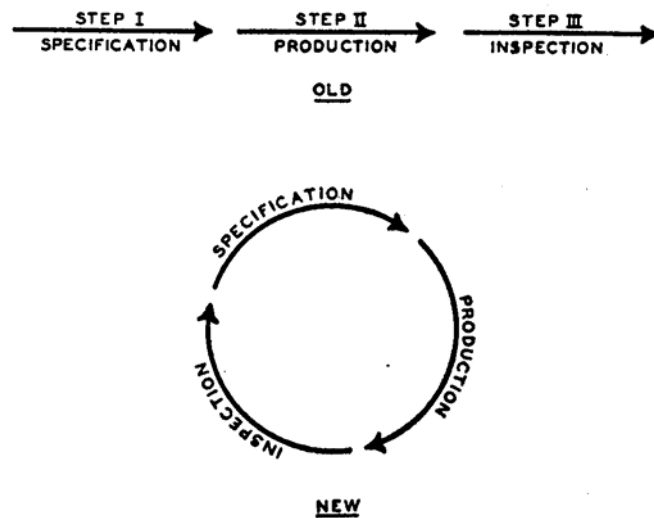
Fig. 4. *Le cycle de Shewhart, version première (1939)*

L'acquisition de connaissance apparaît ainsi comme un flux permanent qui double le flux de la production et permet d'en améliorer les performances. "Mass production viewed in this way constitutes a continuing and self-corrective method for making the most efficient use of raw and fabricated material." (Shewhart 1939, pp. 44-45).

Cette conception peut actuellement nous apparaître bien étroite : pourquoi donc limiter la "connaissance" à la détection des causes assignables de variation? S'il s'agit d'améliorer l'efficacité des processus, il y a bien d'autres connaissances utiles qui peuvent être acquises à travers l'enquête sur les défauts signalés par la carte de contrôle.

Le Lecteur modèle prévu par Shewhart est essentiellement préoccupé de diminuer la variabilité du processus de fabrication. D'autres travaux en contrôle statistique font apparaître des Lecteurs modèles différents. Le phénomène intéressant dans ce cas est que ce sont les travaux de Shewhart qui sont repris et réécrits en y incorporant d'autres Lecteurs modèles, auxquels les lecteurs empiriques trouvent plus d'attrait. .

Ainsi, le cycle de Shewhart a été remanié par le spécialiste de la qualité W. Edwards Deming (Deming 1986, chap. 3) qui y a introduit un quatrième temps, appelé "ACT" ci-dessous.

La terminologie est relativement standardisée, c'est le même texte qui circule dans les manuels et sur l'internet, sur les sites d'ingénieurs conseils ou d'enseignants:
"PLAN: plan ahead for change. Analyze and predict the results.
DO: execute the plan, taking small steps in controlled circumstances.
STUDY: check, study the results.
ACT: take action to standardize or improve the process"

On reconnaîtra les trois temps de Shewhart dans les trois premiers temps de celui-ci. Qu'apporte le quatrième temps? On voit que c'est le temps de la mise en oeuvre des résultats

acquis, peut-être de la réflexion ; un temps qui brise la répétition indéfinie des cycles ternaires. Tout cela semble cependant implicite dans le cycle originel à trois temps...
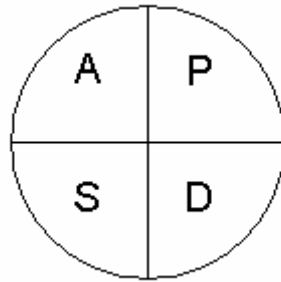
Fig. 3. *Le cycle de Shewhart, selon Deming*

Il est très étonnant que la version originale de Shewhart, le cycle à trois temps, ait complètement disparu des textes en circulation : c'est la version à quatre temps qui circule sous le nom "cycle de Shewhart". Les acteurs qui utilisent commercialement cette démarche évoquent généralement son origine aux Bell Labs à la façon d'un mythe : née dans les années 1920, elle est restée longtemps un des "procédés maison" de AT&T, puis a été exportée au Japon immédiatement après la guerre, adoptée par les dirigeants japonais, etc. Ce mythe fait une belle place à WE Deming, qui aurait été l'acteur principal dans la diffusion et la popularisation au Japon des travaux de Shewhart. Le cycle de Shewhart est d'ailleurs très souvent appelé cycle de Deming ou "Deming wheel".

Le Lecteur modèle de Deming est beaucoup moins spécialisé, moins étroitement scientifique, que celui de Shewhart. La méthode est présentée comme démarche de résolution de problèmes, et non seulement "contrôle de qualité". Elle peut être utilisée dans toutes sortes de domaines. Les livres de Deming sont d'une lecture facile, ils utilisent beaucoup la narration.

La coopération auteur-lecteur autour de la procédure de Shewhart

Nous concluons que la procédure de la carte de contrôle n'apporte pas une aide directe à l'enquête, et que la recherche des causes doit s'appuyer, en général, sur des moyens autres que la méthode statistique. Le Lecteur modèle est supposé disposer de ressources extérieures à la procédure. Ces moyens peuvent être des routines, comme lorsqu'un dispositif de traçabilité fonctionne, mais ces routines sont différentes de la routine de contrôle statistique proprement dite.

Dans la carte de contrôle, le formatage des données qui produit le signal "problème" vise essentiellement à la diminution de la variabilité du processus de fabrication. Les limites de contrôle sont calculées de façon à établir un compromis aussi "économique" que possible entre le risque d'alerte injustifiée et le risque de ne pas donner une alerte justifiée, ces deux risques opposés comportant chacun un coût économique. Il est coûteux de partir à la recherche d'une cause qui n'existe pas (alerte injustifiée), et inversement, de laisser passer (pas

d'alerte) des défauts que l'on pourrait corriger, selon la conception du processus d'amélioration permanente. Le formatage est donc à la fois technique et économique, la dimension économique n'étant pas immédiatement apparente (il n'y a aucune variable économique sur la carte de contrôle).

Lorsqu'une enquête permet de trouver et d'éliminer une cause de variabilité, la procédure standard prescrit de recalculer les limites de contrôle. En effet, la variabilité du processus de fabrication a en principe diminué, et l'équilibre optimal entre les deux espèces de risques s'est déplacé. Le résultat visible d'une enquête réussie est donc, en principe, un resserrement des exigences sur le produit.

C'est là ce que le Lecteur modèle est supposé faire. Mais l'observation des pratiques industrielles montre que, bien souvent, la procédure n'est pas suivie intégralement, les limites de contrôle n'étant pas recalculées. La carte de contrôle n'est pas utilisée pour réduire le plus possible la variabilité du produit mais pour vérifier que les tolérances exigées par le client sont respectées. Les limites de contrôle sont calculées d'après le cahier des charges et ne sont pas révisables. Dans ce cas, l'apparition d'un échantillon hors limites signale un problème vis-à-vis du client, et revêt donc une signification économique plus directe (risque de pénalités si un produit défectueux est livré). L'enquête est orientée d'abord vers l'identification des pièces défectueuses, pour les retirer de la circulation, puis vers la résolution du problème afin de rétablir l'état antérieur à la perturbation.

La carte de contrôle peut donc être interprétée d'une façon très différente de celle prévue par la théorie savante. Cette façon n'est pas légitime par rapport au Lecteur modèle prévu par Shewhart ; en reprenant une distinction posée par Eco, le texte originaire est "utilisé" et non "interprété", car son projet global n'est pas repris. Le formalisme graphique des limites de contrôle est interprété littéralement, les limites sont considérées comme des représentants du client et non comme des moyens d'accroître la connaissance sur le processus de fabrication.

En résumé,
- le formalisme graphique de la carte de contrôle est structuré par une théorie (Shewhart) du coût et de la valeur de l'information, entre lesquels un équilibre doit être trouvé, équilibre qui détermine la position des limites de contrôle
- mais cette théorie est souvent oubliée, les limites de contrôle étant traitées comme des moyens de garantir "ce que veut le client"
- le formalisme graphique n'apporte pas systématiquement une aide à l'enquête, et il peut inciter au comportement le plus paresseux, éliminer les produits défectueux.

L'artefact graphique semble donc avoir prédominé sur le texte pour orienter l'interprétation. On voit ainsi que, pour étudier pleinement la coopération prévue par une procédure, il faut prendre en considération un corpus d'objets qui ne sont peut-être pas tous prévus par le texte, mais que l'utilisateur aura accroché au texte originel. Ceci nous incite à suivre les liens qui se tissent entre artefacts, textes et situations dans l'épaisseur de l'organisation. .

Conclusion

Nous avons tenté dans ce texte de jeter les bases d'une approche qui permettrait de penser ensemble, d'articuler, deux volets complémentaires des activités du contrôle de qualité, les routines standardisées d'un côté, le travail interprétatif de l'autre. La sémiotique peircéenne nous paraît intéressante car elle fait une place de premier rang à l'interprétation, à l'enquête et au raisonnement par hypothèse. Les prolongements que lui a donné Umberto Eco en sémiotique du texte et de la lecture semblent prometteurs pour conceptualiser l'interaction concepteur-utilisateur autour d'un texte ou d'un artefact. Bien sûr, il reste un gros travail à accomplir pour passer du domaine de la littérature de fiction à celui des textes opératoires utilisés dans les entreprises. Il ne s'agit pas de transposer tels quels les concepts élaborés par Eco, qui sont étroitement liés à la nature fictionnelle des textes qu'il étudie, mais de réitérer sa démarche sur des objets textuels nouveaux, et donc d'inventer de nouveaux concepts qui leur soient adéquats.

Cette démarche est porteuse de plusieurs idées fécondes. En premier lieu l'idée de dispositif coopératif porté par le texte et lisible par des analyses à différents niveaux. Ensuite, l'idée que la coopération est proposée par l'auteur mais n'est pas acquise, le lecteur pouvant récupérer le texte et l'utiliser pour ses propres fins. Cette asymétrie fondamentale entre auteur et lecteur, qui semble ici profiter plutôt au lecteur, apporte un point de vue original dans le contexte des entreprises où, bien souvent, l'auteur du texte détient plus de pouvoir que le lecteur.

A l'heure actuelle, nous ne pouvons prétendre, dans notre analyse, être arrivés à des "résultats" : la sémiotique peircéenne n'est pas une technique qui "mouline" des données. C'est plutôt un "regard", comme le dit à l'occasion Eco, qui s'exerce à lire ce qui, derrière les choses, peut être traité en signes. C'est aussi une interrogation permanente sur les phénomènes qui produisent des significations, et notamment sur les différentes manières d'interroger les faits et d'en tirer des conclusions, souvent peu assurées en droit mais parfois pleines de conviction.

Notre thèse selon laquelle les routines fournissent un cadre qui met en évidence les événements passibles d'une enquête paraît bien adaptée au cas de la carte de contrôle. Formulée en général, elle est évidemment d'une grande banalité : il y a des règles, rendues présentes et actives par les routines, et ce qui sort du cadre de la règle est soumis à enquête. Nous revendiquons cependant une originalité : la vision sémiotique de ce processus, qui prête attention à la manière dont se constituent les signes de l'exception, du "hors-règle", à la fois matériellement (par le graphique de la carte de contrôle) et par le raisonnement (les formalismes mathématiques, les facteurs qu'ils incorporent, et aussi les types d'abduction qui fondent l'enquête). La carte de contrôle montre que la théorie statistique fabrique à la fois le descriptif et le normatif, construit donc le candidat coupable (il s'agit des points représentatifs des échantillons) de façon qu'il puisse tomber sous le coup des lois conçues à son intention. Le graphique organise la rencontre et la met en visibilité dans l'espace public, rendant

l'incident accessible au travail collectif des enquêteurs et informateurs qui vont s'efforcer d'en construire une interprétation.

Sur le terrain, les pratiques évoluent vite. La normalisation de la qualité, la certification, imposent toujours de nouveaux standards. Il semble qu'on aille vers une standardisation des procédures d'enquête qualité, comme en témoigne le développement de la traçabilité. Cependant les conceptions de la qualité et de la non-qualité évoluent elles aussi, et la standardisation suit le mouvement avec un certain retard. L'enquête reste un mode essentiel de production de connaissances sur les processus industriels et l'organisation, en particulier dans les domaines innovants. Il importe de reconnaître et de valoriser le rôle de chacun dans ce processus, y compris de ceux qui ne sont, en apparence, "que des exécutants".

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Endnotes

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[2] W. A. Shewhart (1891-1967), physicien de formation, chercheur aux Bell Labs, créateur de la méthode des cartes de contrôle utilisée chez AT&T.

[3] A. R. Crathorne : "The Course in Statistics in the Mathematics Department", The American Mathematical Monthly, Vol. 33, No. 4. (Apr., 1926), pp. 185-194. Voir p. 193

[4] Robert, Dictionnaire de la langue française.

[5] Shewhart et al. : "Applications of Statistical Method in Engineering and Manufacturing", *Mechanical Engineering*, nov. 1932, vol. 54, n°11, 778-780.

[6] Cela signifie que la distance entre la moyenne de la variable et la spécification du client est au minimum de 6 écarts-types, ce qui correspond à 3.4 défauts par million d'occurrences.

[7] Je remercie Yves Cohen, historien, directeur d'études à l'Ecole des hautes études en sciences sociales, pour cette information.

[8] Il existe de très nombreuses définitions du signe chez Peirce, et la terminologie est variable. Nous avons retenu cette définition comme une des plus brèves et intuitives. Le texte intégral est le suivant : "A sign, or representamen, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the interpretant of the first sign. The sign stands for something, its object. It stands for that object, not in all respects, but in reference to a sort of idea, which I have sometimes called the ground of the representamen." (1897)

Organizational Learning:
The Interplay of Routinization and Crisis in Practices

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Abstract

Organizations as distributed knowledge systems are characterized by unshared knowledge. Referring to the concept of transactive knowledge systems, we view organizational knowledge as a specific form of the social organization of individual knowledge, which renders individual knowledge accessible through metaknowledge, i.e. knowledge about knowledge. The aim of the paper is to develop a corresponding model of organizational learning, which conceptualizes organizational learning as, on the one hand, the development and change of knowledge held by individual members of an organization in processes of social interaction and communication and, on the other hand, as developing the organizational accessibility of this unshared individual knowledge. Drawing on the distinctions of implicit and explicit knowledge and of declarative and procedural knowledge we argue that learning may be described as interplay of processes of routinization and crises in organizational practice. We use the case of a department of anesthesiology in a university hospital as illustration for our theoretical arguments.

Introduction

In recent years, there is a still growing discourse on practice-based organization studies (cf. for an overview Gherardi, 2000) which may be placed in the wider context of the 'practice turn in contemporary theory' (Schatzki, Knorr Cetina & Savigny, 2001). Within this discourse, it is widely accepted that learning and knowledge play a constitutive role for performing and understanding practices (e.g., Lave & Wenger, 1991; Cook & Brown, 1999). We will argue in this paper that the underlying concept of knowing as residing in the practices themselves rather than in the memories of the agents (Tsoukas, 1996) is inconsequential because even the proponents of the practice-based view have to refer to individual cognitive processes to understand practices and organizations. We therefore will begin our paper with a conceptualization of individual and organizational knowledge drawn from Brauner (2002) who herself refers to cognitive and social psychology (section 1). In section 2 we will build upon this notion of knowledge to present an alternative conceptualization of organizational learning, which integrates practice-based approaches with approaches that place knowledgeable agents rather in the center of their theorizing without contributing to a reification of agents, practices, and knowledge.

Throughout the paper we give examples from a study about the learning of novice nurse anesthetists in a university hospital. With over 85 nurse anesthetists, 130 anesthetists, and 85 workplaces the department counts among the biggest departments of anesthesiology in Europe. The study focuses on the introductory period of novice nurse anesthetists. Nurse anesthetists mainly assist the anesthetist before, during, and after any narcoses. In the hospital studied, these nurses have to go through a one year's period of job rotation across the main departments. After this period of organized change they are expected to continue to rotate according to the needs of the departments. This rotation results in a high level of uncertainty

because every department has different requirements concerning anesthesia. A second source of uncertainty are the anesthetists, whom the nurses assist. First, anesthetists themselves are trained in this university hospital; they are often not very experienced. Second, every anesthetist has their specific preferences regarding the way a certain procedure is applied, or drugs are used. The work situation of the nurse anesthetists, thus, is characterized by a high level of uncertainty. This uncertainty is even enforced by the fact that the organization, the hospital, and specifically the surgery departments, are high reliability organizations (Weick & Sutcliffe, 2001). The rotation procedure at the beginning of the training is designed to result in high flexibility of the nurse anesthetists.

Organizational Knowledge and Practices

Practices and Knowledge

Social practices may be seen as the basic analytical unit for studying organizations, or social systems in general (Cohen, 1989). Agents in organizations relate in specific and regular ways. These ways can be understood as practices that constitute patterns of social relations (Giddens, 1984). Organizations are thus produced through the continuous flow of social practices. It is a widely shared view that these social practices are knowledge based (e.g., Lave & Wenger, 1991; Cook & Brown, 1999; Brown & Duguid, 2001; Gherardi, 2001); speaking of social practices, thus, implies speaking about knowledge, and learning as the change of knowledge.

In practice-based theorizing on organizations, a common distinction is made between an 'epistemology of possession' and an 'epistemology of practice' (Cook & Brown, 1999). The epistemology of possession is seen as the epistemological basis of knowledge management approaches and the resource-based and knowledge-based views of strategic management.

According to Gherardi (2000) this epistemology holds 'that knowledge resides in the heads of persons, and that it is appropriated, transmitted, and stored by means of mentalistic processes' (p. 212) and thus reifies knowledge as an 'objectified transferable commodity' (p. 213). Cook and Brown (1999) criticize cognitive approaches because they cannot account for the social character of knowledge and knowing as process. The epistemology of practice, on the other hand, states, referring to Lave and Wenger's seminal work (1991), that knowing is part of practice (Cook & Brown, 1999). 'The locus of the agent's knowing … is not in his head but in practice' (Tsoukas, 1996, p. 16).

In our view, this clear juxtaposition of two epistemologies is not helpful in understanding organizational learning and knowledge. While many approaches to knowledge management indeed exhibit a quite naïve conception of the possibilities of storing, sharing, and exchanging knowledge, an epistemology of practice cannot dispose of agents' cognitive processes in describing organizational practice and knowing. This is reflected in Cook and Brown's (1999)

definition of knowing as 'that aspect of practice that does epistemic work' (p. 387), which is characterized as 'the work people must do to acquire, confirm, deploy, or modify what needs to be known in order for them to do what they do' (p. 399). This clearly points to a significant role of individual agents as holders of knowledge. This is supported by Polanyi's work on tacit knowledge and knowing (1958/1998, 1966/1983), which, contrary to a common reading in the context of practice-based organization studies (Gourlay 2004), conceptualizes knowing as an individual cognitive process (cf. Sanders, 1988). A cognitive view on knowledge does not imply a reified conception of knowledge; on the contrary, the non-tradable character of knowledge may exactly be derived from the fact that knowledge is always 'personal knowledge' (Polanyi, 1958/1998) as well as socially embedded as recent approaches to cognitive development from cognitive sciences propose (e.g. Tomasello, 1999).

A structurationist conceptualization of social practices allows for the integration of aspects from both cognitive and practice-based views on knowledge. Social practices are defined as regularised types of acts that agents perform in their action (Giddens, 1984). They are patterns or blueprints for action and are thus, as patterns, more or less independent of specific situations. Performing social practices allows agents, on the one hand, to act in a consistent way over time and space. On the other hand, social practices allow agents to develop stable expectations concerning the action of others. Social practices enable social interaction and at the same time do not exist but through social action. They are therefore recursively reproduced in their enactment. The concept of social practices thus implies the idea of knowledge agents performing these practices (Cohen, 1999). Agents are conceptualized in structuration theory as having explicit and/or implicit knowledge about the practices they perform as well as about the social and time-space conditions of their action (Giddens, 1984). Their knowledge is in the same stance influenced by the practices they are performing and by the conditions of their action (Becker, 1996). In a structurationist view, the locus of knowledge is not in practice (cf. Tsoukas, 1996). It rather makes sense to say that a practice as a pattern as well as its underlying rules and resources is either represented *as knowledge* 'in the head' of the individual agent, or it is *instantiated in action* as performed social practice (cf. Giddens, 1984).

Knowledge and Metaknowledge

It should have become clear that our starting point is the claim that Cook & Brown's (1999) and Gherardi's (2000) critique of an epistemology of possession throws out the baby with the bathwater. At least some cognitive foundation of practice based organization studies is necessary. It is our contention that an appropriate reading of cognitive and semiotic views on knowledge are essential to understand knowledge and learning as bases of organizational practice.

From the perspective of semiotics and cognitive sciences knowledge may be conceptualized as the result of absorbing, processing, and storing information in (an

individual agent's) memory. To clarify our notion of knowledge it is helpful to distinguish knowledge from data and information. Semiotics (for an overview cf. Noth, 1995) claims that things or objects do not have meaning in themselves but that meaning is ascribed or attributed through a human being or any other cognitive system (e.g. an animal, Uexküll & Kriszat, 1934/1983). Objects without meaning (i.e. not processed by a cognitive system) may be termed *data*; if meaning is ascribed to data, they become *information*.

> Consider a novice nurse anesthetist being for the first time confronted with a monitoring device, placed on the anesthesia machine in the operating theatre. This device is meant to deliver reliable information concerning the patient's life parameters during surgery. Novices are often confused by the multitude of data because they are unable to make sense of them. In contrast, an experienced anesthetist or nurse anesthetist quickly attributes meaning to certain acoustic and/or optic signals of the technical device and, thus, is informed by these signals. In the following quotation, the experienced nurse gives an account on that issue:
>
> 'You certainly react to an abnormal sound. I always say: the technical device wants to communicate with you. It talks to you and says: hey, something's wrong, either with me or with the patient. Then I have to react immediately.' (Experienced nurse, five years of work experience)

The transformation of data into information affords an individual assigning meaning through interpreting data. Whether something is information or rather data depends on the individual's current knowledge base.

Information becomes *knowledge* when it is integrated into a system of meanings and interpretations an individual holds, that is, integrated into a cognitive system. Information then is transformed into propositions about the properties of things or objects which only make sense in the context of a cognitive system. Knowledge may thus be defined as propositions about properties ascribed to objects (Klix, 1988), which result from either experience or inferences (Seel, 1991).

> For instance, novice nurse anesthetists develop theories concerning the variety of anesthesiological methods in a very early stage of their introductory period. Through their experience of changing work routines, anesthetists' preferences and the like, they construe that there is no one best way of doing things. This knowledge possibly has an affect on the individual's action taken, e.g. leading him/her to pay closer attention to perceived differences in work styles or to ask questions before starting a specific routine action.
>
> 'Now, I will move again to another workplace, where the same will be done slightly differently. That's what they [colleagues] told me as well ... that another person ... everyone is different, one wants that you place it this way, the other one that way. And you need to find a medium, you need to find out what you want. I need to get to know all kinds of possibilities presented by diverse colleagues. (…) And there is a huge range of possibilities. At this workplace, I've just seen one aspect. Now I will discover other ones.' (Novice nurse, beginning of the second month)

This conceptualization of knowledge implies that knowledge is necessarily viewed as tied to individuals. But, again, this does not imply to view knowledge as a reified, easily

exchangeable item but binds it to the individuals' idiosyncratic though culturally embedded personal experiences.

Knowledge enables agents to perform social practices: First, the practice itself is known either explicitly or tacitly; second, the knowledgeable agent has knowledge about the social and physical context of performing the practice. Knowledge is thus instrumental in the sense that it constitutes relatively reliable points of reference which allow for a minimum of security of expectations concerning the behavior of surrounding objects and people. This affords that in an organization, or more generally in a social system, there is a certain amount of shared knowledge about a common ground of interaction. This is what the sociology of everyday life, e.g., ethnomethodology (Garfinkel, 1967) or symbolic interactionism (Blumer, 1969; Mead, 1934), deals with.[2] But when it comes to cooperation in organizations with their division of tasks the stock of shared common knowledge is limited. This results from two phenomena. First, the cognitive capacities of individuals are limited (Simon, 1951). Second, the division of tasks leads to different and idiosyncratic experiences that result in different knowledge bases of the respective agents. Taken together, these two phenomena make organizations 'distributed knowledge systems' (Tsoukas, 1996), that is, systems characterized by unshared rather than shared knowledge.

Organizational Knowledge

How is cooperation possible in a distributed knowledge system that is characterized by a high amount of unshared idiosyncratic expertise? Against the backdrop of the notion of knowledge developed in the previous subsections it is helpful to draw on Brauner's (2001, 2002, 2003; Brauner & Becker, 2001, 2004, in press) concept of transactive knowledge systems, which is based on the concept of transactive memory (Wegner, Giuliano, & Hertel, 1985; Wegner, 1987, 1995; Moreland, 1999; Moreland, Argote, & Krishnan, 1996, 1998). Underlying these concepts is the basic distinction between (object-related) knowledge and metaknowledge, that is, knowledge *about* knowledge. Metaknowledge is not a particular kind of knowledge but exists only with regard to object-level knowledge (cf. Nelson, 1992, 1999). A person learns through interaction with another person about what this other person knows. He or she not only acquires knowledge about the world or about areas of expertise, but also develops metaknowledge both about his or her own and coworkers' areas of knowledge. Metaknowledge acquired in interaction is termed transactive knowledge.

The concepts of metaknowledge and transactive knowledge systems allow us to conceptualize organizations as distributed knowledge systems, in which meaningful cooperation between organizational agents is possible despite a lack of shared knowledge.[3] Based on a foundation of shared knowledge concerning day-to-day interactions, e.g., the knowledge of a common language, organizational agents develop transactive knowledge *about* their coworkers' knowledge without having to share this specialized expertise. In most cases, to allow for cooperation, it is sufficient to know who knows what in a work team or an

organization, and to know how reliable this person's knowledge is. Brauner (2002) speaks of *declarative metaknowledge* to denote knowledge about the location and quality of other people's knowledge.

In the following quotation, the novice mentions two aspects of declarative metaknowledge. First, he identifies the technician's knowledge as well as its reliability, and second, he also states his knowledge about his own incompetence in a certain area:

'In each department, there is one person in charge of technical devices. In this department it's Joe. I call him, in case say the perfusor (a technical device) is not working. I am not able to manage that. Then he comes, we discuss it together and he handles that. It's working fine this way.' (Novice, fifth month).

Procedural metaknowledge is knowledge about strategies for the acquisition and evaluation of knowledge and of declarative metaknowledge.

Experienced nurses, in charge of instructing novices, stress the importance of quickly gathering declarative metaknowledge about the novices' competence developed so far. This helps in instruction whilst working, since experienced nurses thereby are better able to assign manageable tasks to novices, to decide what needs to be explained (and in what detail) or in what instances they need to be present or not:

'I always ask about their [novices'] previous work experience. What do you know? What sort of training did you get? Then I'm able to roughly classify them. We get a lot of interns/trainees. They have already a lot of work experience in aneasthesiology. That makes a huge difference to those coming directly from school. (…) And if it is someone without any previous experience in anesthesiology, I closely watch them while they carry out diverse tasks.' (Experienced nurse, twelve years of work experience).

An organization may thus be described as a system of interrelated transactive knowledge systems, in which members of formal or informal groups link the knowledge distributed in these groups through transactive metaknowledge about other groups' knowledge, or, the knowledge of individual members of other groups. Figure 1 illustrates this in a schematic way: Within formal organizational sub-units or informal groups (circles), members acquire transactive knowledge (lines) about each other's knowledge bases (Xs) through interaction. Interactions between members of different organizational subunits lead to a network of organizationally interconnected transactive knowledge systems. This is denoted in figure 1 as lines between the circles. Organizational knowledge is, consequently, not a specific kind of knowledge but denotes the social organization of knowledge. It comprises organizational agents' idiosyncratic stocks of expertise interconnected through metaknowledge, based on a common ground of shared (object-level) knowledge (Brauner, 2002; Brauner & Becker, 2001).
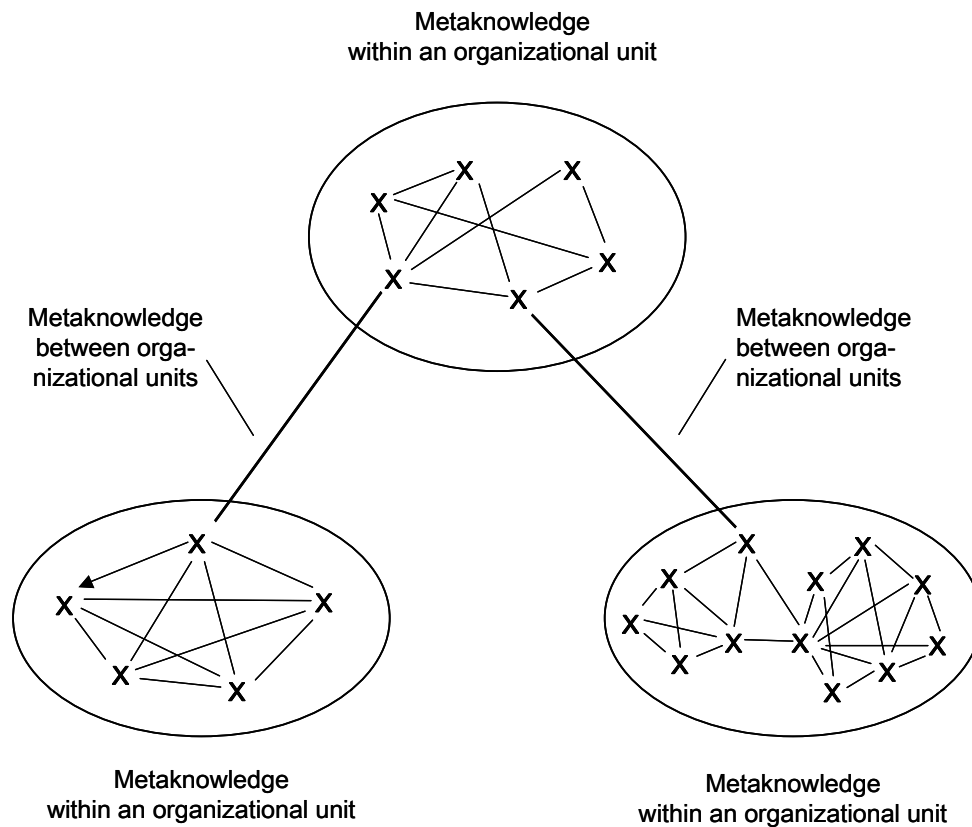
Figure 1. *Interrelated transactive knowledge systems in an organization (adapted from Brauner, 2002; Brauner & Becker, 2001). Xs denote agent's individual knowledge bases, lines denote metaknowledge between agents; the circles represent formal or informal organizational sub-units.*

In the department of anesthesiology studied, teams have been formed that are responsible for training others in operating different machines and monitoring devices. The nurse anesthetists then know who holds knowledge about certain devices they work with.

At the same time, the department is characterized by rather difficult conditions for developing transactive knowledge about co-workers. The anesthesiological teams (consisting of assistant anesthetist and nurse anesthetist, supervised by one senior anesthetist, responsible for several operating theatres at once) change frequently due to constant rotation. In other words, the 'circles' in figure 1 are relatively unstable. Therefore, it is fairly difficult for the team members to establish extensive and reliable declarative metaknowledge about specific other individuals' knowledge. Under these special conditions diverse strategies to socially organize knowledge in the system have emerged: Certain fields of competence are ascribed to 'roles' and professional groups rather than to single persons. Furthermore, routines of mutual checking and questioning are established, which serve to rapidly gain knowledge about the situation-specifics at place. The team members' experience and competencies, in this respects, count as the most relevant aspects to be questioned, as illustrated in the quotation above. Both strategies may be classified as procedural metaknowledge.

Organizational Learning and Transactive Knowledge Systems

We have conceptualized social practices in organizations referring to Giddens' (1984) theory of structuration as regularized types of acts that are performed by knowledgeable agents. Performing practices, particularly in dynamic environments, affords the constant reflection on, and adaptation of, the underlying knowledge of the agents. Learning, understood in a very broad sense as the modification of knowledge, is thus a basic prerequisite of agency. According to our view, which ascribes a prominent role for organizational practice to the agent (cf. Giddens, 1984), we will start our conceptualization of organizational learning from individual knowledge and learning and extend our model then to the level of the organization drawing on transactive knowledge.

Learning and Knowledge

Learning may be defined as the acquisition and development of knowledge, or as a common definition in cognitive psychology states, learning is 'the process by which relatively permanent changes occur in behavioral potential as a result of experience' (Anderson, 1995, p. 4). The behavioral potential referred to in this definition is the agent's knowledge.[4] To conceptualize learning it is thus necessary to have a second look at knowledge and to call to mind two common distinctions: explicit vs. implicit and declarative vs. procedural knowledge.

Declarative knowledge, or 'knowing that' (Ryle, 1962), refers to the mental representation[5] of things or objects, while procedural knowledge, or 'knowing how' (Ryle, 1962) refers to mental and behavioral operations (Anderson, 1995). Knowing the display of the monitoring device in the operation theatre, knowing that 'isoflurane' is an inhalation anesthetic, or knowing that a patient's sweating is a sign for pain, may be examples of declarative knowledge of (nurse) anesthetists. Procedural knowledge is knowledge about how to relate, combine, or associate items, which are represented as declarative knowledge. An example is knowing the relation between the figures on the display of the monitoring device and the symptoms observed in the patient and knowing what procedures have to be performed in reaction to these observations (e.g. that a certain medication is appropriate in case the monitor displays heightened heart rate). The interplay of declarative and procedural knowledge is thus the prerequisite of agency, or performing practices.

Distinguishing explicit and implicit (or tacit) knowledge (Polanyi, 1966/1983) has received much more attention in the literature on organizational learning (e.g., Nonaka & Takeuchi, 1995; Spender, 1996; Tsoukas, 2003; Gourlay, 2004) than the declarative-procedural distinction. This distinction concerns the verbalizability of knowledge and its conscious availability (Berry & Dienes, 1993; Stadler & Frensch, 1998; Reber, 1989, 1993). Individual knowledge that is not consciously accessible to the individual and may not be verbalized is termed implicit, or tacit, knowledge (Anderson, 1995; Sternberg, 1999), whereas knowledge that may be verbalized and is consciously accessible is termed explicit, accordingly.

The declarative-procedural and explicit-implicit distinctions can be combined identifying four types of knowledge (see figure 1). *Explicit declarative knowledge* is the conscious knowledge about the world, which may be verbalized. When novice nurses learn about drugs and their effects, they acquire explicit declarative knowledge. Contrary to the often stated claim in the literature on organizational knowledge and learning (e.g., Nonaka & Takeuchi, 1995; Tsoukas & Vladimirou, 2001; Gourlay, 2004), there may also be *implicit declarative knowledge*. As Sanders (1988) argues, Polanyi's theory of tacit knowing is even based on the idea of tacit declarative knowledge. Polanyi (1966/1983) conceptualizes knowing as perceptual integration of 'subsidiaries', elements of knowledge that are not consciously present and that are cognitively combined in the process of knowing against the backdrop of the focal awareness of a whole, or *Gestalt*. Thus, in diagnosing patients, a doctor is often only tacitly aware of single symptoms, which are represented as tacit declarative knowledge. Furthermore, a lot of taken-for-granted cultural knowledge is represented as implicit declarative knowledge, for example, the specific jargon used in operation theatres.

	Explicit knowledge	Implicit knowledge
Declarative knowledge	▪ Knowing that (Ryle, 1962) ▪ Conscious knowledge about the world (Anderson, 1995) ▪ Verbalization possible and necessary (Anderson, 1995) ▪ Cognitive stage of skill learning (Anderson, 1995)	▪ No conscious awareness ▪ Incidental learning (Berry & Dienes, 1993) ▪ Representation rather in examples, more context bound (Berry & Dienes, 1993)
Procedural knowledge	▪ Knowing how (Ryle, 1962) ▪ Transition from declarative to procedural representation (Anderson, 1995) ▪ Verbalization still possible although not necessary (Anderson, 1995) ▪ Associative stage of skill learning (Anderson, 1995)	▪ Automatic, lack of conscious control, effortless (Frensch, 1998) ▪ Potential loss of ability for verbal description (Anderson, 1995) ▪ Autonomous stage of skill learning (Anderson, 1995)

Figure 1. *Forms of knowledge: declarative/procedural and explicit/implicit knowledge*

Also contrary to Nonaka and Takeuchi (1995), there may be *explicit procedural knowledge* (Brauner & Becker, 2001). Knowledge about the combination of elements of declarative knowledge in performing practices may be represented in a form that allows verbalization of the declarative components and their interrelation. In the cognitive sciences, this is related to the associative stage of skill learning (Anderson, 1995). When the novice nurses learn to assist an intubation, they may be in a stage of developing their skills where they do not have to reflect on every single aspect of the process, but where the process runs not yet automatic. *Implicit procedural knowledge* denotes the cognitive basis of performing practices automatically, so that verbalization is not possible or may even be detrimental because reflection hinders performance (e.g., Shea, Wulf, Whitacre, & Park, 2001; Wulf & McNevin, 2003; Wulf & Weigelt, 1997). Highly skilled artisans, musicians, athletes, or professionals

base their practice on this latter form of knowledge (cf. the seminal work of Lave & Wenger, 1991). These four forms of knowledge constitute the basis of our model of individual learning, which we will develop in the following section.

Individual Learning: Cycles of Routinization and Crisis

Knowledge may be acquired basically either through explicit, conscious processes, or through implicit, or unconscious, processes (Reber, 1989, 1993). Implicit learning may result in implicit declarative or implicit procedural knowledge. This knowledge comprises, e.g., knowledge about one's first language or about aspects of everyday culture that are so taken-for-granted that this knowledge is challenged only in situations of crisis, such as, for example, in Garfinkel's (1967) breaching experiments. Explicit-declarative knowledge may be learned through conscious processes of information acquisition such as, for example, in classroom or textbook learning. The conscious imitation of skilled individuals is another example.

Describing learning as either textbook-like conscious inclusion of information into memory or as unconscious by-product of social interaction is not sufficient. In organizations it is necessary to understand learning as skill development, as the process of agents' acquisition of competences for doing their work, and it is necessary to understand triggers or opportunities to learn (or not to learn). Both aspects are closely linked in that they encompass the relations of the four forms of knowledge described above. We will conceptualize individual learning as the interplay of routinization - the change from declarative and explicit knowledge representations to more procedural and/or tacit representations – and crisis - changes from procedural and/or implicit to explicit declarative knowledge representation. Figure 2 gives an overview over the processes involved.
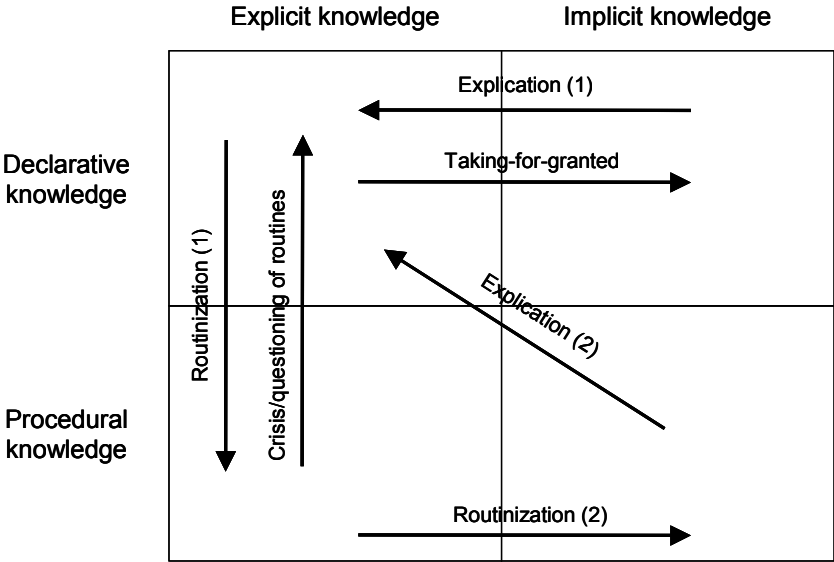
Figure 2. *Routinization, explication, and crisis of knowledge in learning processes*

The common model of skill development in cognitive psychology is captured by the processes of *routinization* (1) and (2) in figure 2. Skill learning is conceptualized as consisting of three stages: the cognitive stage, the associative stage, and the autonomous stage (Anderson, 1995). The cognitive stage comprises explicit learning: declarative knowledge about the skill is learned.

In the following interaction, a novice nurse anesthetist is confronted with a specific technical device for the first time. The experienced nurse, who was called for help by the novice, tells him step by step what he needs to do.

Observation protocol 26-11-03, novice nurse, second month	
Novice nurse:	[action: gets the 'orthopad' (a technical device for blood processing during surgery)]
Novice nurse:	(Statement to the anesthetist) 'I call for Anna (experienced nurse), because I've never prepared the 'orthopad' before." [phones Anna]
Experienced nurse (Anna):	(Statement, command) 'You should do it yourself. Take the …!"
Novice nurse:	(Question) 'May I touch this?"
Experienced nurse.	(Statement) 'Yes, because …"
Novice nurse:	[Action]
Experienced nurse.	[observes him] (statement, command) 'No, not like this. You have to …!"
Novice nurse:	[Action]
Experienced nurse:	[observes him] (statement, command) 'Very good! And now put the centrifuge there!'
Novice nurse:	(question) 'Where? Here above?'
Experienced nurse:	(statemtent) 'Yes, right over there'
Novice nurse:	[Action]
Experienced nurse:	(statement) 'And this is the most important part now, you have to put that ring smoothly …" [Action: shows him, how to do it] (…)

The first step in the process of routinization occurs in the associative stage when a transition from a declarative representation of knowledge to a procedural representation takes place (arrow 'Routinization 1'). As a result, the action starts to become smoother.

Interviewer: 'Do you have a feeling of certainty in some way?'

Interviewee (novice nurse): 'In the beginning, I was afraid of all kind of bigger surgeries, where you need blood bottles, more technical devices … that scared me. I was thinking: 'If I forget to do something, e.g. to close this or that, that will be a catastrophe! And now, due to the fact, that I experienced such big surgeries in this department nearly daily, I simply gained security. I'm still respectful, but I feel more secure.'

Interviewer: 'How do you know?'

Interviewee '... simply, I practiced it more often. The processes are smoother now. I know now one after another ... I do not anxiously question and examine 100 times, whether I really performed a certain step.' (Novice, second month).

In this first step of the routinization process the verbalization of declarative components is still possible, although not necessary. Skill learning in the associative stage is thus an example of the development of explicit procedural knowledge. With more training, skill performance often becomes automatic and needs no longer to be consciously controlled, that is, a second step in routinization ('Routinization 2' in figure 2) occurs. This stage of skill accomplishment is termed autonomous stage in cognitive psychology.

Nurse anesthetists, being in this stage, do not talk any more in detail about the mastered skills. They are no more able to name single steps to be performed. They typically indicate this stage by statements like: 'I don't have to think about it any more.' 'I just know what to do.' etc.

'We had to deal with respiration, first in school and then certainly during work. Thereby you get more and more knowledge, after some time this becomes routine. For instance, when we had a 'lung' - which is a surgery deemed to be rather stressful – that was not stressing me out any more, because that [the actions to be taken] was somehow within myself.' (Experienced nurse, twelve years of work experience).

The learning process of routinization ideal-typically implies a chain of knowledge development from explicit declarative to implicit procedural knowledge.

Another process of knowledge development may occur that involves a change from explicit declarative to implicit declarative knowledge. This may happen when items of knowledge, which have been learned through conscious learning, become so taken-for-granted that they are no longer reflected upon (arrow 'Taking-for-granted' in figure 2). This *taking-for-granted* may, for example, include knowledge about the meaning of a special jargon in an organization. Though in some way similar to the process of routinization, taking-for-granted comprises declarative knowledge rather than procedural knowledge.

The surgeries to be performed are the major focus of the work of anesthetists as well as nurse anesthetists. They have developed a specific jargon concerning kinds of surgeries and patients. Most frequently phrases are used such as: 'The table is already laid.' (meaning that the patient is on the operating table, already anesthetized, in turn meaning that the surgery is going to start soon); 'What is going to be applied now?' (meaning: what kind of surgery is done with the next patient?); 'This point is going smoothly', 'Which table do you have?' (using the terms 'point' or 'table' as substitute for a specific patient with a specific disease/type of surgery). This language use sounds rather odd to a

stranger, but novice nurses quickly adopt this kind of jargon, taking it for granted after a few weeks.

Routinization and taking-for-granted denote forms of learning that should occur in situations which are characterized by low ambiguity, little disruption of routines, and relative stability. In the department of anesthesiology, this may even comprise emergencies which are partly handled by sticking to routines. Even in high reliability organizations dealing with emergencies, there may be furthermore islands of relative stability, such as the handling of technical devices, the interpretation of the monitoring device's signals, or day-to-day interaction in the coffee breaks. Routinization and taking-for-granted deepen existing knowledge and allow for greater smoothness of operations; they are thus important forms of learning in organizations.

It is a common observation that learning takes place when disruptive events or crises occur. Schön (1976), for example, defines learning as correction of errors (see also, e.g., March, Sproull, & Tamuz, 1991; Weick & Sutcliffe, 2001). Gherardi (2000) argues that 'reflexive understanding arises in moments of breakdown' (p.215) and even that '[r]eflexive, investigative, theoretical knowledge requires that something previously usable must now be unusable' (p. 214). While we would not agree that theoretical knowledge *per se* requires a crises we would take up Gherardi's argument from another perspective: to initiate learning processes in the case of crises, explicit declarative knowledge is necessary. This is depicted in the arrows 'Explication 1', 'Explication 2', and 'Crisis/questioning of routines' in figure 2. We claim that the disruption of routines, or the failing of taken-for-granted knowledge, leads to conscious reflection of knowledge, that is, explicit declarative knowledge. This conscious reflection on one's knowledge is a metacognitive process, that is, a process involving metaknowledge. While there may be, as argued in the previous chapter, declarative as well as procedural metaknowledge, there is no implicit metaknowledge because metaknowledge always implies reflexive processes. Learning from failures, thus, always involves metaknowledge.

In the case of *crisis of routines* explicit procedural knowledge proves problematic. This is a common case in the learning process of the novice nurses in the anesthesiology department.

> 'First, I've prepared everything and then I come back and the surgical assistant tells me: 'You know that everything [the surgical scheme] has been changed again, don't you?' That means that I've prepared for the wrong surgery, because I relied too much on the plan from the morning. First, it was a standard preparation and then I needed to prepare for a more complex surgery, I needed an ,artery' [more complex kind of monitoring] and the like. Running the risk of a delay is problematic. Maybe the patient has already arrived or the anesthetist or the surgeons are waiting … and then they say that this delay is my fault. I have learned that I need to check the surgical plan regularly for any changes in the computer and I do this early enough. You just have to be up-to-date, you need to get the latest information.' (Novice, first month).

The routines are not yet so deeply embedded that they are not reflected upon; thus, this case leads relatively easy to reflection and learning. If knowledge is implicit, either

declarative or procedural, the case is more difficult because the accessibility of the knowledge in question is more problematic. Failure of knowledge may then result in a rather diffuse feeling of not knowing (Brauner, 2002). That is, metaknowledge about this implicit knowledge is not as easily available as metaknowledge about explicit knowledge. Therefore, reflection on what is going wrong is harder. Implicit knowledge has to be explicated, i.e. made explicit; the *explication* of implicit knowledge leads to explicit declarative knowledge (arrows 'Explication 1 and 2' in figure 2).

> 'When I make any mistake, this is bothering me. I think for myself: 'What did I do wrong? That was a mistake. Why did this happen?' I talk about it and think it over in detail. I think this is the only way to make it better next time.' (Experienced nurse, twelve years of work experience)

In cases of crisis of routines or failure of implicit knowledge, thus, agents draw upon metaknowledge. We can now spell out this process in more detail referring to the distinction between declarative and procedural metaknowledge. As stated above, declarative metaknowledge comprises metaknowledge, not only about other people's knowledge, but also about the agent's own knowledge, that is, what the individual knows, and metaknowledge about the quality of this knowledge (Brauner, 2002). Failure of routines or implicit knowledge will lead an agent to evaluate his or her knowledge and competences.

> Interviewer: 'Can you tell me a specific situation of your introductory period that you remember particularly well?'
>
> Interviewee: 'Yes, it was at the department of gynecology, in the very beginning of my introductory period. I was in the operating theatre together with the anesthetist, preparing for a 'caesarean section'. Then he told me to prepare a certain drug and to connect the lines [through which the drug is administered] via a technical device. Well, I prepared the device, I was familiar with it, and I've already heard the name of the drug as well. But I didn't know the action of this drug. Then I thought: 'Okay, he is going to use this kind of anesthesia, then this certainly has to be connected there. Then I set up the device, cables and connections. Fortunately, the anesthetist watched me and questioned what I was doing. He explained to me that I would have killed the patient with the connections put at the wrong place. I will never forget this!'
>
> Interviewer: 'What did you learn from this experience?'
>
> Interviewee: 'Better ask twice if you are not sure about what you're doing, how the drug works, or what the anesthetist wants. If your task is not clearly assigned/phrased, ask. Then you can work more securely. That means security for the patient, and you know that what you're doing is okay … So, whenever you don't really understand something, you have to ask again and again.' (Experienced nurse, five years of work experience)

Knowledge about the strategies of locating and/or evaluating knowledge we have termed, referring to Brauner (2002), procedural metaknowledge. An agent may develop routines of coping with situation, in which his or her knowledge proves problematic, for instance, using a diary.

'I remember with all the drugs, I took the package insert and I went through it. Later, I consulted books on anesthesiology; that was much better. And then I wrote down certain processes. First I thought them through and then I wrote them down. When I haven't done certain things for a long time, I use these notes.' (Experienced nurse, twelve years of work experience)

To summarize, we conceptualize individual learning as the acquisition and development of knowledge consisting of three analytically distinguishable processes: (a) processes of conscious and/or unconscious acquisition of knowledge, i.e. storing of information in the memories of the respective agents; (b) processes of routinization, denoting the transformation of declarative into procedural, and of explicit into implicit knowledge; and (c) processes of reflection involving declarative and procedural metaknowledge, triggered by crises of routine processes and/or the inadequacy of implicit knowledge.

Organizational Learning

There is no organizational learning without a change in the knowledge bases and/or metaknowledge of the members of the organization, that is, without individual learning. Individual learning processes, like individual agency for organizational action and individual knowledge for organizational knowledge, form the foundation of organizational learning. Thus, in analogy to organizational in relation to individual knowledge, speaking of organizational learning means speaking about the organization of individual learning in organizations and about the organizational consequences of this individual learning. We will describe this, analytically distinguishing the cases of the change of individual object-level knowledge and the change of transactive knowledge.

The change of object-level knowledge of an organizational actor may result (a) from the acquisition of knowledge previously not held by anyone in the organization by a member of the organization; (b) from new members entering the organization and importing new kinds of knowledge; and (c) from sharing previously unshared knowledge within the organization. In cases (a) and (b), knowledge existing within the organization changes. An example of case (b) is the following quotation from an interview with a novice nurse anesthetist:

'For instance, rather trivial things like winding a blood heater (technical device, with a type of cable to be wound around) ... I can complicate this procedure, doing it in a very annoying way, or I can do it in a simple way. Once, I watched Corinna (experienced nurse) doing it and I told her that I would do it differently. She told me that she has always done it in her way. Then I showed her my way of doing it. First, she looked rather puzzled: ‚I've never seen it like that! But, yes, it's actually easier.' And now she adopted my way of doing it.' (Novice nurse, first month, with six months of experience at a smaller hospital)

The change of individual knowledge thus results in a change of the sum total of knowledge within an organization and, if previously unshared knowledge is shared, in a change of the distribution of knowledge in the organization.

The example cited also shows that one way of distributing new knowledge within the organization is sharing it (case c). Knowledge sharing is the mechanism usually assumed in the literature to characterize organizational learning (Shrivastava, 1983; Crossan, Lane, & White, 1999), even when it starts from the image of organizations as distributed knowledge systems (e.g., Huysman, 2004, drawing on Tsoukas & Vladimirou, 2001). But, as we have argued above, sharing all knowledge is often neither helpful, nor possible considering the actors' bounded rationality (Simon, 1951). The change of individual knowledge within an organization may thus be only the prerequisite for the accessibility of this knowledge for organizational practice.

Knowledge in organizations becomes organizational knowledge when it is socially integrated through transactive knowledge systems and individuals' metaknowledge. Individual learning may also result in the change of the agent's metaknowledge. Within the logic of organizations as systems of interrelated transactive knowledge systems, we will speak of *organizational* learning only when the accessibility of knowledge within the organization is modified by individual learning processes. Note that speaking of individual learning does not imply an isolated monad but only refers to the fact that learning is a cognitive process, which affects individual memories; learning in transactive knowledge systems occurs almost exclusively in interaction. This new knowledge will only be accessible within the organization if individuals develop modified metaknowledge about new knowledge, preferably transactive knowledge.

Organizational learning thus implies an adaptation of the transactive knowledge systems within an organization.   The management of transactive knowledge systems, i.e. the management of organizational learning processes, is usually termed knowledge management (Brauner & Becker, 2001, 2004, in press). That is, organizations apply procedural metaknowledge, strategies for the acquisition and evaluation of knowledge and procedural metaknowledge. More precisely, actors in organizations consciously and reflectively apply metacognitive strategies in relation to knowledge available in the organization.

> In the department of anesthesiology teams have recently been established that are responsible for the training in using certain machinery and electronic monitoring devices. This was a consequence of the idea of some actors in the department that the available knowledge in these areas was not sufficient and its distribution very ineffective. Moreover, the project from which our examples are drawn may be seen as the attempt to evaluate and, if necessary, reorganize the process of learning of novice nurses. This reflects a usual strategy for acquiring and evaluating knowledge in organizations, that is, to hire consultants, organizational development specialists, or social scientists. These are examples of the reflective application of metacognitive strategies which may be termed organizational learning.

To summarize, we can again refer to figure 1, which depicts an organization as interrelated transactive knowledge systems. The change of organizational knowledge may imply changes of each type of elements in the figure. But, if only the stocks of object-level knowledge of some actors (that is, some Xs in the figure) change, we would not consider this organizational

learning. Organizational learning implies a change in organizationally available knowledge; this implies at least some change in transactive knowledge systems.

Conclusion

We started from the claim that practice-based organization studies are right in stressing the central importance of practices as analytical starting point for understanding organizations; that this implies the importance of knowledge and learning for understanding organizations on an analytical level and for the survival of organizations on a very practical level. But we argued that the practice-based approach goes too far in expelling the agent, individual knowledge, and individual learning from practices and knowing and, hence, as a consequence, throws out the baby with the bathwater. We tried to show that, on the contrary, it is helpful to start reflecting about organizational knowledge and learning from a conceptualization of knowledge and learning grounded in cognitive science and social psychology. We conceptualized organizational knowledge not as a specific kind of knowledge but as a specific form of the social organization of knowledge and metaknowledge. Consequently, organizational learning is depicted as processes of change in individual knowledge organizationally effective through transactive knowledge and through the change of transactive knowledge. In this perspective, knowledge management is seen as a specific reflexive form of organizational learning: as applying procedural metaknowledge to improve the accessibility of knowledge in the organization.

At this stage of the conceptualization of organizational learning on the basis of the concept of transactive knowledge systems (Brauner, 2002) we can only point to three implications: First, in our view this approach allows for a theoretically sound conceptualization of organizational learning, which, on the one hand, does not ignore the constitutive role of agents, their knowledge and thus practices, and which, on the other hand, prevents a reifying conceptualization of knowledge as tradable asset (cf. Gherardi, 2000). Second, our approach implies a modified view on knowledge management, as specific aspect of organizational learning on the one hand and as fundamentally social, and not technical, process, on the other hand. Third, possible area of research that may be supported and further developed by referring to this approach is knowledge and learning in high reliability organizations (Weick & Sutcliffe, 2001). A more differentiated description concerning the role of individuals, individual knowledge and metaknowledge in transactive interaction processes in high reliability organizations could advance our understanding of how mindfulness in these organizations is created. Our examples in this paper in fact have been drawn from a high reliability organization, a department of anesthesiology.

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Endnotes

[1]   Brooklyn College & The Graduate Center, City University of New York

[2]   At the same time, Garfinkel's (1967) 'breaching experiments' demonstrate how thin the layer of security of common knowledge is.

[3]   In the next section, we will also argue that metaknowledge is involved in processes of learning.

[4]   The potential of an agent's behavior, of course, comprises elements of his or her situation, i.e. the social and physical context. But because the latter are not objectively given in relation to an agent's actions, they are enacted against the backdrop of his or her knowledge.

[5]   The term 'mental representation' should not evoke the image of a copy of an external reality which may be objectively known. In cognitive science, it refers to a person's cognitive construction of knowledge and processing of information based on perception and/or reflection.

Newcomers´ Construction of Identity:
A Socio-Cultural Approach to Workplace Learning

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Abstract

The aim of this article is to develop the foundations of a socio-cultural approach and how this shapes our perception of newcomer's construction of identity in two different workplaces; a high- tech delivery ward with newly employed midwives and a real estate agency with newly employed real state agents. In this paper we explored how newcomer construct their identity through participation in different communities of practice at work. Our main focus is on how and what kind of learning processes the newcomer must be involved in as part of their identity construction. The construction of identity is in this paper seen as a mutual process between the individual disposition (pre-existing identity) and their participation in several communities of practice. We find that initiative and proactivity is decisive for how newcomers learn and is important for their creation of knowledge and ability to develop their own personal identity and style in the new profession.

Introduction

In this paper, we will present an ethnographic study of how newcomers´ construction of identity is a result of their participation in different communities of practice at work. Our approach to learning is according to central contributions from Gherardi and Nicolini (2002), stating that learners as social beings construct their understanding and learn through social interaction within specific socio-cultural settings. The workplace is conceptualised as an environment including several socio-cultural settings, which provides the newcomer to learn through participation in activities within these practices, which we will refer to as communities of practice. It is proposed from a socio-cultural (Cole, 1998; Wertsh,1991) and an anthropological (Lave and Wenger, 1991;Wenger 1998) perspective that individual learning is a product of participation in social practices. However, workplace learning is conceptualized differently by several researchers within situated learning, workplace learning and organizational learning. Therefore, we start with a short review on what we consider important contributions within a socio-cultural approach to learning, with a special focus on learning through participation in communities of practice. Later, we present the result of our case studies in two different working places. In our discussions we focus on how and what kind of learning processes seems to be important for newcomers construction of identity when entering a real state agency and a high.-tech. delivery ward. The similarities between the two professions are in focus.

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A socio-cultural approach to learning in organization

Learning as participation in communities of practice, was first introduced into workplace by Lave and Wenger (1991; Brown and Duguid,1991; Wenger 1998), as a movement from newcomer to old-timer (Elkjaer 2004). Their approach highlights the collective and social nature of learning, which is often missed in analyses of individual attainment, where learning is focused upon as individual acquisition of skills and knowledge. Instead, Lave and Wenger argue that knowledge and competence is anchored in communities of practice and learning is relational. The idea of communities of practice is an informal aggregate defined not only by its members but also by the shared ways in which they perform their work and interpret events (Gherardi and Nicolini 2002). .

Lave and Wengers (1991) situated perspective, and Wengers (1998) community of practice perspective, and their approach to understand workplace learning, has been criticized by several researchers. Elkjaer (2004) argues that within their participation metaphor, the how (how learning takes place) and what (what is learned) seem to disappear. Billett (2004) also focuses on the nature of participation and how workplace learning depends on the extent to which individuals have the chance to participate in activities and interact with colleagues. However, he also outlines the importance of individuals choosing to engage in available learning opportunities. Individuals´ participation in and the guidance afforded by the workplace, its invitational qualities, will according to Billett influence how individuals come to learn and what they learn. Beckett in collaboration with Hager investigates the nature of knowledge produced in the workplace and its relationship to conventional academic disciplines (Beckett & Hager 2002) by contrasting two learning paradigm; standard paradigm and emerging paradigm in. According to Beckett and Hager, learning is identified through the standard paradigm represented only as a small part of the kind of learning that takes place in the work context, while the emerging paradigm, with its focus on holism, judgement, action and context, to a larger degree represents the kind of learning that actually occurs in organizations.

Eraut (2004) focuses on different kind of knowledge in a workplace setting, especially focusing on the role cultural knowledge plays in most work-based practices. In particular, Eraut argues that performance involves integration of several forms of knowledge, under conditions that allow little time for the analytic and deliberative approaches recognized in higher education. One consequence is therefore greater reliance on tacit knowledge, including knowledge of how more formal, explicit knowledge is used in various practice settings.

Instead of looking at well- bounded communities of practice (Lave and Wenger 1991), Engestrøm (2001) seeks to understand the muliti-voicedness in an organisation. Based on Vygotskys (1978) cultural historical activity theory, Engestrøm takes workplace learning a step forward, stressing the learning happening within activity systems, as they face internal and external contradictions and tensions. According to Engestrøm contradiction is not the same as problem and conflicts. Instead contradictions are historically accumulated tensions between activity systems.

Fuller and Unvin (2003) argue that Engestrøm has a limited focus on aspects of organizational context. The purpose is to identify features of the environment or work situation which influence the extent to which workplace as a whole create opportunities or barriers to learning. By identifying them and analysing them in terms of their expansive and restrictive characteristics, they provide a conceptual tool for evaluating quality of learning environment. The ability to contrast expansive with restrictive also helps to focus attention on issues, such as access to forms of participation and work organization within communities of practice. They claim that this is underdeveloped in Lave and Wenger (1991) approach to learning, but have significant influence on the learning environment. According to Fuller and Unwin (2003), an expansive view of expertise entails the creation of environments, which allow for substantial horizontal, cross-boundary activity, dialogue and problem solving.

In order to understand how organizations and individuals are being mutually formed, and how learning takes place and what is learned through participating in communities of practice, Elkjaer (2004) suggests a "third way" of organizational learning. Elkjaer uses Deweys concept of inquiry or reflective thinking and experience, to contribute to the definition of what happens in participation and in the meaning between the learner and every day and work practice.

A socio-cultural approach to workplace learning try to combine the individual as well as the social aspect of learning, instead of just focusing on the individual as the unit of analysis (Matthews and Candy 1999) and individual acquisition of skills and knowledge (Elkjaer 2004). From this perspective thinking, doing and acting are integrated activities. Individuals and the work community create mutuality, through social, cultural and historical processes, and maintain actions and mediate meaning. Since learning is situated and distributed processes, it is necessary to understand how the work is organized and which kind of activities that occur. Participation in combination with observation, interaction and dialogue give insight in what and how learning occurs and skills are developed.

The construction of identity through participation

We see the construction of identity as a relational process and in order to understand construction of identity we find the work of Michael (1996) relevant. He focuses on how parts and aspects of pre-existing identities are drawn upon in the construction of identity and how actors move between identities in relation to how they move between different communities in the organization. Gherardi and Nicolini (2002) present a view on identity, based on a dual process of positioning and belonging. They argue that when we are enabled to develop a new identity with reference to others in the same activity, we become accountable to them and to other communities with which they interact. Learning is therefore both belonging and positioning oneself in a discourse (Gherardi and Nicolini 2002,p.421). So participation in a community of practice involves construction of identity in relation to, and with references to others, which also makes construction of identity an act of negotiating a position.

Wenger (1998) claims that issues of identity are integral aspects of a social theory of learning and thus inseparable from issues of practice, community and meaning. He argues that we bound identity at the highest level, as organizational identity and as personal identity at the lowest level. We argue that construction of identity is a result of participation in communities of practice and that social interaction is crucial to our personal identity development. Wenger (1998) argues that when bringing the two together through the negotiation of meaning, we construct who we are. As a consequence, identity exists in the constant work of negotiating the self and figuring out "Who am I?"

Communities of practice

A community of practice is a group of people who share a concern, a set of problems, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis (Wenger 1998). According to Wenger "they find value in their interactions, create knowledge standards and develop a tacit understanding. Over time they develop a unique perspective and body of common knowledge, practices, approaches and a common sense of identity (Wenger, McDermott and Snyder 2002, p.5). The notion of community of practice suggests that working, learning and innovating are not distinct activities. Instead they are closely bound up with each other in a local practice (Gherardi and Nicolini 2002).

Within a community of practice, meanings, beliefs and understandings is negotiated and reflected upon. Therefore, learning is viewed as distribution among participants and their expertise are transformed through their own actions and those of others. Learning takes place in social and material settings, as relational, and knowledge and competence are a result of participation in communities of practice. The learner enter a community of practice at the periphery and over time move more close to full participation as they gain knowledge and learn the community customs and rituals and adopt a view of themselves as a member of the community. Learning from the viewpoint of legitimate peripheral participation, involves becoming an insider (Brown and Duguid 1991). The notion of LPP also implies that learning involves conflicts (Gherardi and Nicolini 2002). Legitimacy and peripherality are integrated in a complex way. Occasionally, learners are granted legitimacy but are denied peripherality. Conversely, they can be granted peripherality but denied legitimacy. So newcomers need legitimate access to the periphery (to formal or informal) meetings. According to Brown and Duguid (1991) it is important to consider the periphery not only because it is important for learning, but also it can be important site for innovation.

In this article we take a socio-cultural approach to learning. Our main focus is what characterizes newcomers learning as a construction of identity in two different professions. We also discuss how newcomers´ participation and possibility or choice of participation in communities of practice as important for identity construction. And how a socio-cultural approach can contribute to the understanding of newcomers´ identity construction in communities of practice.

Method

What seems to be important for newcomers´ construction of identity when they enter two different work communities, are the main focus of our project. Case 1, newly employed midwives, included 7 midwives students were each newcomer was participating in the research project for at least one year. The midwifery students' average age is 28, and all had a minimum of two years' experience in practice as nurses before starting midwifery school Case 2, included a total of 11 newly employed real estate agents, were each newcomer was observed and interviewed for at least one year and for many of them over a period of 18 months.

Case 1 Newcomers´ construction of identity in a high.-tech. delivery ward

The setting for this study is a centralized and specialized labour ward with approximately 5000 births per year. It is a modern, high-tech labour ward is equipped to be able to handle both normal and complicated births. The midwives who work here must thus be in command of advanced birth technology, in parallel to attempting to attend to the normal course of labour. They must at all times be familiar with the "written rules" in force in regard to how a birth is to be monitored and when various experts are to be called. For the midwife it is therefore important to know the limits of her own competence at all times, and to know when other experts are to step in. In this workplace setting the "medical men", birth science, define norms for good birth care. The values reflected in the organization of midwives were those of an organizational vision culturally coded as masculine (Davis, 1995, Kirkham and Stapleton 1998). This community could be seen as a multi-voicedness community, were different positions, traditions and interest are meeting, but with a dominated voice and a more invisible midwifery voice (Blåka 2002). In the dominating birth science discourse, all birthing women become patients at risk, on the other side, midwives try to se birth as a natural social event in women s life. The scientific birth expertise stands forth as guarantor, as it takes upon itself the responsibility for offering safe and secure birth care and define the norms for what is to be characterized as defensible birth care. The procedures should be based on evidence-based knowledge. This kind of knowledge stands in contrast to the invisible practical (tacit) midwifery knowledge, which she has developed through many years experience.

The way work and tasks are organized, must be seen in the light of the hierarchical structure, and how power and position are distributed in a hierarchy, which consists mainly of women. The ward midwife is the ward's highest professional leader. It is she who sets the standards and the tone of the ward. What she feels is good midwifery practice becomes the guide for other midwives, especially when new midwives come to the ward. The ward midwife becomes the one who assigns roles and positions in this hierarchy. An important role is the role of charge midwife. The one assigned this role has the main responsibility for what happens on the ward on her shift. It is she who delegates tasks to the respective midwives on duty. To be assigned this role one must have accumulated experience, and in a convincing

way, shown one's competence. A midwife assigned this role may feel honoured. The role of a floor midwife indicates a limited responsibility. As the name states, she has responsibility for the women 'on the floor'—in the labour rooms. The respective floor midwives speak of 'my women', not as 'our women', which results in a certain privatisation. It is she who is responsible for 'order' in the room, seeing to it that all equipment and technology are in place. She consults the obstetrician when something is not right. The respective floor midwives have their own styles, their own various ways of regarding and practicing midwifery judgment. The fact that the midwives have different styles will also influence the participation of the newcomer, her way of perceiving the work of the midwife.

Case 2: Newcomers´ construction of identity in a real estate agency

This case was conducted in a real estate agency, the 3rd largest real estate agency in Norway with a total of 90 employees. The agency has 19 offices in Oslo and surrounding areas. The head office is in the centre of Oslo. Various forms of qualitative methods have been used to analyse newcomers' learning processes and the importance of interaction with established colleagues. Both interviews, conversations, observations, participation and diary notes have been used to capture the complexity of newcomers' learning processes as social interactions in communities of practices and how identity construction within these social practices are comprised of both tacit and explicit knowledge. The case includes a total of 11 newly employed real estate agents, where each newcomer has been followed over a period of 12 to 18 months and a total of 52 in-depth interviews was collected. In this period we were in contact with the newcomer at least every months, starting one month after he or she entered the real estate agency and until they had been employed for at least 12 months. Each round of observations has been concluded with a field conversation with the newcomer and his or her leader in order to discuss and clarify observations from the newcomer, the leader and the researcher. The newcomers´ supervisor was also interviewed. One of the focus areas of this study has been on the newcomers´ learning processes and how knowledge is anchored among participants in several communities of practices and is dependent on the newcomers´ ability to get access to these communities of practices. Another focus area is connected to the way the newcomers relate to established colleagues in communities of practices and how this gives a transformation of interpretation and the newcomers´ construction of identity in the new organization. The newcomers' most important formal community of practice is the local office in which they are employed. Each office consists of real estate agents with different experience and knowledge in addition to their office leader who is responsible for the training of the newcomer. The sample of 11 new employed real estate agents consisted of newly-educated real estate agents. They all had rather limited working experience, some within sales and as real estate agent assistants during their education. Their age spanned from 23 to 36 years old. Two were women, which was representative for the number of female real estate agents within this organization.

Procedures and analyses of data

To gain insight into how newcomers construct their identity as part of participation, an ethnographic and interpretive approach has been used. Ethnography is a style of enquiry that enables the researcher to get access to the meanings contained in the culture, which guides its members' behaviour (Atkinson 1990, Burnes and Grove 1993). The aim was not to describe the entire cultural system. In our ethnographic study, we directed our attention to a special theme in these two cultures, that is, the learning mechanism which is involved as part of newcomers´ construction of identity in these two workplaces. A thematic focus in ethnography has also been described by Geertz (1973),and Gheraldi and Nicolini (2002). The methodological choice for exploring participation was participant observations and observations. This allowed us to "study processes, relationships between people and events, the organization of people and events, continuities over time and pattern, as wee as the immediate socio-cultural contexts in which human existence unfolds" (Jørgensen 1989 p.12).

Presentation and discussion

Related to how and what newcomers learn in the process of constructing their identity, this discussion present our empirical results as follows:
1. Why do they learn as a question of moving from pre-existing identities to a new identity in this particular organization. The process of belonging and becoming "one of them".
2. How do they learn as a question of participation and getting access to several communities of practice.
3. What do they learn as a question of understanding newcomers´ identity construction as socio-cultural learning processes. What is going on in these two quite different occupational contexts?

Pre-existing Identities – Why do they learn?

Newcomers´ previous experience and knowledge are of course a result of their education, work practice and experiences in their personal life. The newcomer enters the new organization with a pre-existing identity (Michael 1996), which effects their learning processes and their development of new identity through role behaviour in this particular workplace setting. We recognize in our studies, how newcomers´ sensemaking starts with their pre-existing identity. However, we also find that newcomers have multiple identities depended on their adjustment and role behaviour in a particular social and cultural context within a particular community of practice. Wenger (1998) explains identity as a way of talking about our changing ability to experience our life as meaningful and make sense of new situations. Our studies confirm the importance of sensemaking in newcomers´ identity construction processes. Newcomers develop their identity in social and cultural practices, but their identity in one practice can differ in another practice. But at the same time they have a

core identity that affect their development of new identities, or as they explain, they have to believe and find their own way of becoming a real estate agent or a midwife. Two of the real estate agents explain:

> "I think there are many good agents at the office. Training, observing others, learning from them and so forth. But basically I am myself in all situations. In order to succeed as a real estate agent, I have to be myself. I cannot imitate others".
>
> "I learn as much as possible from as many as a possible can……I also recognize that I have learned both negative and positive qualifications. Today, I have found my own personal style, but everything has its sources".

When midwives enter the maternity ward they already have a pre-existing identity as a nurse. One of them explains:

> " It took me some time before I found my new role and I had trouble to se myself as a midwife and not a nurse. In the beginning, I therefore found it safe to have one midwives to collaborate with. But later on, when I found my own way of doing, I learned different things from many of them"

When they get an inside "feeling" and find their place in a way, they see different midwifery styles and pick up detail from many of them when constructing their own personal identity. At the same time, in the process of forming their own identity, they also observed two different types of midwifes; The "doing midwife" and the" being midwife". The "doing midwife" is the active one, fascinated by modern technology and always in action in different activities. The "being midwife" is the calm one who takes time to listen and try in another way to combine modern technology with the use of her own senses. One of the newcomer says;

> " I hope I never will be like the doing midwife, her behaviour scares me". While another says; "I always like action, and during my experience as intensive nurse, I had to do a lot of things in a hurry".

For the real estate agents one important pre-existing identity is a result of their education, which gives them the possibility of being authorized real estate agents after two year of practice. In the real estate agency they have several real estate agents without education and therefore is employed as sales consultants. For newcomers this is important for their identification with established real estate agents and the newcomers build relations to a larger extent with established colleagues that have the same educational background as they have.

We find that newcomers´ personal identity effects with whom they identify. So clearly, identification determines what the newcomers learn and from whom they learn. Their pre-existing identity effects their development of new identities but also with whom they identify with in the organization. These colleagues becomes important for their learning processes. Identification variables can for instance be age, lifestyle, gender, educational background, values and position in the organization. However, it is not clearly recognized and can be a combination of several factors, which determines that a newcomer identify and prefer building relationship to one colleague instead of another. For instance that the newcomer

prefer to build relations to the "being midwife" instead of the "doing midwife" or the real estate agents that sell the most instead of the more average but with a good reputation.

In sum, as an overall pattern, our studies confirm, both for real estate agents and midwifes that they relied more on and used built relationships to a larger extent with colleagues in which they identified. One of the real estate agents explains:

> "I do not identify with only one person in particular….But I have a theory on how I want to be myself, and then look to many different real estate agents who behave in a way I want to behave, and then I am able to learn from them".

In addition to identification, the quality of the relation between newcomers and their colleagues is of importance to their learning and identity development. We will discuss this when we consider the newcomers´ ability and possibility to get access to several communities of practice in the new organization.

How do they learn?

For newcomers, entering the profession is about gaining access and belonging to a community, both in a social and professional sense. The workplace invites to participate in activities and provide newcomers with access to learning (Billett 2001). How the "gate" is opened has much to say for the newcomer's security and feeling of belonging to the community. In the maternity ward, the ward midwife as the ward's highest professional leader becomes in many ways the gatekeeper and gives the formal invitation. For real estate agents, their office leader had a corresponding role as the ward midwife. Our findings show that the first week is important. Feeling valued, not just as a "newcomer in general, but as a unique person" is emphasized as the most important factor for newcomers. And also, being appreciated as an individual that can contribute with new knowledge into the profession and not just adjusting to the established best practice. For most of the real estate agents they were expected to perform immediately while the midwife had formal training as on the job practice.

The formal invitation is only one of the entrances. Learning a professional culture is just as much about understanding the informal entryways, and whose team it is a good idea to join, and build good relationships with. Understanding which behaviour is valued, and being able to learn established colleagues tacit knowledge, takes time to understand. From our observational studies it appears as though the active newcomer who understands the language of the culture, and finds the correct ways to ask questions that fit, will have easier access than the more cautious newcomer who can be overshadowed and remain at the outskirts for a long time.

For the newly employed real estate agents, the most important community of practice is the local office in which they are employed. This office consists of different experience and knowledge, and they have their own social and cultural understanding of what a good real estate agent is. They represent their own unique culture, including tacit knowledge, as a result

of negotiations among the participants. For the newly qualified midwives, the maternity ward is the local community. This community consist of a dominant medical community, which in many ways defines norms and a midwifery community, which have their own norms for what it means to be a skilled midwife. Within the collective midwifery group there will be many styles, and more then one story will be played out of what it means to be a skilled midwife in this ward, which is the same we observe among the different personal styles the real estate agents tries to develop. The new employed real estate agents are all very focused on developing their own personal style as real estate agents and not imitate what they consider the perfect real estate agent in theory. Or as one of them explain:

> "I want to find my own way of doing thing. I cannot do things the same way as Hansen, Olsen or Pettersen. And I am not sure they have the same style and do things the same way, either. I have to find out what´s me, and I think that is important. I have to develop my own personal style as a real estate agent".

Negotiations means that within the two local communities we recognize the same as Gherardi and Nicolini found (2002). Each member have established their own identity as a result of positioning themselves among colleagues, finding their own social role and as a consequence, they belong and are considered an established member of this particular community of practice. The challenges for the newcomers are to handle the transformation between different cultures and within different communities of practice. Belonging is also about relations and the quality of relations and social interaction among participants. Each member of the community represents different experience and their own unique style and perspective. Therefore, several participants represent a key role when it comes to different kinds of knowledge. For the newcomer the challenge is to create relationships in order to develop their own knowledge and personal identity in their new occupation. Their ability to established relations has also to do with the members of the community and to what extent they are willing to open doors to and let the newcomer get access to several learning arenas.

However, our studies show that getting access also lies in the hands of the newcomer. We use the term proactivity to explain this phenomenon. Proactivity means that newcomers are active in asking questions and forming relations with their new colleagues. Furthermore, they are not afraid of reviewing their own uncertainty. Their proactivity helps the grasp and understand unreadable language and culture, as it helps them getting access and open doors. Newcomers who don't ask questions or who are passive with regard to their relations with colleagues clearly have difficulties in new and insecure situations and have difficulty exploring their own lack of knowledge. Instead, as a result of problems with their new role, they do not have access to necessary learning arenas, and moreover have to rely on themselves. So, in order to learn the social and cultural conditions and obtain the required knowledge, they need to be proactive and participate in several knowledge communities. This is especially true for the real estate agents who have to rely on them selves and are not part of a formal training program as the midwifes are. However, independent of being part of a formal training program or not, our studies show that to succeed in a new organization the

newcomer need access to informal communities of practice as well as informal social practices, because informal learning arenas seem to be the most important for their learning and construction of identity.

For newly employed real estate agents the foundation of success is strongly attached to their experience the first four to six weeks of employment. It is a result of experiences of winning sales and handling the workload. Early positive experience results in increased self-confidence, which again is important for future learning processes. Also midwife students have increased or decreased self-confidence as a result of experiences their first term of four weeks. For all newcomers, their self-confidence is a result of personal characteristics and pre-existing identities. They need to get feedback on how they perform and receive valuation of their previous experience and qualifications in order to construct new identity in this profession that they can identify with as a way of stating; "Who am I". Their new identity will clearly effect their self-confidence in a positive way as long as their identity in the new organization is in accordance to how they want to belong and what position they want to have in the new organization. On example of the statements we have made on getting access to several learning arenas is a newcomer in the real estate agency who succeeded. He says:

> I have taking the initiative myself to meet several very-well qualified real estate agents outside our office to be able to get as many examples on agents who succeed. I take after different qualifications from several of them, trying to take out what they do well. .. I have pictured which qualifications I think is important to do well myself. And try to take the best out of several colleagues because people work differently. I think it is important to find one´s own style…. I have been able to observe they working, being out on assignment with them and so forth".

The newcomers who succeed in maternity ward has some other points:

> I'asked a lot of question from the beginning and tried to pick up important tricks from different midwives. People are so nice here, we find the same tone of voice immediately, but I've been very active and persistent myself. I have not been afraid to discuss my uncertainty with several midwives."

These newcomers work as an example of Billetts´(2001) argument that newcomers must choose themselves to engage in available learning opportunities. It is not enough to have available learning arenas, the newcomer must also takes responsibility of their own learning. This is especially important since informal communities of practice seem to be the most important learning arenas for the newcomer based on two crucial factors. 1. Because informal bounding often is a result of participants own choices and a result of individuals identifying themselves with each other. This will help the newcomer in creating an identity which state the "Who am I" he or she wants. 2. Formal learning arenas is often limited and can rely too much on conformity, at least our studies show that tendency, so informal learning communities can also help the newcomer in being more innovative or at least be able to create their own unique identity as a real estate agent or a midwife. Or as Gherardi and Nicolini (2002) argue:

> "The idea of communities of practice is an informal aggregate defined not only by its members but also by the shared ways in which they perform their work and interpret events"

Learning as belonging (Wenger 1998) is about establishing and building relations to the community members. Here we distinguish between formal and informal relations. Formal relations means institutionalised formal learning, and relations between, for instance, a mentor and the newcomer. In contrast to formal relations, informal relations are the immediate contact, often unplanned, as part of participation in a practice. In order to learn the culture, tacit knowledge and different artifacts, the newcomer needs to participate in informal relationships and informal communities of practice. For the newly employed real estate agents, their supervisor represents the formal relations but also the formal part of the practice. At the same time other established real estate agents are of importance to the newcomer's learning processes. At the real estate offices they have open-landscapes. Therefore the newcomer has the possibility to be engaged in informal social and cultural relations with several key persons. Our study shows that newcomers´ who engage in informal relations and participate in informal communities of practice, are the ones that succeed the most. We found the same result for midwife students. To be able to obtain culture and language they needed to participate in all potential learning areas. This is also of extreme importance for development of the capacity to acquire tacit knowledge.

If the newcomers should learn from their experiences, they must be in dialogue with different knowledge sources. Experience means thinking and reflecting upon the action taken in a situation, both in a cognitive as well as in an emotional way. It involves as Elkjaer (2004) quotes *"a transactional relation between individual and environment"*. So conversation and dialogue on practice is of particular importance for individual and collective learning. During our observation studies we find that conversations take place in different places and with different aims. In the corridor at the maternity ward we listened to conversation on practical ways to solve and judge practical birth situation, but also conflicting discussion take place here.

It is not just conversation with people, but also with artefact used in the practice as one of the newcomers explains it:

> "I started the shift without having any woman in labour, and I thought that was boring. But I spent the day testing old knowledge like starting IV, read a little in the station procedure books, and went to the placenta room to practice suture ring"

In the process of becoming and forming their new identity, they need to be in dialogue with supervisors. As mention by Vygotsky (1978), we have the possibility of obtaining knowledge as a result of conversations and dialogue in order to be able to obtain new knowledge. Our studies show how importance the dialogical quality between master and newcomer are. In a knowledge creating dialogue both parts must establish a learning relationships that promotes trust, and that keeps both parties to the table, daring to be vulnerable, but must care for this vulnerability by showing respectful behaviour to one

another. As one of the mentors says: *"When the newcomer is secure with me, then I call a "spade a spade", and try to be honest".* First when they communicate at the same level of confidentiality, the newcomer will be invited to active participation. This dialogue has then an open and inquisitive form, so that the newcomer may contribute her own opinions. It's a dialogue where they take care of each other utterances (Bakthin 1981). It is a matter of how the master tries to couple the newcomers´ experiential world with the professional demand of the community, and how they create a dynamic that helps newcomers in forming her own style. This is also a result of supervisors´ way of given response, One of the supervisor says *"it is important to find a common ground, ask about the newcomers previous experience and start with her answer"*

What do they learn?

Learning to be a midwife or a real state agent involves taking part in the professional cultures common base of knowledge in these two organizations and their respective communities of practice. When members of the community describe and explain activities they use a practical working language, a language, which attempts to show many of the professional knowledge characteristics. This practical working language is not only a translation of the professional language, but also a rephrasing of it, against the background of accumulated experience from various situations they have been in. This is much more a living form of knowledge than an objective, fixed form. The practical working language will be a language in flux, which is tied to concrete events fixed in time and space. When they talk about skilled practice, they use a varied and mobile language full of nuance. This is as Gherardi and Nicolini (2002) mention, the decisive factors for the learning process.

Seen this way, learning a professional culture will be a matter of getting "inside" the jargon used in these two organisations. Newcomers must learn some institutionalized ways of acting, i.e. some acts may be more acceptable than others, and in addition, some individuals in the environment may stand out as "code bearers", with greater influence than others. Parts of this language are formulated explicitly, while others are merely there as a part of the culture, as tacit knowledge and taken for granted. They develop a type of common understanding for what they do, a type of bodily, tacit expertise, which implies a deep understanding for complex situations they are in the midst of (Wenger, 2002). As one of the staff midwives say: *"In this maternity ward we do it this way."* An important part of the newcomer's learning process is understanding these institutionalized ways of behaving, these ways of thinking and solving problems, and being able to pose the relevant questions. In the real estate agency, several of the office leaders are aware of the fact that newcomers need to observe, ask questions and practice together with established colleagues in order to get a grasp on the cultural language, bodily expressions and tacit knowledge. One of them explains:

> "The newcomer must have several real estate agents involves in his training. The
> newcomer can then observe and practice together with several others, but he has to find

his own style. The newcomer need to be able to "steel" a little from each of the other real estate agents, in order to find his own personal style".

According to Gherardi and Nicolini (2002) we can say language is used to reinforcing tacit knowledge. The skill of seeing and looking is structured through constant use of directions and micro-explanations; the newcomer is taught how to see. Through a combination of physical and linguistic actions, newcomers are taught how to feel according to the norm of the group of community. Members of this community say something about the nature of the work and about the rhythm of the work. They talk about a space that is alive, constantly in motion, where something is happening, but the way in which things happen can be different and cannot be predicted. In this living space, the experienced midwife constantly tries to be open to these unpredictable moments and explain to the newcomer *"Here, it is a question of tuning in, in this lies an open, attentive attitude, a person who dares to stick out and stand on her own two feet."*

Another midwives has more to say about this living space:
"It is a room with a lot of life, but the margins are small, it changes so suddenly, a labour can in a moment change to being very dramatic. Here, it is a matter of precision and exactingness. That's why you always have to be a step or two ahead of things."

Real estate agents have to work independent and be able to make their own decisions out on assignments. They have to learn to behave towards customers and how to handle a number of different types of individuals. One of them explain:
"There are many colleagues at the office which a observe, look at, and learn from. And I think they are all very good real estate agents. However, I prefer to be myself in all situations. I prefer to be honest. Some take after others a lot. I do that too, but chose to hold on to what´s my own. I have to be myself and learn what it takes for me to succeed as a real estate agent".

Learning a practice as a situated activity, is also about finding out what´s going on at different places to different times. The labour ward is divided into different rooms, which each have their respective activities and here various side of skilled midwifery come to the forth. The newcomer must have experience from participation in these activities in order to be able to secure necessary competence. Some of this spaces are formal meeting places, as the midwives meeting room, where knowledge about the condition of the labouring women is transmitted here from one shift to another. Here the newcomer participates in the oral narrative language. Through short fragment midwives tell something about what is important to emphasize in reporting off to the next midwifery duty. The newcomer always comes to this room with a certain expectation, as one the informant said: *"Wonder who I'll be put with to day"?* This room is in more then one way the midwives private room, and can be a room only for the "insiders". The newcomer who at the moment is not one of them, could feel worry, as our informant told us; *It requires a high degree of inner security to go often into this room".* On the corridor midwives often reflect upon their doing, difficult situation they have been involved in, and negotiations about guidelines for what a good practice is. Newcomers

gradually grasp the fact that many important conversation and different story take place here. *"It takes a while to understand what is happening here,* said several of the newcomers. Our finding show that if the newcomer becomes to bonded up to the formal activities, she may lose a lot of the informal learning that happens other places. The active and inquisitive newcomer "on watch at all time", who quickly understand these informal codes, will obtain more knowledge then the less active newcomer. The real estate agents have to informally bound and for the insecure newcomer it is too difficult to bound relations with the most successful real estate agents. The more self-confident real estate agents are more secure and active in bounding relations with everyone in the organization, including the most successful real estate agents, and therefore they succeed more themselves. Becoming an "insider", be one of them, has also to do with coming in a position, know the pats of entry into the culture and know how the work is organized. The newcomer has to be able to identify with key person in team in which it is a good idea to participate. It has also to do with how power, roles and position is distributed in a culture which mainly consists of women   This process seems important in order to gain access to the community different learning situations. As mention earlier the ward midwife and the office leader are the newcomers´ highest professional leader, in many ways the formal "gatekeeper" to the community. He or she distribute role and position and sets the standard and tone in the organization. The formal invitation is only one of the entrances. Learning a professional culture is just as much about understanding the informal entryways and whose team it is a good idea to join in order for the newcomer to gain necessary knowledge for the construction of his or hers personal identity in this occupation.

Conclusions

In this article we have discussed the characteristics of newcomers learning as a construction of identity in two professions, a high.tech. delivery ward and a real estate agency. Within a socio-cultural approach to learning we have explored the similarities between the two professions and how identity construction is a question of participation in communities of practice. We have argued that the challenge for the newcomers in both professions is getting access to several learning arenas, as a mutual relation between the newcomers´ engagement and established practice. However, participation in different communities in these two organizations is not enough in the newcomers´ construction of identity. For the newcomer to become an "insider, she or he must take part in the conversations, learn the language and learn tacit knowledge through experience with established colleagues. In our studies we show that the newcomer is confronted with several local cultures, operating side by side in the organization. Each of these cultures has its own way of thinking about what it means to be a skilled midwife and real estate agent. Through observations and identification with different members in these communities, newcomers learn appropriate language and the cultures norms. This is not a passive, but an active, reciprocal process with the newcomer, its participants and the community. So mastering a

practice is a result of active engagement in the ongoing practice. Our study show that newcomers who take initiative and understand the tacit as well as the explicit knowledge (understand the "unspoken language) have preferences to more learning situations, in contrast to newcomers who feel insecure and are afraid to ask questions. We find that the newcomers learning processes are more complex then Wenger (1998) describes them. It is not a singular process from peripheral to a centre. It takes many forms and has to be seen in relation to the newcomers´ expectation and ability to get access or wanting to get access to several communities of practice. Our study shows that getting access must be related to newcomers´ initiative and engagement in the workplace invitational qualities. It is a question of how they belong and build relations to established colleagues. We also find that when it comes to newcomers´ construction of identity in the profession, their pre-existing identities affect their new identity and they are very much aware of finding their own way in the new organization, finding their own unique personal identity as a midwife or a real estate agent. We also conclude that our findings on the most important characteristics in order to understand newcomers learning processes as a construction of identity is quite similar within these two professions. Their identity and what they learn is of course different, but how they learn is independent of the newcomers being midwifes or real estate agents.

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Fostering learning – The role of mediators

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Introduction

Recently, we have witnessed a surge of training projects and programs, mainly funded by EU. Rarely, these organizations represent actors from traditional education sector. Often these organizations engage in mediating task, with an aim to foster the participants learning in respect of becoming "professional" or to enter a market. Usually, these programs are evaluated in comparison to their aims – e.g. how may of the participants was employed afterwards, or how many new firms were established. The perspectives of learning results and methods, used in educational sector, are not applied. In this study, we wish to point out by our case example, the importance of evaluating these projects from the perspective of learning process as well.

This study aims to understand how a mediator can facilitate or foster learning in a context where the actors don't share similar backgrounds e.g. immigrant artists, or are not part of the target communities of practice wishing to co-operate and share activities. The key research questions are: *What is the role and means of the mediator to foster learning? How does the understanding on learning affect the activities of a mediator?*

The role of mediators as enabling joint practices and knowledge creation among differing cultures, communities or groups have been found important in international business and management studies (e.g. Karppinen-Takada, 1994; Möller and Svahn, 2004; von Krogh et al., 2000; Wenger 2000; Ahola et al 2004). However, the role of mediators as explicitly fostering learning and enabling participation merits more attention.

In this paper the mediators' activities are analyzed through the concept of ba (Nonaka and Konno, 1998) and the concept of communities of practice (see e.g. Lave and Wenger, 1991; Wenger, 1998; Wenger and Snyder, 2000; Brown and Duguid, 1991, 2000; Cox, 2004). The role of identity is highlighted. We will concentrate in a specific context where the aim of the learning is to enter a market/community, and where the entrant thus needs to learn the language and the ways to operate among the actors of that market/community.

The research approach of the study is qualitative. The study builds on a case conducted among handicapped or immigrant artists participating in TARU, EU equal program aiming to help them to market themselves and enter the professional art network.

In the first chapter, we will elaborate the concept of mediator briefly. Then we proceed to discuss learning and especially learning as acquiring identities. Finally, we focus on the role of context in learning, especially on the concepts of *ba* and *community of practice* as contexts of learning. Then we move along to present the research design and the TARU case. In the TARU case analysis we first discuss the learning-related expectations of the artists. We analyse the artists' views on the mediators' roles and tasks, and compare these to the mediators' own perceptions. Then, we analyse the TARU activities applying the concepts of ba and communities of practice. Finally, we evaluate how the activities might enhance the construction of a professional artist identity. We conclude by discussing the practical

implications of the analysis and the differences that the two chosen analytical tools bring about.

Theoretical discussion

The concept of (cultural) *mediators* has been previously used in the context of consumer culture (e.g. Bourdieu, 1984; McCracken, 1986; du Gay et al., 1997) and in international business (see e.g. Karppinen-Takada, 1994; Möller and Svahn, 2004). In management studies, the role of mediators or boundary spanners has been perceived important (e.g. von Krogh et al. 2000; Ahola et al., 2004) Wenger (1998, 2000) discusses mediating or acting between the boundaries of different communities of practice. The brokering (mediating) may include taking care of a specific boundary space, e.g. the helper of computer department assigned to a specific department. Sometimes mediators go from place to place creating connections and distributing knowledge, or they only visit another community and bring back new ideas. Often the mediators do their brokering through personal relationships. Von Krogh et al. (2000) introduce the concept of knowledge activist that can be seen as a type of mediator – their role is to bring different people and groups together to create knowledge.

Intermediary or organizational mediators are often defined as the actors operating at the borders between users and producers of knowledge. They may operate also between public and private sphere. Moreover, mediating organizations have been defined as influencing the structures and dynamics – as catalyst (Ståhle, Smedlund and Köppä, 2004). Ståhle et al. (2004) present types of mediating aims; developing knowledge and know how, developing guiding mechanism, and creating dynamic structures, e.g. networks and collaboration. We define mediator as an individual or an organization aiming to bring different contexts (e.g. art/professional field) together with the aim of knowledge creation (of the participants).

We regard *learning* as an ongoing, dynamic, social process, which occurs intentionally or unintentionally, in everyday activities, (see e.g. Araujo, 1998; Gherardi, 1999; also Leonard and Sensiper, 1998: implicit learning -concept). In addition to the process nature of learning, we emphasize the contextual and experiential nature of learning (e.g. Dalley and Hamilton, 2000; Gibb, 1997).

We want also to highlight that learning involves acquiring identities (Brown and Duguid, 2001); it involves becoming an "insider". Nonaka et al. (2000: 8) have expressed the same view in a nutshell: "Knowledge creation is a journey *from* [italics in the original] being to becoming". Identity is closed linked to the communities of practice we belong to – they are part of our identity (Lave and Wenger, 1991; Wenger, 1998; Brown and Duguid, 1991). Learning, therefore, involves acquiring identities that reflect both how a learner sees the world and how the world sees the learner. For example, it is not enough to claim to be a professional artist – people, particularly other actors in the art field have to recognize you as such (e.g. Brown and Duguid, 2001; Jyrämä, 1999). Wenger (1998) emphasizes identity as a key component of learning; not only is it important what we become in learning but also our self

perception. Learning changes who we are, and how we learn is affected by how we see ourselves. In this study the aim of the studied project is to help the participants to build a professional identity.

When knowledge is understood as context-specific, it means that in knowledge creation one cannot be free from the context; knowledge cannot be created in vacuum. Social, cultural and historical contexts are important for individuals as such contexts provide the basis for one to interpret information to create meanings. (Nonaka and Toyama, 2003). Wenger (1998) places learning in the context of our lived experience of our participation in the world. He emphasizes that learning needs a context where it can be recognized as learning – as new knowledge. Next we will elaborate two concepts that have been introduced as contexts for learning and/or knowledge creation; ba and communities of practice.

Ba is a place where information is interpreted to become knowledge (Nonaka et al., 2000). Thus, ba is considered to be a shared place that serves as a foundation for knowledge creation. The concept of ba was originally proposed by the Japanese philosopher Nishida and developed further by Shimizu (Nonaka and Konno, 1998).

Ba is defined as a shared context (Nonaka et al., 2000) or a platform (Nonaka et al., 2001) in which knowledge is shared, created and utilized. The key concept in understanding ba is 'interaction'. Knowledge is created through the interactions amongst individuals or between individuals and their environments, rather than by an individual operating alone (Nonaka et al., 2000). Therefore ba can be thought of as a shared place for emerging relationships: a physical or virtual place or a mental space or any combination of these (Nonaka and Konno, 1998).

According to Nonaka and Konno (1998) there are four types of ba: originating, interacting, cyber, and exercising. Interacting ba is also called dialoguing ba (Nonaka et al., 2000; 2001) and cyber ba is also called systemising (Nonaka et al., 2000) or systematizing ba (Nonaka et al., 2001). These four types of ba correspond to the four stages of the SECI model that can be very briefly summarized as follows: S = socialisation is the process of converting new tacit knowledge through shared experiences, E = externalisation is the process of articulating tacit knowledge into explicit knowledge, C = combination is the process of converting explicit knowledge into more complex and systematic sets of explicit knowledge, and I = internalisation is the process of embodying explicit knowledge into tacit knowledge (Nonaka et al., 2000; 2001).

Originating ba is a place where individuals share feelings, emotions, experiences, and mental models. Physical, face-to-face contacts are necessary for conversion and transfer of tacit knowledge as tacit knowledge is exchanged through joint activities or by just spending time together. It is noteworthy that tacit knowledge can be acquired without language, for example by observation, imitation and practice (Nonaka, 1994). Common tacit knowledge, such as a worldview, can also be created during informal meetings, over meals and drinks (Nonaka et al., 2001). Originating ba mainly offers a context for socialization. From it emerge care, love, trust, commitment, freedom and safety, which form the basis for knowledge

conversion among individuals.   (Nonaka and Konno, 1998; Nonaka et al., 2000; 2001; Nonaka and Toyama, 2003)

Dialoguing ba is more consciously constructed than originating ba. Through dialogue (between peers), individuals' mental models and skills are converted into common terms and concepts, metaphors, diagrams or models, in other words their tacit knowledge is shared and articulated. Individuals share the mental models of others but also reflect and analyze their own (Nonaka et al., 2001). Hence, dialoguing ba mainly offers a context for externalization (Nonaka et al., 2000).

In the systematizing ba, new explicit information is combined with existing information and knowledge. The systematizing ba thus offers a context for combination. Nonaka and Konno (1998) argue that the combination of explicit knowledge is most efficiently supported in collaborative environments utilizing information technology (internet, intranet, databases etc.).

Exercising ba supports internalization by facilitating the conversion of explicit knowledge to tacit knowledge. Internalization is closely related to "learning by doing" (Nonaka et al., 2001). Exercising ba synthesizes the transcendence and reflection through action, while dialoguing ba achieves this through thought (Nonaka and Konno, 1998; Nonaka et al., 2000; 2001).

Another context for learning and knowledge creation introduced is the concept of communities of practice. The concept of communities of practice (e.g. Lave and Wenger, 1991; Wenger, 1998; Wenger and Snyder, 2000; Brown and Duguid, 2001, 1991; Cox, 2004) has been defined as a freely-created community that engages in an activity together and then gradually forms a tight community *that learns together through joint practice*. It includes "the language, tools, documents, images, symbols, well-defined roles, specified criteria, codified procedures, regulations, and contracts that various practices make explicit for a variety of purposes" (Wenger, 1998: 47). Wenger (1998: 73) defines the dimensions of practice as the property of a community through mutual engagement, joint enterprise, and shared repertoire. There are communities of people who share some activity or practice, and have similar values, norms and language. Communities of practice have mainly been defined as freely-created, however recently the concept has been used for communities created by and for management purposes (see Swan et al., 2002 for a discussion on "managing" communities of practice).

The emergence of a community entails a sense of trust, when people want to engage in joint activities and share knowledge. However, the sense of trust does not mean a view on community as an entity free from conflict (see Lave and Wenger, 1991; Wenger, 1998). Sharing a language is also part of becoming a member of a community of practice (Lave and Wenger, 1991; Wenger, 1998).

The borders of communities of practice are blurred. We may have various ways and levels to participate in a community; we may be active members engaged in creation of the shared values and norms, or we may be newcomers only having a peripheral access, learning the

ways of the community. The term legitimate peripheral participation (Lave and Wenger, 1991) points out two ways one can become part of community. Peripheral applies that you can get exposure before becoming part of the actual practise. This can be achieved by assistance; e.g. lessons. But, it is emphasized that there are big differences between lessons that are about the practice and lessons that occur within the practice. The peripheral participation ought to provide access to all dimensions of practise: to mutual engagement with other members, to their actions and their negotiation of the enterprise, and to the repertoire in use (Lave and Wenger, 1991; Wenger, 1998). Also, in order to become a member the newcomers need to be granted enough legitimacy to be treated as potential members. For example, doctoral students gain access to the academic communities by their professors. Wenger (1998) proposes two ways we can influence a practice; either by participation or by reification. By policies of participation you rely on the personal relationships and in reification you use e.g. legislation, statistics, or demonstrations as tools of influence.

Both of the two concepts present contexts for learning, but from different traditions and discussions. Nonaka et al. (2000, see also Nonaka and Toyama, 2003) argue that there are important differences between the concept of communities of practice and ba. According to these scholars, the members of the community of practice learn knowledge that is embedded in the community but ba enables the creation of new knowledge. However, if we acknowledge that we all perceive and understand new or even old issues through our own perceptions and histories – then we always interpret "what is there" in new ways –and hence create new knowledge.(e.g. Love and Wenger 1991; Wenger, 1998).

Furthermore Nonaka et al. (2000) maintain that the boundaries of a community of practice are firmly set contrary to the fluid boundaries of ba; in many respects a community of practice is considered more stable than ba. Nonaka and Toyama (2003) emphasize that ba has a 'here and now' quality, and it is constantly moving as the members of the ba change or as the contexts of the participants change. The question of boundaries merits more discussion. The idea of peripheral participation connected tightly with the concept of communities of practise in itself highlights the different ways of participating in a community of practise. The ways of participation, then, imply that the communities of practise have blurred boundaries. Yet, one needs to emphasize that even though these boundaries exist – they are blurred and can be – and are crossed. Moreover, understanding communities of practice as non-dynamic needs re-reflection, communities of practice change and evolve through the activities and practices shared (Lave and Wenger 1991; Wenger 1998).

To conclude; both concepts deal with contexts of learning, yet, they approach it from different aspects. Ba has as a starting point the nature of knowledge and spirality of tacit and explicit knowledge. It moves from epistemological ideas to practise. On the other hand, communities of practice, starts from our everyday experiences on learning and moves from there into concepts and theoretical understanding. We want to emphasize that we do not perceive these two concepts as "the same", but rather two different ways to discuss and research the context of learning.

Research Design

In order to analyze the learning processes of the actors, and to understand the role of the mediator in these process in the specific context of our case TARU, we have to try to be very sensitive to the context of the phenomenon. Thus, a qualitative research approach, more specifically a qualitative case study, was chosen as the study method. Our case, the TARU project, is intrinsic in their nature. It was selected because in its particularity and ordinariness, the case itself is of interest (Stake, 1995: 3, 2000).

In addition, our understanding of the nature of knowledge and the theoretical discussion behind our analysis follow the ideas of qualitative approach. In this study, the process of analyzing is not a separate function, but occurs throughout the study as we reflect on our pre-understanding and theoretical background throughout the whole research process (Coffey and Atkinson, 1996: 6). Next, we will present the case and the data of the study briefly.

The TARU case

The TARU project aims to develop cultural marketing and training by showcasing interesting minority group artists and their work who have not received any notable media exposure. The project's primary target group consists of immigrant artists representing minority cultures as well as disabled artists. The project nevertheless does not exclude artists disadvantaged in other ways. The objective of the project is to profile their art on an equal footing with Finnish art and as an integral part of Finnish culture.

The project brings these artists and their work to the attention of the larger public by making use of the various media, for example, television (a series of 10-minutes-shows in the Morning TV -program), the internet and digital printing. The project organizes training for artists belonging to the target group. Marketing methods are tested in concrete productions in the performing arts domain and experiences accrued from marketing campaigns are assembled to practical tools and internet info-packages. A register of the target group artists and their works will also be assembled in the internet.

The three-year TARU project is jointly carried out by Lasipalatsi Media Centre (responsible for coordination and financial management of the project), Finnish Broadcasting Company, Finnish Theatre Information Centre and Försti-Filmi (a privately-owned film production company). TARU is part of a larger EU EQUAL -program funded by the European Social Fund.

In the TARU case, the representatives of the partnering organizations are considered as mediators. We interviewed eight persons who carried out different kind of tasks in the project (managers of the partnering organizations, a project manager, a producer, an assistant, etc.). All together 20 artists were interviewed, nine of them were immigrant artists, nine were disabled artists and two belonged to the group "other artists in a marginal position". In this study, the analysis is based on the transcribed interviews, although other kind of material

(web pages, contracts, information letters sent to artists, reports on seminars) has been gathered for other purposes.

The interviews of the artists took place when the project had been going on for a year, and the interviews of the mediators were carried out a few months later. By the time of the data collection, TARU had included training seminars, 31 tv-shows, a list of 170 artists had been published on the TARU web pages with links to the home pages of the artists, six exhibitions in the art gallery of Lasipalatsi Media Centre had been run, and two books by the TARU artists had been published.

The concepts of ba and communities of practice were used as tools of analysis to look into the ways mediators foster learning. Moreover, understandings on professional identities in respect of learning were looked into.

The creation of learning contexts – case of TARU

In the following TARU case analysis we first discuss the learning-related expectations of the artists. Second, we analyse the artists' views on the mediators' roles and tasks, and we compare these to the mediators' own perceptions. Third, we analyse the TARU activities applying the concepts of ba and communities of practice. Finally, we evaluate how the activities might enhance the construction of a professional artist identity.

In the interviews, the artists expressed their individual hopes, visions and goals concerning their career as artists. Their expectations concentrated on two themes: contacts, or networking, and practical help with building a career in the Finnish art world. When the artists had joined the project, they had expected opportunities for discussion with other disabled or immigrant artists to share experiences, values and beliefs, in other words to share tacit knowledge. Interaction with peers was considered a source of strength.

Networking among peers was expected to open new opportunities for co-operation: the artists were looking for potential partners in their productions, and an opportunity to create a joint production under the TARU umbrella brand. The artists also sought contacts with individuals or institutions capable of helping them to develop their careers. Hence, the artists expected new knowledge how to "become somebody", how to acquire a socially legitimate artist identity.

The artist expected to receive practical help with marketing-related issues, such as how to organize a concert or how to contact publishers, gallery owners or agents. "Practical help" refers to learning by doing. Most of the artists seemed to assume that the TARU organizers would offer individual guidance, advice, and tips on how to make contacts. They also expected information on grants and individual guidance in making applications for funding. Some believed that TARU itself should have employed the artists as assistant project managers or organizers on various joint productions.

In sum, these results on the expectations of TARU artists seem to indicate that the artists emphasize learning by doing. The artists seem to understand learning as social, context-specific, and based on one's own and others' experiences.

The artists' expectations revealed that the project was expected to create chances for networking. The mediators were expected to know the actors of the professional art field, and therefore network brokering was considered one of their roles. The artists expected the mediators to be their personal tutors or coaches, who solve their individual problems in face-to-face discussions. Some even expected the mediators to act as their sales manager or an agent who organizes gigs and draws internet pages and press releases.

The interviewed mediators saw their own and the project's role more like an organizer of indirect means (e.g. tv-shows, seminars, web pages) which would enhance the target group's opportunities to integrate in the Finnish art field. The mediators said that they would also like to offer the artists personalized help but that this was impossible because of the large number of artists in the project and their heterogeneity and degree of professionalism. Therefore the mediators considered one of their own tasks to be documenting the best practices both at home and abroad, in other EQUAL projects, and bringing these documented practices available through web pages. As organizers of training seminars, the mediators thought that their role was to recruit the best experts to give lessons on the subjects on which new information was needed. All in all, the interviews of the mediators reveal that the activities of the project were planned according to the insight that learning occurs when explicit knowledge is transferred to the target group.

Next we will analyse the TARU activities by applying the concepts of ba and community of practice. The figure 1 presents four types of ba: originating, dialoguing, systematizing and exercising ba (Nonaka et al., 2001). Each cell of the grid presents those activities that had taken place by the time of the interviews.

Originating ba (face-to-face) • group work in the first seminar • coffee breaks in the seminars	Dialoguing ba (peer-to-peer) • face-to-face discussions between the most active artists and mediators in the offices of partnering organizations
Exercising ba (on-site) • joint production in the Night of the Arts -happening • drawing up applications for funds • using advice received in face-to-face discussions when organizing one's own concert or exhibition	Systematizing ba (collaboration) • web pages • lectures and other information given in seminars • information letters, e-mail sent by the TARU organizers

Figure 1. *TARU activities in the grid of four ba (adopted from Nonaka et al., 2001)*

Originating ba as the context for knowledge creation enables face-to-face interaction to share feelings, experiences and insights in an atmosphere of trust. Although most of the interviewed artists expected face-to-face discussions amongst themselves and with mediators, there had been only a few opportunities for interaction. Only in the very first TARU seminar there was time allocated for small group discussion. Each group was led by a mediator. The artists' interviews tell us that every opportunity to discuss with peers was highly appreciated (coffee breaks in the grid).

At the time of the interviews there was no activity or context created to enhance dialogue among the artists. The most active artists had managed to engage in discussions with mediators and they were satisfied with the advice. We consider these discussions as possible contexts for dialogue.

The systematizing ba, where new explicit information is combined with existing information, seems to be the best run ba by the time of the study; the premises of this ba relate to the mediators' insights of learning as transfer of information. Yet, in practice the artists encountered difficulties in systematizing ba as well. Their disabilities reduced their ability to use internet or read information letters, immigrant artists had language problems, or the participants of the project were unfamiliar with computers or had no access to internet. In the TARU web pages there were no tools for chatting or other co-operational activities as the feedback loop was one-way: visitors were able to give feedback to the TARU organizers but no interaction was possible.

Exercising ba supports internalization of new knowledge. As the artists' interviews were carried out in the first half of the project, our data includes only a few examples of exercising ba.

The analysis of the contexts created so far tells us that most of the major activities concentrate in systematizing ba. The result indicates that the mediators of the TARU project believed that knowledge creation process begins with explicit knowledge − and therefore their role was to enhance knowledge transfer from experts to the newcomers in the Finnish art field.

The mediators of the TARU project have actively listened and reflected on the feedback received from the participants. New activities have been planned. Next we will analyse how these activities could foster learning in the second half of the project. The same grid of four ba will be utilized, see figure 2.

Originating ba (face-to-face)	Dialoguing ba (peer-to-peer)
• a producer for personal interaction with the artists • TARU Club or Café to be opened	• small groups (by the type of art) led by the tutor • TARU Club or Café to be opened
Exercising ba (on-site) • using the information given about the TARU artists on the web pages, finding partners in joint art productions • applying the models and other best practices shown on the web pages and television shows • exhibitions or performances organized and books published by the TARU project	Systematizing ba (collaboration) • best practices and models on web pages, also from other EQUAL projects in Finland and abroad • reports on seminars and all the other activities on web pages

Figure 2. *TARU activities planned to be implemented in the grid of four ba (adopted from Nonaka et al., 2001)*

New contexts for enabling face-to-face interaction and dialogue have been planned. A new employee, a producer, had just started her work when we interviewed the mediators. She will listen to the artists' ideas and plans, give personal advice and help in the practical problems they might have. A TARU club or a café is planned to be opened. It would offer a context for the participants to share their knowledge not only by talk but also by music playing, dancing, performances or even by painting.

Small groups by the type of art (painting, music, literature, and performing arts) have been organized, the first meetings had either taken place or were planned to take place. A tutor, an established Finnish artist or a producer had been assigned as a leader for each group. The participants of TARU were not selected as group tutors. This might indicate that the mediators thought that the tutors should transfer their own expertise to TARU artists, which, on the other hand, means that the participants of the groups were not considered capable of knowledge creation.

According to the new plans, both the systematizing ba and the exercising ba were based on the explicit information given on web pages. The mediators seemed to believe that practises can be learnt by adopting explicit knowledge. Internet was the most important media although the mediators had realized the difficulties the participants had had in utilizing the information technology. Yet, the newly employed producer and the tutor-led groups support the exercising ba. Exhibitions and other art productions organized by the project were important contexts for internalization; they offered opportunities for learning by doing and thus fulfilled the expectations of the participants.

When looking at TARU from the communities of practice perspective, the mediators' aim was clear: They wanted to help the participants to enter an existing community of practise (or several) – the community of professional artists. To achieve this aim TARU started by making the potential newcomers visible through the register. They also gave lessons about the practise, yet according to Lave and Wenger (1991), these lessons ought to occur within the practice to be useful – only in some cases TARU succeeded in providing access to the practice itself. Moreover, the artists clearly looked for legitimacy by participating in TARU. Yet, the TARU mediators themselves were not part of the aimed community, and could not thus themselves grant the access and legitimacy by their own choices. The organizers were mainly part of the institutional art community rather than the professional market oriented community in arts. Only at later stages they organized a series of exhibitions in existing galleries, hence creating a context for personal interaction for the participants with the "old timers" of the aimed community of practise. On the other hand, for example, the café might have contributed to create a community – but rather than gaining access to the existing community, it helped the newcomers to form a community of their own.

Wenger (1998) proposes two ways to influence what becomes of a practise; participation and reification. From TARU activities we can identify several means of reifications: they showed the participants and their work in various media; the web, exhibitions, TV-shows. The means of participation seem to have been less used. The interviewed mediators did not give examples of using their own personal contacts with the aimed community as means to promote the participants.

How did the contexts created in TARU enable the construction of a professional artist identity? In the mediator interviews the above mentioned new plans were discussed but the question of construction of an artist identity was not raised by the discussants although the main goal of the project, to integrate these artists in the Finnish art field was mentioned when the expectations were elaborated. The only exception was television shows: the mediators maintained that the TARU television shows would strengthen the positions of disabled and immigrant artists in the market. As the mediators expected the artists to learn mostly by adopting explicit knowledge transferred from the experts, they did not think learning "as becoming", and therefore they did not take this point of view into consideration when planning new activities or when evaluating those already implemented. Hence, we argue that the TARU mediators did not regard their own role as supporters in participants' identity construction.

Yet, the newly implemented and future actions might enable artists' identity construction. Personal discussions with an experienced producer offer time and space for reflection on the questions concerning how to be a cultural professional in Finland. A club or a café to be opened will enable interaction amongst participants, for example professional immigrant artists and those who have already built a career in Finland are able to share there experiences to others. These discussions might create valuable contexts for participants who ponder the question: "What is my place in the art society and amongst people on the whole?"

If the tutor-led groups will succeed in creating a joint production and in building relations to the actors in the field, these contacts will support participants' artist identity construction. Exhibitions in the Lasipalatsi Gallery and books published (e.g. poem anthologies) by the Media Centre open opportunities for learning by doing. Also other activities in exercising ba represent the following view of knowledge: knowing is building the future. Therefore, our results suggest that the project's support for creating versatile exercising ba needs to be strengthened.

Conclusions

In this study we have analysed the role and means of mediators in the TARU project focused on helping immigrant and disabled artists' paths to the Finnish art field.

The analysis of the TARU project revealed that the mediators' understandings on learning differed from those of the participants. This conflict was especially manifested on the ways how practices could be learnt. The organizers of the project were confident that the artists' learning processes were sufficiently supported by identifying the best practices, documenting them carefully and transferring the documents accessible to the participants. Yet the artists thought that practices could be learnt only by doing.

Our results strongly suggest that one of the most important tasks of the mediators in this kind of a project is to carefully and sensitively reflect and ponder their own and the participants' view on the nature of knowledge and on the nature of learning. Time and space − both for originating and dialoguing ba − should be created for this kind of reflection both in the planning stage and in the implementing stages: Contexts, where both the mediators/organizers and the participants can share their understandings on knowledge and the nature of learning and reflect how this applies in practices.

The role of mediators in enabling the creation of the contexts for knowledge creation, ba, is crucial. This role may be even more important in the context of a project − a temporary and loosely-tied organization − than in more established organizational settings like firms. The participants' of the project have no physical place of their own, and they don't know each other beforehand; therefore opportunities for originating and dialoguing ba to rise without any specific measures are rare. We emphasize that the special characteristics of the project organization should be taken into the consideration when the means to foster participants' learning are planned.

In this particular case, TARU, the group of participants was extremely heterogeneous; at least five subgroups could be identified: immigrant artists who had made a professional career at their homelands, immigrant artists who may have an artist training but for whom art has been a hobby, disabled professional artists who have already made a career in Finland, disabled persons who take an active interest in art but whose income is secured otherwise (pension, other profession), and those professional Finnish artists who perceive their position to be in the margins of the art field. Hence, the aims of the participants differed considerably:

they did not all wish to build an identity as a professional artist. Understanding learning as becoming, as part of one's identity, affects the success of the learning process. This ought to be taken into consideration when evaluating the projects. In the case of TARU, the personal learning aims may have been fulfilled even though the project did not result employment as a professional artist in Finland.

The analysis also pointed out that mediators ought to have access to the communities aimed at, either being members of it themselves or have contacts within that can grant the legitimacy to the participants of the project. They need to become peripheral participants of a community of practise, not just participants of the project. The mediators ought to be able to be able to provide lessons occurring within the community not only about the community. If you get access to become a peripheral participant, then the membership/identity depends more on yourself; your aims and your own competences, once you have access to the community specific competences that are learnt by participating.

The use of two different tools of analysis to look into the learning contexts was found to be useful. The analysis by concept of ba revealed the lack on spaces for different kinds of knowledge creation. Communities of practice, then, pointed out the need to operate preferably within the community of practice targeted for, or at least have connections to it. Hence, the differing starting points of the two concepts clearly reflected also to the use of them. They bring forth various aspects of the learning contexts – ba promoting how we should foster the learning process - by creation of spaces, whereas the community of practice shows us the people – with whom or who should be fostering the learning process.

To conclude we wish to emphasize that the key role of the mediator is to create a good learning context, nurturing and fostering rather than managing learning process: Building various spaces for knowledge creation by understanding the differed ways of learning and by acknowledging the key actors who ought to be involved.

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Why Good Luck has a Reason:
Mindful Practices in Offshore Oil and Gas Drilling

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Patterns of collaboration and human interaction should be viewed as important contributors to safety in hazardous activities. In a mindful organisation, safety is seen as a collective competence where the interplay between employees is essential. The objective of this paper is to create a better understanding of the mindful characteristics of current safety practices in a specific work organisation. The paper reports results from a qualitative study within the drilling organization of a gas production installation operating in the North Sea.

Background

Offshore oil and gas production involves several major hazards. In the tightly coupled production systems, incidents such as gas releases can quickly escalate to major accidents. The industry meets this challenge by introducing various safety defences such as firewalls, emergency shutdown systems, and work permit systems (Skjerve et al, 2004). This may be satisfactory in stable hierarchies with sufficient resources, but may be inadequate under trying conditions where organisations are tightly coupled, and interactively complex (Pettersen & Aase, 2004). As is the case in oil and gas production, humans are essential as part of the safety defences at petroleum installations, mainly due to their flexibility, their ability to improvise, to interact in work processes, and to create and improve safe work practices. Such qualities are essential in safety critical situations where proper measures are not possible to foresee in detail. To prepare for humans' role as safety defences requires organisational processes to assure adequate knowledge, competence, resources, and tools.

Such organisational processes may involve a series of efforts directed at individual, group, and organisational level. Studies of the oil and gas industry show that formal repositories of experience and knowledge often fail to achieve their expected impact (Aase, 1997; Wulff, 1997). Employees find that face-to-face interaction and informal channels of experience and knowledge (e.g. personal networks) better serve their learning needs. Informal means exceed formal tools in terms of richness and the ability to integrate and develop new knowledge. These results are in accordance with research suggesting a shift towards a collective and practice-based view on knowledge and organisational learning (e.g. Cook & Brown, 1999; Wenger, 1998; Wenger & Snyder, 2000).

In this paper we view safety as a collective competence developed and learned in local work environments (e.g. Gherardi & Nicolini, 2000). By focusing on the local work environment we draw attention to the importance of the group level for developing safe practices. By group level we include factors like the local work environment, managers' attitude to safety, the psychological work environment, and colleagues' use of mindful practices (Skjerve & Lauridsen, 2004). Through an exploratory case study in an offshore oil and gas drilling company, we want to define important group level components of mindful practices contributing to a robust organisation with safe work operations.

A framework for studying mindful practices

In this paper we define mindful practices as *general safety promoting work practices that may prevent unwanted event sequences and/ or interrupt such sequences* (adopted from Skjerve & Lauridsen, 2004).

To promote safety, research and industry has traditionally been preoccupied with introducing safety barriers according to a defence-in-depth-strategy (e.g. Kjellén, 2003). Safety barriers can be defined as "systems or functions that have been planned and implemented in order to interrupt or moderate a specified unwanted event sequence" (Skjerve et al, 2004). The defence-in-depth-strategy then implies that the risk for a predefined unwanted event is reduced to the required risk level using series of independent and diverse barriers. Within the oil and gas industry, such predefined events include for example hydrocarbon releases, fires and explosions, helicopter crashes, and ship collisions. In complex technological and organisational systems, it will be practical impossible to pre-plan and implement barriers for every possible risk scenario for every work context. This is in line with research stating that unforeseen events inevitably will come to occur from time to time in complex and tightly coupled production systems (e.g. Perrow, 1984). This creates a need for additional defences to prevent unwanted events. Our assertion is that mindful practices are important contributors in this matter.

The concept of mindfulness stems from research within social psychology defining key qualities of mindful behaviour as creation of new categories, openness to new information, and awareness of more than one perspective (Langer, 1989; 1997). Within organisational studies, the concept of collective mind or mindfulness has been applied to explain how diverse high reliability organisations (HROs) are able to function reliably despite a considerable potential for error and disaster (Weick & Sutcliffe, 2001, see also Weick & Roberts, 1993; Weick et al, 1999). Already for more than fifteen years ago, Weick (1987) claimed that we had thought about reliability in conventional ways using ideas of structure, training, and redundancy, and seemed to be up against some limits in where those ideas could take us. In the wake of this statement, the literature on high reliability organizations was established, focusing on how such organizations could minimize the frequency and severity of accidents or disasters. Some of the recommendations were already then focusing on organizing for high reliability by creating processes of collective mindfulness. These processes should be based on a preoccupation with failure, an increase in level of requisite variety, and the development of substitutes for trial-and-error learning by using elements from imagination, storytelling, simulation, etc.

Theories of communities of practice are occupied with the importance of a practice-based view on learning and knowledge (Brown & Duguid, 1991; 2001; Wenger, 1998). Mindful practices can then be seen as a competence developed within organisational practices, emerging from a collective process involving people, technologies, and textual and symbolic forms (Gherardi & Nicolini, 2000). According to a practice-based view, it is not safety as a specific topic or subject that should be learned, but safe work practices. The learning of safe

work practices should then include formal and informal processing of tacit and explicit knowledge. Instead of a desire to express individual tacit knowledge explicitly, research has documented the importance of collective processes. The term collective tacit knowledge has been introduced, referring to professional communities of practice as the most important learning arenas (Swart & Pye, 2002).

Learning safe work practices in high-risk organisations means that communities of practice should play an important role in preparing employees for future crises. Crises are stochastic in their nature, and may have causal chains that are still unknown. To prepare the organisation for such unanticipated events demands the communities of practice to focus on processes of improvisation, simulation, and unpredictability (Weick & Sutcliffe, 2001). Employees' and organization's capacity for improvisation influences the ability to tackle situations that were not foreseen by for example designers, or not covered in operating procedures (Skjerve et al, 2004). A community of practice may interpret and understand a situation beyond standard operating procedures, thereby preventing potential escalation of events.

Context and methodology

Offshore oil and gas production at the Norwegian Continental Shelf takes place in a hostile environment including large amounts of hydrocarbons under pressure, and poor evacuation possibilities. Employees work and live at offshore installations at a distance of one to two hours (by helicopter) from the coastline. Most offshore employees have during the last couple of years changed their work schedule from 2-3-2-4 (two weeks offshore, three weeks free, two weeks offshore, four weeks free) to 2-4-2 (two weeks offshore, four weeks free). Subcontractor employees on shorter contracts may have other schedules. Safety-wise, the industry has a history of building technical and physical barriers, and to regulate behaviour by developing detailed work descriptions for critical operations. Facing several serious accidents in the last couple of years, the industry has acknowledged that there is more to safe operations than robust technology and detailed procedures.

A national study of safety in Norwegian petroleum industry

In 2001, the Norwegian Petroleum Directorate conducted a large-scale study to assess the risk-level at the Norwegian Continental Shelf. A questionnaire survey was part of the study, addressing work place safety, accident risks, work environment, and employees' health at 64 petroleum installations (N=3309, response frequency 50-55%).

Among a broad selection of questions, the questionnaire contained four items related to mindful safety practices:
1. "I stop working if I find that continuing could imply a danger to myself or to others"
2. "I ask my colleagues to stop working, if I find that they perform their activities in a manner that threatens safety".

3. "If I observe dangerous situations, I report on these".

4. "My colleagues will stop me if I work in a risky manner".

Skjerve & Lauridsen (2004) conducted an analysis of the four items[4] according to what type of organisational factors that may affect employees' willingness to apply mindful safety practices at Norwegian petroleum installations. The factors were analysed by developing indexes at three levels: the *individual level* (factors associated with the individual employee), the *group level* (factors associated with the local work environment), and the *organisational level* (factors associated with the overall work environment at the installation). Individual factors were age, overall health state, and perceived personal capability to deal with safety-related issues; group factors were local work environment, managers' attitude to safety, psychological work environment, and colleagues' use of mindful safety practices; and organisational factors were overall work environment, perceived risk level, physical work environment, and spare time and rest facilities. The relationship between the employees' willingness to use mindful safety practices and the organisational factors that had been defined was explored using correlations.

Results showed that factors at the *group level* more markedly affected employees' willingness to use mindful safety practices, than factors at the individual and organisational level. The results thus indicated that initiatives to promote the use of mindful safety practices would be most efficient if directed at the group level, i.e. the local work environment. Correlation coefficients further revealed that the relationship between group level factors and the use of mindful safety practices were relatively stronger with respect to items 2 and 3, than with respect to item 1. This indicates that employees' willingness to mindful safety practices involving other persons is more sensitive to group level factors, than mindful safety practices which only involve the employee him or herself.

Analyses to study differences among work groups (process, drilling, well service, catering, construction/ modification, maintenance) at the offshore installations were also carried out. Results showed that the work areas process and drilling had a significant higher use of the four items included in mindful safety practices than the other work areas. The two work areas contain staff members that tend to work on a given installation for longer periods of time, and therefore are expected to hold a high level of familiarity with their local work environment (i.e. a factor that was suggested to affect employees' willingness to use mindful safety practices).

Considering common biases in the quantitative approach (e.g. response rate, self-reported data, and different heuristics), and the fact that the questionnaire was not developed with the aim of studying mindful safety practices, there is a need for further studies of the qualitative aspects of mindful practices (Skjerve & Lauridsen, 2004).

A qualitative study at group level

An exploratory case study design was chosen to gain more understanding of the *group level components of mindful practices* within the offshore oil and gas industry. The case company is a Norwegian oil and gas drilling company, and data were gathered within the drilling activities of a gas production installation operating in the North Sea. At the time of the data collection, the current gas production platform had excellent safety records, including their drilling activity. The drilling company had not had any loss time injuries for the last two years. The platform was often used as an example of succession for other offshore installations regarding their practical safety focus and activities.

Drilling at the offshore petroleum installation at hand involves drilling of production wells and well service, i.e. preparation of wells for production and well maintenance. The drilling activities are provided by a main contractor (a Norwegian drilling company), and two subcontractors. The main drilling company provides the installation with 6 different offshore crews that are the main focus of this study. Informants were drilling personnel (works manager, tool pusher, driller, derrick man, roughneck, roustabout, crane operator, electrician, mechanist) covering the 6 offshore crews at the installation. In the study we define the *group level* to be each of the 6 drilling crews. Each drilling crew consists of 16 employees, and a total of 85 (of totally 96) employees participated in the study.

Methods included 22 semi-structured interviews, participant and non-participant observation, informal discussions, and document analysis. The data collection took place in a period of four months in 2003. More specifically, table 1 shows the different data collection activities[5] with belonging arenas, participants, and focal themes:

Data collection activity	Arenas	Participants	Focal themes
Semi-structured interviews	Office area, drilling area	22 selected employees in 5 drilling crews	Individual responses to safe work operations and changes/ reduction in offshore manning
Participant observation	Offshore departure sessions	All employees in 6 drilling crews	Updates on work operations and safety in upcoming offshore period, discussion/ reflection on changes/ reduction in offshore manning
Non-participant observation	Safety meetings, toolbox meetings, safety inspections, open safety conversations, work operations	All employees in 5 drilling crews	Organisation and quality of formal safety practices
Informal discussions	Coffee shop, office area, drilling area, cantina	Random employees in 5 drilling crews	Elements of informal safety practices, attitudes and group norms
Document analysis	Procedures and documents related to Safe Job Analysis, Open Safety Conversations, handover, drilling programs, work permits, incident reports	All employees in 6 drilling crews	Requirements for safe behaviour

Table 1. *Data collection activities*

Data collection was carried out by participating at 12 offshore departure sessions (twice for each of the 6 drilling crews) at the heliport, and by three offshore trips each with duration of two days. Semi-structured interviews were carried out as open conversations using a guide with 11 questions as a starting point. Participant observation was carried out by participating at 12 regular offshore departure sessions at the heliport, mentoring an additional discussion/ reflection session[6] on safe behaviour. Non-participant observation and informal discussions was carried out by participating in the regular work operations of the drilling crews during three offshore trips. Document analysis was carried out by gathering copies of relevant procedures and documents for the different safety activities offshore.

Data were analysed by transcribing summaries and memos with relevant quotations from all data collection activities. Based on the theoretical framework of mindfulness, a first categorization was made using the dimensions of formal and informal safety practices. Data were further analysed by using Skjerve & Lauridsen's (2004) group level factors (local work

environment, managers' attitude to safety, psychological work environment, and colleagues' use of mindful safety practices).

To study safe practices creates several methodological challenges. Traditionally, safety research has been occupied with studying reasons for why certain accidents happen, and to prescribe possible measures for how similar accidents should be prevented in the future. To collect data on work practices that prevent incidents to escalate is difficult for several reasons. First, it is difficult to identify the relationship between certain work practices and possible safety consequences. Second, safe work practices may have unintentional or unconscious aspects that are difficult to describe or even observe. For such reasons, data collection during relatively short offshore trips may only grasp certain elements of safe work practices, at a given time. In addition, participant observation also calls for highly individualized data, making the choices of focal themes in describing the safe work practices dependant on the researcher. To compensate for these methodological challenges, the three authors compared empirical results from other studies in the oil and gas industry to qualify the selection of what aspects of safe practices that were to be described.

Mindful practices in offshore drilling

Results from the case study revealed that safe practices in offshore drilling consist of both formal and informal mechanisms. The practices vary in their degree of formality and in their extent of human interaction and collaboration.

Formally established practices

Examples of formal practices in the drilling company are shown in table 2. These practices were formally established (most often in written procedures or requirements) as arenas or mechanisms for communication, planning, and circulation of knowledge in the drilling work operations.

Formal safety practices	Participants	Interaction-type
Offshore departure sessions	Drilling crew members	One-on-many
Safety meetings	Drilling crew members	One-on-many
Handover sessions	Off/ ongoing drilling shifts	One-on-many
Safe Job Analysis	Work operation group	Group-based
Toolbox meetings	Work operation group	Group-based
Open Safety Conversation	Tool pusher + crew member	One-on-one

Table 2. *Formal safety practices*

Each of the practices in table 2 has qualities that meet different aspects of mindful practices. Offshore departure sessions gather the entire drilling crew at the heliport before going offshore. The aim is to discuss upcoming work operations, performed work tasks since last offshore period, specific safety issues, etc. Safety meetings gather the entire drilling crew offshore once every second week with the aim of discussing safety issues. Handover sessions are overlap discussions between ongoing and off going crews. Safe job analyses and toolbox meetings are activities for planning and experience transfer related to upcoming work operations. Open safety conversations are arenas for informal discussions related to safety issues in ongoing work operations.

It is worth noticing that formalism is of great importance in the drilling company, as is the case for most organizations in the oil and gas industry. The company seems to hold on to regulated and formalized safety practices due to the inevitable probability of major accidents. This tendency towards structure and formalism is pictured through their use of open safety conversations. These conversations were originally informal and dialogue-based discussions on relevant hands-on safety issues between an offshore manager and his/her employees. In time, these apparently informal one-on-one based conversations were turned into a formalized tool by using them to measure safety by counting the number of open safety conversations performed.

To establish formal safety mechanisms did not itself assure mindful practices in the drilling company. The organisation had to work continuously to develop and maintain the quality in performing the formal practices. For example in a toolbox meeting, we identified problems with unclear communication and handover of the drilling program after the meeting had started. Issues like active listening and participation, clarity in speech, authority, and summing up were identified as important for the quality of the safety practices.

In addition to the quality of the formal safety practices, a tradeoff between mindful practices, workforce manning and time pressure was pinpointed by several of the informants:

"In the driller position, there has always been a dilemma regarding planning and experience transfer in work operations. Particularly in the drilling periods, it has been a tradition to hand the drilling program over to us with an expectation of getting started without briefing. The focus is on completing the drilling program without problems and according to plan. In this business time is money. In periods with well overhauls this is better" (driller).

"My possibilities for planning and experience transfer in work operations are satisfactorily. Nowadays we take our time. It is us who decides, and we are now participating in the discussion. This means that we are more appreciated than before. Earlier, the tool pusher just told us what to do" (roughneck).

"There is only one derrick man on the crew, in addition to the assistant derrick man. Since we are the only ones in this position, we become a 'corn in the

system'. If any of us drops out of work, we have to make readjustments and get new crew members sent offshore" (derrick man).

Informally established practices

In addition to the formally established practices, the drilling personnel had developed informal practices that were collectively practiced without being specified in any written descriptions or procedures. The background for evolving these practices was diverse and rooted in previous experience, unwanted incidents, or feelings of care and responsibility.

- Time-out or "take two"

    This practice allows crew members to "take two minutes" whenever they feel insecure, stressed or in lack of an overview of the work operations. The practice is supported and communicated by all crewmembers from tool pusher to roustabout. The "take two" practice requires crewmembers with confidence and persistency.

    > *"We are being told all the time that we need to take our time. We have to think things through, plan our work operations and get feedback from others. I feel no pressure, my focus is on working safe and well" (derrick man).*

    > *"Earlier, I felt time pressure and stress in my work, but now I am more relaxed. My attitude is that I speak out if I feel the pressure. If anybody makes a fuss about something, I say that 'it will happen when it happens'" (crane operator).*

- Hawk's eye

    This practice requires a crewmember to function as a "hawk's eye" in certain work operation. A hawk's eye has radio contact with all employees involved in the work operation, and her main task is to observe and follow the work operation closely without taking active an part in the operation.

    > *"I was hawk's eye in a crane operation. We had performed safe job analysis and worked through the procedures before going into the top drive. There were lots of straps and lots of people. Together with the crane operator, we observed that the crane pulled much harder than expected. The wire was about to pull apart, and a person was hit by a wire splint without any serious damages. The burden on the crane was 8 tons, and could have caused a catastrophe" (roustabout).*

- Comrade's check

    This practice requires that crewmembers using a man rider belt are double checked by one of their colleagues with regards to the equipment (belt and bolts) before climbing the top drive. The comrade's check is now a regular routine related to all work

operations including a man rider belt. The history behind the practice involves a serious accident:

> *"Two years ago I was going up in the man rider belt, but had not fixed the bolts properly. I fell four meters and landed on my knees and elbows. They were crushed. I've had numerous operations, and was absent for a long period. I still lack some vigor in my elbows, but am happy to be back at work. After the accident, we started the comrade's check practice"* *(roustabout)*

It is worth noticing that the degree of informality among the "informally established practices" might vary. Hawk's eye can for instance be required in certain procedures, while comrade's check might be more or less routinely performed related to top drive climbing.

Other group level factors

As we can see, most of the safety practices that were formally or informally established take place within the drilling crew, i.e. at the group level. We have also seen that for these practices to act as safety enhancing, it is not enough to merely establish them. The quality in performing them, or the level of mindfulness related to them, is influenced by group level factors such as the local and psychological work environment. When describing the most important factors for their own safety, all members of the drilling organization referred to work environment mechanisms such as care, openness, trust, team spirit or fellowship, and the desire to share knowledge.

> *"There is a positive will to share with one another! And this runs throughout the company. We must be willing to learn away our secrets because we are dependent on each other. If we were working in an individualistic manner, we would work ourselves to death"* *(derrick man).*

> *"At this crew the willingness to share knowledge and experiences is excellent. Generally, it varies from crew to crew and from person to person. I have noticed this especially since I am new and not on a fixed working schedule. At other crews, some persons are strenuous to ask"* *(roustabout).*

> *"We have to work as a team. Poor working environment influences safety. If work is strenuous and there are collaborative problems, it affects our well-being, which again affects the safety level"* *(roustabout).*

> *"Team spirit means a lot. I want to take my colleague with me home without any injuries. As a crane operator you have a very good overview of work operations, you can observe, see different situations, let people know, and give them feedback. For instance to make colleagues aware of always having their "back free" in different lifting operations"* *(crane operator).*

Managers' attitude to safety was pinpointed by several informants as important for integrating safety in the daily work operations of each offshore crew.

> *"What matters for us is that the platform management shows us that they prioritize safety in practice. At our installation, operations have been stopped several times to carry out Safe Job Analysis or call offshore employees in for work shops, implying considerable costs. Compared to other installations I have worked at, safety is prioritized in Sunday speeches, but when Monday comes, it boils down to production being the main priority"* (mechanist).

Besides the platform management, the drilling crews had a works manager with personal abilities and a desire to protect his employees from dangerous work operations. His experience included several of the offshore drilling positions, meaning that he could intervene in the work operations with great integrity. His offshore experience was respected, and he influenced the quality of the safety practices positively.

Employees' ability to act mindfully was influenced by their colleagues and the group norms of their drilling crew. For example were newcomers with lack of experience with certain work operations taken care of by experienced personnel.

> *"Since I have 25 years of experience, I use my time on newcomers as a mentor. I take care of them and try to transfer my experiences regarding different work operations. This is not an established routine, but something I take time to do"* (roustabout)

Reasons for good luck to fail

The objective of this paper has been to create a better understanding of the mindful characteristics of current safety practices in a specific work organisation. The paper suggests that taken together, a variety of formal and informal mechanisms, and the quality in performing them, can be seen as key sources to mindful practices. In addition, the paper documents that group level factors such as care, trust, openness, and team spirit are important for safe work practices.

Nevertheless, there are a number of pitfalls in describing the reasons for good luck, or the sources to mindful practices. The description tends to be static, exploring the practices at a given time related to a specific organisational setting. Contrary, the concept of mindfulness is dynamic, including a constant awareness of, and an ability to search for, evolving practices and mechanisms to handle the unexpected nature of incidents and errors that could escalate into a crisis (Weick & Sutcliffe, 2001). Our statement is that if we find sources to mindful practices in different work groups at a given time, these work groups will, if they consist over time with sufficient framework conditions, have the ability to continue to act mindfully.

There are constant threats to the good luck in forms of organisational framework conditions. These come in forms of a trade-off between mindfulness and workforce stability, manning, and time pressure. Considering the importance of group level factors for mindful practices, workforce stability is a key prerequisite. Informants in our qualitative study pinpointed collaboration over time as essential for the development of trust, team spirit, and

fellowship. Important work environment factors are thus threatened by efficiency demands. Results from another study of offshore work practices indicate that operators and maintenance personnel had established extensive organizational redundancy (Rosness et al, 2000). This was done through patterns of co-operation, level of staffing, competence level and organizational structure at the platform. The study furthermore displayed a picture of staffing levels and organizational structures on Norwegian production platforms allowing for a considerable degree of organizational redundancy during the 1990s. This picture has now changed, meaning that downsizing processes has also reached the oil and gas industry.

Our starting point for this study was to see safety as a collective competence developed in communities of practice, and thereby document the role of mindfulness. Important questions in this regard should be whether it is possible to prescribe or create "good luck", i.e. mindful practices. And is it possible to "establish" informal practices without running the risk of formalising them, and thus influence the nature of mindfulness? Considering these complex issues, our assertion is that it is possible to nurture good luck by cultivating group level factors and arranging for arenas for mindful practices to take place.

Implications

This paper has shown that one should combine formally and informally established mechanisms to prepare for mindful safety practices in high-risk organizations, and that group level factors should be given special attention. Our aim has been to visualize some of these mechanisms, in order to assess their contribution to safety. The results from the qualitative study might indicate several implications, regarding both practice and research.

Practical implications should consider the nature of mindfulness as "…*dynamic, including a constant awareness of, and an ability to, search for evolving practices…*" (Weick & Sutcliffe, 2001). This means that the interface between formalism and informality is of great importance. Given the nature of high-risk industries, is it possible to rely on informal or even unconscious safety practices? Our study indicates that one should acknowledge informal practices, and limit the desire to formalise all mindful practices. Work practices are subject to constant changes (colleagues, work tasks, equipment, work place design, etc.), and mindfulness based on informality may have a better chance to meet such changes.

Based on the results from this study, our assertion is that it is possible to nurture mindful practices. Given this, offshore organisations should support practices that enable collective sense making from a variety of sources of information and to act on such knowledge. High-risk organizations would then benefit from integrating aspects of imagination, stories, collective training, and group-based knowledge arenas in their approaches to mindfulness. The value of some of these practices has been well documented in a number of case studies (Aase & Nybø, 2005). Our study also indicates that these approaches as far as possible should take place in employees' daily work environment, and not solely in formally established "lessons learned" sessions. Managers will also have to train employees in how to act within

their communities of practice to be active and enhance their collectively developed safety competence.

To establish the relation between mindful practices and safety requires further research. Below are some of the avenues this research may take:

- The study of near misses or incidents with successful recovery, i.e. to document mindful practices that have prevented safety critical situations to escalate.
- The study of how mindful safety practices can be developed using collective training elements such as active participation, dialogue, and storytelling.
- The study of how imagination and improvisation could improve mindful safety practices.

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Endnotes

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[4] The questionnaire was not designed with Skjerve & Lauridsen's (2004) research question in mind, making neither the selection of items nor the quite general item formulations optimal.

[5] All data collection activities were performed by the first author

[6] On request from the drilling company, discussion/ reflection sessions were designed by the researchers to focus on possible safety consequences from reduction/ changes in offshore manning. Results from the discussion/ reflection sessions will be reported in Aase (2005).

The social construction of organizational learning and knowledge: An interactional perspective

Max Visser[1]

The notion that learning and knowledge are socially constructed in organizations seems to be gaining ground in the literature (and in particular in this conference volume). These gains c be traced to two related theoretical developments. The first development pertains to a conceptual shift from an individual to a social perspective on organizational learning (Easterby-Smith et al., 2004). Individual learning refers to an inner mental process through which information and knowledge are acquired and processed. It is a predominantly cognitive process, directed at the enhancement of the mental models (or cognitive structures) guiding behavior. Social learning refers to a process in which knowledge acquisition is situated and grounded in interaction, activity and practice in everyday organizational life and work. The emphasis is not so much on knowledge (cognitive, facts and skills), but on knowing (behavioral, something we do)(Elkjaer, 2003; Vera & Crossan, 2003).

The second development pertains to a conceptual shift from a content to a relational perspective on knowledge. Authors from the content perspective regard knowledge as a mental commodity that can be codified and stored in systems and exchanged between individuals and individuals and systems (e.g., Alavi & Leidner, 2001; Davenport & Prusak, 1998; Gallupe, 2001; Nonaka, 1991; 1994; Nonaka & Takeuchi, 1995). Authors from the relational perspective regard knowledge as a relative, provisional and context-bound phenomenon, with a focus on the processes of knowing and acting. Knowledge is socially embedded in communities and intimately tied to day-to-day practice (e.g., Blackler, 1995; Bogenrieder & Nooteboom, 2004; Breu & Hemingway, 2002; Hayes & Walsham, 2003; Huysman, 2004; Plaskoff, 2003).

Authors from the social and relational perspectives have sometimes criticized the individual and content approaches for vagueness of their definitions, their weak empirical base and prescriptive standpoints (e.g., Alvesson & Kårreman, 2001; Hayes & Walsham, 2003; Tsoukas & Vladimirou, 2001). Yet the social and relational perspectives themselves cannot fully escape similar critiques. What exactly does take place when knowledge is being socially constructed in organizations? How do we distinguish learning from acting and interacting? What exactly constitutes the relational nature of knowledge? What seems to be missing in these perspectives is a theory of communication and interaction with which to approach such questions.

In this working paper I propose an interactional perspective on knowledge and learning that intends to shed more light on the processes underlying the social construction and the situated, relational nature of knowledge. Grounded in the work of the Palo Alto schools on learning and communication (e.g., Bateson, 1958; 1972; 1979; Haley, 1963; Ruesch & Bateson, 1951; Watzlawick et al., 1967) and based on my earlier work in these areas (Visser, 2003ab; 2004), learning and knowing are viewed in terms of behavioral interaction at the level of context and relationship.

To develop this perspective, I first distinguish between three orders of knowledge and learning. Second, I discuss pathologies in learning and double binds and show their implications for organizational knowledge construction. Finally, the paper is summarized and conclusions are drawn. Throughout this paper, I will use the well-known experiment of the 'neurotic

dog' to make my concepts clear at a relatively simple, straight forward level. Further, I define learning as the process of acquiring knowledge, following a tentative definition by Easterby-Smith & Lyles (2003: 3).

Three orders of knowledge and learning

In a classical salivary conditioning experiment, a dog is trained to respond differentially to two stimuli, a circle and an ellipse. The appearance of the circle is repeatedly accompanied by food. After several pairings of food and circle, the dog learns to salivate in response to the circle alone. The appearance of the ellipse is not accompanied by food. Consequently, the dog learns not to salivate in response to the ellipse alone. When the dog sufficiently has been conditioned to discriminate between the conditioned stimuli, the task is slowly made more difficult. In consecutive trials the experimenter gradually reduces the contrast between the stimuli by making the ellipse somewhat fatter and the circle somewhat flatter, until the ratio of the semi-axes in the ellipse reaches 9:8. After three weeks of working on this differentiation, the dog increasingly fails to discriminate between the two forms. At the same time it starts to exhibit symptoms of severe disturbance (like violently barking and squealing, biting its keeper, refusing food, becoming disobedient, etc.). When the contrast between the stimuli is increased again, the dog gradually becomes quieter and returns to its normal state. When subsequently the contrast between the stimuli is reduced again to 9:8, the dog again starts to exhibit symptoms of disturbance (Pavlov, 1927: 289-293).

To account for knowledge acquisition and learning in this experiment, I propose a distinction between three orders of knowledge, which correspond to three orders of learning (Bateson, 1972; 1979; 1996/1971; Watzlawick et al., 1967). The reader should note that this is an analytical distinction of learning process occurring concomitantly:

(1) The dog acquires knowledge *of* things: it becomes aware of the objects circle and ellipse through his senses. Acquiring this knowledge corresponds to zero-learning. It involves the simple receipt of a signal, not subject to correction by earlier experience. Following this, one can speak of zero-order knowledge.

(2) The dog acquires knowledge *about* the objects circle and ellipse, their relationship to the occurrence of instances of reinforcement and punishment, and thus their importance for his survival. Acquiring this knowledge corresponds to proto-learning. The dog learns to respond to the experimental contingencies of reinforcement, i.e. to adapt his behavior to instances of reinforcement and punishment. Following this, one can speak of first-order knowledge.

(3) The dog acquires knowledge about the *context* in which the objects and his responses become related. Acquiring this knowledge corresponds to deutero-learning. The dog learns about characteristic patterns of contingency, or contexts of conditioning, in his relationship to the experimenter and the laboratory environment in which the experi-

ments take place. In other words, the dog learns to (proto-) learn. Following this, one can speak of second-order knowledge.

For humans (and arguably, for dogs as well) the acquisition of zero-order knowledge alone is very rare. It would amount to a perception for which no explanation from past experience or present context is available, producing a world of merely unexplainable, uncontrollable and unpredictable events and objects which would be quite anxiety-producing (Mineka & Kihlstrom, 1978; Watzlawick et al., 1967).

First- and second-order knowledge is commonly acquired by humans in continuous interaction with physical and social objects in their environment. From this interaction, humans develop an awareness of contexts of consequences and a habit of responding to future contexts. For example, a person who (like Pavlov's dog) is reared under or subjected to a prolonged situation of classic conditioning will increasingly expect contexts in which signs of future reinforcements can be detected, but nothing can be done to influence the occurrence of reinforcement. In mental terms such a person is likely to adopt an attitude of fatalism. This experience with earlier contingency patterns leads to a habit of acting as if all new contexts exhibit the same pattern. The habit of expecting a certain pattern of events in its turn tends to become self-validating by promoting certain behaviors and by discouraging others. The fatalistic person who behaves passively and waits silently for things to happen fulfills his own expectations (Bateson, 1958; 1963).

Mental characteristics like awareness, habit, experience and attitude do not exist in a social vacuum. These characteristics can always be redefined in terms of a relation between a person and somebody or something else. In relational transactions there are contexts of proto-learning that bring about the deutero-learning to which the mental characteristic refers. Here stimuli, responses and reinforcements acquire meaning in contingency patterns of interchange. These patterns are defined by the participants as characteristics of their relation, depending upon their subjective patterning of events. For example, when in ongoing interchange person A as a rule provides positive reinforcements in response to the stimuli, provided by person B, one could characterize the relationship between A and B in terms of supporting and leaning (Bateson, 1963; 1972; Bateson & Jackson, 1968).

In human relations, contexts of proto-learning are introduced in two ways. First, a message, sent by one person, sets the context for a certain class of response by the other person. Second, non-verbal signs (like tone of voice, facial expression, gestures and bodily posture) function as a context marker of the verbal message, therefore as a 'context of context' for the other person. This setting of contexts is inevitable in interpersonal exchange, since in interaction the categories stimulus, response and reinforcement are never 'empty.' All behavior (verbal and non-verbal) occurring between persons who are conscious of each other's presence has behavioral effects, whether intended or not. Such effects have interpersonal message value, and therefore are communicative in nature. Since for humans it is impossible not to behave in one way or the other, it follows that in interaction it is impossible not to communicate (Bateson, 1963; Haley, 1963; Watzlawick et al., 1967).

When applied to organizations, the social construction of knowledge predominantly pertains to second-order knowledge. It is acquired through deutero-learning, the learning of characteristic patterns of contingency in an organizational context. Such learning is intimately tied to behavioral interaction and communication. In an organizational context, all behavior that is emitted in the presence of others has effects on those others, intended or unintended. Those effects, describable in proto-learning terms as reinforcing or punishing consequences, are mutual and continuous. At the same time members deutero-learn: they come to discern regularities or patterns in the numerous consequences they experience in the course of their working days and they come to behave accordingly. The knowledge they thus acquire is inherently relational, i.e. tied to transactions with their social and physical environment.

Double binds

The 'neurotic dog' experiment implies that, from an interactional perspective, learning and knowledge acquisition are by no means unproblematic. Bateson has interpreted the disturbed behavior of the dog as pathological deutero-learning. In the beginning of the experiment the dog deutero-learns that it acts in a context for discrimination. The whole experimental setup, the laboratory situation and the course of the experiment contains numerous context markers for this discrimination purpose. At the point when discrimination becomes impossible, these markers become misleading. At once the animal enters a context in which it no longer should show discrimination, but instead should resort to guesswork and gambling. Obviously, the dog is not able to adapt to this sudden breach of contexts. Bateson has supported this interpretation with two observations from other animal experiments. First, dogs that are not trained in discrimination do not show signs of disturbance when randomly confronted with slightly different ellipses and circles. Second, when similar experiments are conducted outside the laboratory, the dogs fail to develop these symptoms. Bateson concluded that the 'neurotic dog' is being put in the wrong at the deutero-learning level. In other words, it is placed in a double bind situation (Bateson, 1972; 1979; 1996/1971; Ruesch & Bateson, 1951; Watzlawick et al., 1967).

The double bind situation has four interdependent and jointly operative characteristics (Bateson, 1972; Visser, 2003a):

(1) Two or more communicants are involved in an intense relationship with a high (physical or psychological) survival value for at least one of them. For example, in the experiment the dog is critically dependent upon the experimenter for food, shelter, attention and affection.

(2) In this relationship incongruent messages are regularly given that at one level assert something, but at another other level negate or conflict with this assertion. The first message often takes the form of a negative injunction, threatening some behavior with punishment. The second message conflicts with the first at one or more points and is also enforced by punishments or signals that threaten survival. For example, in the ex-

periment the presence of the circle signals the occurrence of reinforcement to the dog, while the presence of the ellipse signals punishment (i.e. the absence of reinforcement). When circle and ellipse come to resemble each other too much, the resulting stimulus signals an incongruent message that threatens the basis of reinforcement of the dog.

(3) In this relation the receiver of the incongruent messages is prevented from withdrawing from the situation or commenting on it. The receiver may be prohibited from escaping the field or (s)he may not have learned on which level of communication to respond. For example, in the experiment the dog is kept in a leather harness during the experiments that drastically curtails its freedom of movement and permits no escape from aversive stimuli.

(4) Double binding in this sense is a long lasting characteristic of the situation, which, once established, tends toward self-perpetuation. For example, in the experiment the dog remains highly sensitive to the 9:8 stimulus when shown after the experiments.

The social construction of knowledge in organizations may be subject to comparable double bind characteristics, which foster pathological deutero-learning and may induce stress and anxiety in organization members, comparable to Pavlov's dog. In the sparse research on double binds in organizations, the four characteristics have been applied as follows:

Ad (1): The 'intensity' of the relationship has been related to the degree of psychological identification members feel toward their organizations and work. Members who feel highly attached to their organizations and work experience more stress and anxiety in a double bind situation than members who feel less or not attached (Tracy, 2004). The 'survival value' of the relationship has been related to hierarchical dependency in organizations. Members who feel more dependent on management experience more stress and anxiety in a double bind situation than members who feel less dependent (Dopson & Neumann, 1998; Steier, 1995).

Ad (2): The 'incongruent communication' and 'threats of punishment' have not been researched in organizations. However, in psychological experiments in which subjects have been exposed to incongruent communication in an atmosphere of punishment, a significant amount of stress and anxiety has been measured in those subjects. It may be supposed that organizations members who repeatedly are exposed to these two factors experience more stress and anxiety in a double bind situation than members who are less or not exposed to these factors (e.g., Bowers & Sanders, 1974; Dush & Brodsky, 1981; Smith, 1976).

Ad (3): Being 'prevented from withdrawing from the situation' has been related to the personal and financial status and benefits members receive from their organizations and to their beliefs that other organizations will not provide equal status and benefits, or worse, to fears of being fired and becoming unemployed. Members who perceive a high negative difference between current status and benefits and possible future status and benefits experience more stress and anxiety in a double bind

situation than members who feel a negative or no difference in this respect (Dopson & Neumann, 1998). Being 'prevented from commenting on the situation' has been related to the 'total institution' atmosphere of organizations that deal with life-death emergencies and emotionally intense problems (examples are prisons, correctional facilities, police, armed forces, hospitals, mental institutions, secret services and fire departments). The large difference in emotional intensity between life inside and outside such organizations, the necessity of strong unit cohesion and clear leadership in recurrent emergency situations, the classified nature of some activities all limit the possibilities of meta-communication inside and outside these organizations. Members who are exposed to a strong 'total institution' atmosphere experience more stress and anxiety in a double bind situation than members exposed to a less pronounced 'total institution' atmosphere (Tracy, 2004).

Ad (4): The 'long lasting' characteristic of the double bind has been found to be less essential, even when some other aggravating conditions were present. The stress and anxiety in the experiments, mentioned under (2), occurred in spite of the relatively short period, the transient nature of the subjects' relation to the experimenter and the relatively lenient nature of the punishments involved. Thus in experiments this characteristic has been only modestly present, arguably less so than in many organizations (as the results of Dopson & Neumann and Tracy suggest).

Summary & conclusions

In the current literature a conceptual shift is discernible from an individual to a social perspective on organizational learning and from a content to a relational perspective on knowledge. Learning and knowledge increasingly are regarded as socially constructed in organizations. In this working paper I have outlined an interactional perspective that intends to shed more light on the processes underlying the social construction and the situated, relational nature of knowledge. Conceptually, the knowledge that is socially constructed in organizations is regarded as second-order knowledge, acquired through deutero-learning. Learning and knowledge of these kinds are inherently relational, i.e. intimately tied to behavioral interaction and communication with the social and physical context in organizations. Under certain conditions learning and knowledge of these kinds may lead to a double bind situation, which may induce stress and anxiety in organizational members.

The added theoretical value of this interactional perspective seems to lie in two specific notions. First, it adds the notion of the 'impossibility of not communicating'. This notion points at the significance of all forms of social interaction between organizational members who are aware of each others' presence. Noting that second-order knowledge is acquired in social contexts, one could extend this notion and propose the 'impossibility of not constructing knowledge socially' in organizations. Such knowledge is intimately tied to relationships and to the mutually exchanged verbal and non-verbal behaviors that constitute these relationships. Sec-

ond, it adds the notion that learning and knowledge are not necessarily positive or neutral phenomena. Under double bind conditions, the social construction of knowledge may become pathological, leaving the organization and its members increasingly maladjusted to environmental contingencies. More generally, the interactional perspective provides additional theoretical clues as to how interpretations of reality are formed in interaction and how pathologies in interpretation are formed and maintained in organizations.

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Endnotes

Students´ curriculum
What do the students learn in the business school?

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Introduction

"Business students are not interested in learning." "Business students are always looking for ways to cut corners." "Business students cheat and have low morals."

Are these statements familiar to you? To me they are, but although these are not totally unfounded assumptions, to my ear (being a recent graduate of the Helsinki School of Economics), these allegations seem somewhat unfair also. They seem unfair not because they are not true but because they give only a partial and incomplete explanation of the situation. Surely, there is some fault also in the way business education is organized. As Pferrer and Fong (2004, 1508) point out, when business school faculty complain that students are not interested enough in learning for its own sake, it is possible that the business schools themselves have, through their own actions, helped to create this situation.

Romme and Putzel (2003, 512) find reasons for the student's behavior in the design of educational practices. They argue that most of the educational practices in business education do not rely on any meaningful educational theory and hardly any on organizational theories. They say that business schools´ faculty members do not seem to practice what they teach, i.e. teachers preach about organizational and group learning but do not design education accordingly. In addition, Thomas & Anthony (1996, 17) sarcastically point out that it does not require much philosophical insight to realize that the mere existence of institutions that claim to be dedicated to management education is not sufficient for accepting that what they do is educational. But why is this then problematic?

It seems to be forgotten in the design of business education that according to our own theories (e.g. Lave & Wenger 1991, Brown and Duguid 1991, Wenger 1998, Gold & Watson 2001) people (i.e. students as well) do not only learn the contents of their work but they also learn through work processes and practices. This means that we should treat students as individuals working, learning and knowing through their participation in educational practices. Accordingly, we should study students´ studying activities using theories of organizational learning and knowing. I claim that this would lead to a more fair and merciful treatment of business students.

In this paper, I am interested in students´ curriculum, which includes students´ ways of learning and knowing. Thus, the focus of my paper is on the ways BSc./MSc. students of Helsinki School of Economics (HSE) themselves create and maintain meanings on the educational practices, and in particular on the practice of examination. In the search of students´ curriculum, I turn to the theoretical concepts emphasizing participants´/actors´ agency in creating, maintaining and renewing their social realities. Consequently, I introduce the concepts of situated curriculum and the hidden curriculum.

As empirical material for this paper, I use a series of exchanged messages, which took place in the student union web pages between March and April 2004. About ten students took part in the exchange of messages and by the summer 2004 these messages had been read

almost 2500 times. In the analysis of this empirical material, I present an interpretation of the students´ curriculum and analyze what kind of learning and knowing it enhances. In the conclusions I argue that the integration of concepts of situated curriculum and hidden curriculum opens up new ways to understand business education.

The situated curriculum

Business education as a net of practices

Business education can be seen as a network of practices within specific institutional settings. Practices of everyday business education include listening and giving lectures, participating in classroom work, taking and grading exams, and evaluating both students and teachers. These practices interact with each other, support each other, depend on each other, and interfere with each other (Nicoloni & Holti 2001, 3). Thus, these practices constitute a net of educational practices, in which changes in one practice affect its relations to others. However, despite the connectedness of practices, they are not all of equal importance. There are so called anchoring practices (c.f. Swindler 2001), which means that some practices are more crucial than others in defining and sustaining the net of practices and the prevailing reality. In particular, in business education, the practice of examination affects the ways courses are organized, the ways the students study and act in teaching situations (in lectures and classrooms) and the ways teachers evaluate and grade students.

Moreover, practices are situated; which means they do not appear as identical in different contexts. Lave and Wenger (1991) suggest that this very relationship between a practice in specific context and participation in that context is significant. They emphasize that people in different contexts create and negotiate particular ways of acting, learning and knowing. Thus, participating in the practice of examination for example - and the learning and knowing produced by this participation - vary from educational institution to other. Taking an exam in HSE may require different kind of learning and knowing than taking the exam at the same level in some other business school.

Practices become learnt and known through situated curriculum

Gherardi et al. (1998) have introduced the concept of a situated curriculum to emphasize the contextual nature of learning and knowing. They argue that the contents of situated curricula differ from the contents of formal curricula and work manuals. Accordingly, the situated curriculum is embedded in the social processes and traditions of the community and it is sustained and transmitted from one generation to the next. Thus, when today's newcomers have acquired the sufficient know how and knowledge to act as masters, they tend to guide those who follow the same path as they did, perpetuating the curriculum with some of the innovations that have occurred in the meanwhile. The situated curriculum is one of the ways in which new knowledge, both cultural and material is produced.

As stated above, learning and knowing the practices can always be located to a particular community. However, referring to community does not mean emphasizing the existence of informal groups or social systems within organization. It is a way to emphasize that every practice is dependent on the social processes through which is it sustained and renewed, and that learning takes place through the engagement in that practice (Gherardi et al. 1998). Also Brown & Duguid (2001, 204-205) argue that if people share a practice, they will also share know how and knowledge of that practice. Thus, communities of practice are actually defined by the communal practices of which its members are likely to have shared knowledge and know how. Consequently, the focus is more on the practices and less on the community.

Being a business student is learning and knowing the situated curriculum

Based on these assumptions, being a business student means participating in different kinds of practices with other students in a specific business school, e.g. in HSE. Being a business student means being capable of participating in the complex web of relationships among other people and activities. As Gherardi et al. (1998: 274) put it: "Goal is to discover what to do, when to do and how to do it, using specific routines and artifacts, and how to give a reasonable account of why it was done." As if this was not a challenge enough, being a competent business student means reaching this goal in a way that is appreciated and valued by others. Contu and Willmott (2003, 6) continue: "It is not the acquisition of skill or knowledge with a universal currency (e.g. textbook knowledge) that identifies the 'competent' member. Rather, it is a demonstrated ability to `read' the local context and act in ways that are recognized and valued by other members of the immediate community of practice that is all-important."

Therefore, the situated curriculum contains learning and knowing a practice in a specific context. It implies that once members of community come to learn the situated curriculum of their work practices, they will also gain a better understanding of those practices. From this perspective, the link between the situated curriculum and the practices seems generally promising. But what if situated curriculum comprises a kind of learning and knowing that do not lead to qualitatively better understanding of the practices in question. In the education studies, this problem is often solved by introducing the concept of the hidden curriculum. Next, I will look at this concept in more detail.

The hidden curriculum

Concept of hidden curriculum connects doing, learning and knowing

Another way of looking at the link between practices, learning and knowing in business education is by introducing the concept of a hidden curriculum (Ottewill, Leah, Mackenzie 2004). This concept problematizes the harmonious connection between practices, learning and knowing in education. It claims that sometimes the practices of education do not operate in a

way an official curriculum suggests. Beside the official curriculum, there exists a hidden curriculum, which favours a different kind of learning and knowing than what the official curriculum is meant to promote (e.g. Bergenhengouwen 1987, Ahola 2000, Margolis 2001).

An overview of the concept of hidden curriculum

The concept of hidden curriculum was first introduced by Jackson (1968). He noticed that students were expected to develop skills and competences which were not stated in formal curriculum. Students were expected to learn to wait quietly, complete assignments, be neat and punctual, keep busy etc. This provided a foundation for the general definition of the hidden curriculum as the element of socialization, which takes place in school and which is imparted to students through daily routines, teaching and studying practices, and social relationship. (Margolis et. al 2001, 6) The hidden curriculum was understood as institutional expectations, values and norms, which were set by teachers and initially completely unknown to students. It was contrasted with official curriculum in which sense the former is hidden because it is not public (Portelli 1993, 345).

However, this view has been criticized by pointing out that teachers cannot straightforwardly direct the students´ knowing and learning. Educationists such as Martin (1976) and Gordon (1982) have argued that educational practices always produce learning and knowing that cannot be foreseen. Thus, the hidden curriculum can also been seen as unintended learning outcomes or messages. (Portelli 1993, 346) These messages imply what kind of learning and knowing is desired and from whom, not only in the context of education but also in society. As Margolis et al. (2001, 15) state from this perspective the hidden curriculum is located in specific social practices, cultural images and forms of discourse. Here the 'hiddenness' of the curriculum is emphasized, but the positive side of it is that it can potentially be uncovered and eliminated.

A more radical view of the hidden curriculum implies that the hidden curriculum has a more profound relationship to society (e.g. Bowles & Gintis 1976). It is argued that through formal and hidden curricula schools reproduce the social relationship necessary in maintaining society and capitalism. The whole educational structure supports the practices of competition and evaluation, hierarchical division of labour, bureaucratic authority and compliance. (Margolis et. al 2001, 7) Reproduction of these practices, and the skills and attitudes needed to participate in them, prepares students for their future work roles (Ehrensal 2001)[1]. The hidden curriculum functions to mediate and legitimate the reproduction of different kinds of inequalities, including social class, racial and gender relations. And as the hidden curriculum is seen to arise from the structure of education (and its relation to society), it is hard to transform.

However, the view of education as an ideology machine maintaining prevailing practices is contested by arguing that the reality of education is more complicated. It is lived and produced by teachers and students. This view points out that the hidden curriculum is multi-

faceted opening up space for teachers and students to resist the mechanisms of social control and domination. However, this does not mean that teachers' and students' interests go hand in hand. The students may resist teacher's attempts and vice versa, as the students do not necessarily share the same idea of what is or is not 'domination' (Korpiaho and Päiviö 2004). Thus, students can act creatively and in ways that contradict the expectations of teachers and/or the educational system. Furthermore, students can create and share their own hidden curriculum, which arises out of their reactions and attitudes toward the formal curriculum (Snyder 1973).

The hidden curriculum in business education

I understand the hidden curriculum as something that is an essential part of educational practices producing unforeseen learning outcomes, including ideological and normative meanings. However, the hidden curriculum does not simply subordinate students, but it is also rejected, recreated and maintained by students. Students are not just pawns moved by the hidden curriculum of educational practices but they themselves are active participants in creating and exploiting the hidden curriculum. Thus, studying students´ learning and knowing in business education requires also an understanding of the concept of hidden curriculum.

Studying the students´ curriculum in practice

In order to study students´ views of learning and knowing the educational practices, an access to the students´ world is needed. A real challenge is to create situations where students would tell unreserved accounts of their everyday practices and openly discuss their understanding of those practices in business education. It is not necessary in students´ interest to reveal their curriculum, including elements of the situated curriculum and the hidden curriculum, to people that are potentially dangerous to their ways of doing, learning and knowing, i.e. the personnel of the university. Therefore, I decided to rely on naturally occurring data, i.e. material that was produced without my (teacher/researcher's) intervention.

I use students´ internet discussion about the practice of examination as my data. In HSE, as in many other business schools, there are internet forums - often supported and updated by student unions - for students to express their voices. In these internet forums, students share their thoughts and opinions about educational practices, different courses and teachers. In HSE, the internet forums were established in 2002 and after two years there were almost 1400 registered users. Registered users have their own nick names behind which students write and send messages to the public internet forum, where the messages are visible for everyone to be read and commented on. Therefore, there are much more readers than there are active participants in the internet forums.

The series of messages, which I use in this paper, took place in the forum called "HSE-internet discussions about HSE and its courses". As this forum deals mostly with matters

important to the first and second year students, it serves as an important channel for students to instruct each other. This is also the case in my particular series of messages, which was entitled as "Organizing work, panic attacks". Almost ten students sent messages and commented on them between March and April 2004. By the summer of 2004, the series of messages had been read 2480 times[2].

The focus of my paper is on the ways the students, in their internet writings, construct views of the relevant learning and knowing of the practice of taking exams. Consequently, I need to ask from my research material: What, and how, do the students write the practice of taking exams on the Internet?

In this paper, I present eight out fourteen messages and analyze them in more detail. I have not altered the nicknames of the students nor have I changed the sequence of the messages. I start the analysis from the beginning and analyze first eight messages quite thoroughly but leave the rest out of analysis as they begin - more or less - to repeat each other. In the analysis, I am not interested in the use of the language per se but rather what the students are trying to say about the practice of examination in particular and studying at HSE in general. To be able to analyze their writings from this perspective, a thorough comprehension of the context is needed. However, for the scope of this paper, I offer a brief description of the context of studying at the HSE.

Studying at HSE

The Helsinki School of Economics was founded in 1911. It is an independent state institution, which engages in economics and business research and education. It is the largest business school in Finland with over 4,000 students. The main programs at HSE are the undergraduate Bachelor of Science and the graduate Master of Science degree programs.

Annually about 400 new students are admitted to the BSc/MSc program out of about 2,000 qualified applicants. The admission is mainly based on an entrance test (questions on five books) and grades in the nationwide matriculation examination. As the admission rate is as low as 20%, applicants have to study hard in order to get in. The living legend among the students tells that this is the hardest test they have to face in their studies. Once they have been accepted to the HSE, they do not need to worry about passing tests anymore. Unless a student participates in deceitful activities, it is almost impossible to become excluded from the program. However, this information offers only a short-term comfort for students.

As the new students begin their studies at the HSE, they soon realize the extent of the work they are expected to carry through during the first one and the half years. Students´ schedules are filled with mandatory courses in economics and business disciplines[3], together worth of 60 credits[4]. These studies are called 'the general studies' as their official purpose is to ensure that every student has the necessary knowledge and skills required from The Business Candidate. At the HSE, the official curriculum concentrates on logic-rational thinking, quantitative methods and mathematical/ numerical skills. These kinds of competences are

required in 36 out of 60 credits. Furthermore, the students who possess these competences are able to participate in so called 'combination courses' (in mathematics, in statistics, in macro- and microeconomics) and thus gain extra 16 credits. This means that after mandatory courses it is possible to have a total of 52 credits in quantitatively orientated courses compared to 24 credits in other subjects.

After the mandatory courses students are to choose their majors from 16 different subjects. The mandatory core courses serve as an introduction to most majors e.g. to Accounting, Finance, Economics, Marketing and Organization & Management. In addition, there are the so called 'major fairs' where professors, assistants and graduates market their own subject as a major. For the disciplines' point of view, the number of majoring students is crucial as the number of graduating students is the key to receiving funds. For the students' point of view, choosing a major is regarded almost as seriously as choosing a future. According to Kinnunen (2002), the most important reasons in HSE to choose a major are the attractiveness of future job responsibilities, compatibility to one's own abilities, possibilities of getting a job after graduation, and possibilities of salary and career development.

However, in order to become a majoring student in a specific discipline, students have to apply for it. There is a calculation formula, which ranks students based on the number of courses taken and grades received. Thus, it is in students´ interest to take as many courses as they are expected to and to receive as good grades as they assume they will need. Here again subjects like Finance, Accounting, Quantitative Methods of Economics and Management Science, Management science and Technology Management and Policy have their own basis of calculation. They put more weight to their own courses and require good grades[5]. Consequently, if one wants some of those subjects as one's major, there is a pressure to perform required courses with good enough grades. Practically, there is no competition between students, i.e. almost every student gets the major of his/her preference, and those who do not, are able to change majors later on. But this artificial competition has effects on the practice of examination.

Because the core courses are mandatory for everyone and they 'need' to be performed before choosing majors, the students usually take the courses with their peers. This means taking at least ten exams and spending about 40 hours to the exams during their first year. Although the popularity of different teaching methods, like cases, reports and other assignments, has increased in recent years, the weight of exams in the final grade is still between 80-100% in most courses. And the same continues as the students advance in their studies: over 1000 exams[6] are arranged in HSE annually. Thus, learning and knowing the practice of examination is a key to studying at HSE and it is in their interest to share the knowledge of that practice in their own student community.

Discovering the students´ curriculum

In this paper, I am interested in what the students learn in the business school. In order to answer this question I look at the students´ own conceptions of their studies at HSE and of the practice of taking exams in particular. From my empirical material I ask: What, and how, do the students write about the practice of taking exams on the Internet? The series of exchanged messages that I show here, deals with one mandatory course, i.e. 'Organizing work' and it has been named as "Organizing work, panic attacks."

The first messages deals with the question where a novice asks help for finding study materials for the book exam in 'Organizing work'. The following messages show how quickly she/she is instructed in the practice of examination.

1. Time investments

FK: *I intend to take a book exam but I cannot find Gabriel's book on 'Organizing & Organizations' anywhere. Does anybody happen to have a decent summary of the book? Or the book? Otherwise, I guess it is pointless to go to the exam.*

Karl: *If you have taken the trouble to register for the exam, it is always worthwhile to go. And if you drag yourself to the exam, it always pays out to answer. If I had not taken the exams that I panicked about or had one or more books left to read, I would probably have about 20-30 credits less than I have now. And as it is an exam of the course 'Organizing work' you only have to answer just about right…*

The first objective of learning, that is hardly ever publicly questioned, is to use time efficiently[7]. In the first year of studying, students are to take up to 10 mandatory courses, of which almost all include a final exam at the end of the fall/spring semester. This puts students to situations where they are unable to master the content of every subject with equal thoroughness. As Ahonen (1997, 44) points out, in business education there is a fundamental contradiction between the course content and students´ abilities to learn. This leads to a situation where students´ primary concern, especially in the beginning of their studies, is how to pass the mandatory courses.

For a student to concentrate on the quality and not the quantity of courses would require an essentially slower studying pace. However, both the formal curriculum and the students´ moral order work against this sort of activity. The mandatory courses serve as an introduction to the 12 different majors, so it is unrealistic to expect students to be contentually motivated. Moreover, the students are pressured to perform these courses efficiently under the suggested time span, as the number of performed courses is an important criterion for getting a major of one's choice. Also, the students´ moral order at the HSE supports the virtues of effectiveness, performance, and fast graduation, and thus emphasizes the speed of studying over the depth of understanding (Päiviö & Leppälä 2001).

So, in order to just pass through the mandatory courses, the students have innovated ways to optimize their time usage. Student union, KY, runs a book agency, where old books, book

summaries and old exam questions are sold. After 2004, the selling of the book summaries was forbidden because of copyright violations. As a consequence, the abstracts are now distributed through internet free of charge by students. In this situation, a new challenge arises, as the students are to learn where or from whom to get this material once delivered by KY. This chain of events sets a basis for a novice to ask book summaries on the internet in the first place. His/her request opens up a possibility to an older student, Karl, to comfort a novice. Karl assures that it is always worthwhile to take the exams despite insufficient preparation.

2. Coping strategies

Karl: *If you feel that you cannot answer some questions, just 'compose' something. Be obscure and difficult to understand but give an impression that you know what you are doing. Write at least one page, use concepts and sophisticated words that sound stylish. Let your imagination guide you! It is very possible that you manage to slip through that exam. And considering the course you are taking, the grade should not matter at all.*

Karl advises a novice to concentrate on learning a 'composing' strategy instead of spending his/her time searching for literature. Composing can be understood as a kind of intellectual play against the examiner, where the name of the game is how to present oneself as a competent student. This requires learning and knowing the key concepts and terms of management discourse. As Karl instructs, "Write at least one page, use concepts and sophisticated words that sound stylish". However, this requires at least a rough comprehension of the concepts and terms that are considered to be persuasive and convincing in the context of business education, and in the context of specific exams. Gradually, exam by exam, the business students will learn the particular- and for an outsider peculiar- language of contemporary management practice. Grey (2002, 501) points out that this very capacity to speak and understand the right kind of management discourse is a major accomplishment of business students.

Accordingly, more important than learning and understanding business realities, its practices and actors, is to know the 'right' vocabulary and discourse in different contexts. But not any language will do. The suitability of terminology is defined by the appropriateness of ideological messages expressed through the language (Grey 2002). It is suggested (Alvesson & Willmott 1992, 1996, Prasad & Caprioni 1997, Frost 1997), that these ideological messages often promote rationalistic aspects of business life, salute the managerial view, and advance technocratic thinking. However, it is important to remember that the ideological messages in management discourses can vary from subject to subject. Thus, it is essential for students to learn what discourses to use in different contexts.

When the students learn the discourses well enough, they just might be able to bluff/convince the examiner to pass them through the exams. Consequently, students share

tips of the appropriate discourse usages also on the internet. For example, it is argued that using the phrase "whole organization must be committed to organizational change" in the exam of "Business Policy and Strategy" increases the average grade by 10 points (when the scale of grading is from 40 to 100). I believe that this is phrase mentioned because its ideological message deviates from the managerialist dominant way of teaching business policy and strategy issues in business education.

Although mastering the composing strategy comes very handy for students, it also mystifies the students´ learning processes by alienating the outcome (the answer filled with management jargon) from the learner (typically: a business student with no experience in business life). Learning becomes secondary and the mastery of the composing strategy primary. This might be one reason why the use of composing strategy is not appreciated by all the students.

3. Choosing exams, majors, futures

Big III: Thank god there are other subjects in HSE, which punish students for 'composing' rather than support this kind of activity by giving points. Therefore, one should consider if one wants to choose 'composing' or 'knowing' as a major in HSE.

Interestingly, the criticism of the use of a composing strategy is not targeted at its users but at the exams and subjects that allow its usage. Students learn that composing, as the use of sophisticated concepts and terms, is possible only in some exams or more precisely in some subject's exams. The possibility to benefit from verbal abilities and intellectual imagination (remember Karl´s advice: Let your imagination guide you!) makes the exams somehow less worthy, requiring less of the actual 'knowing'. The discussant above talks about 'subjects of composing' and 'subjects of knowing' without naming the subjects in question. It seems that the students collectively produce this category, which is not - at least officially- supported by the faculty. But on what basis is the divide then made?

One obvious source of knowledge is the official curriculum and its the emphasis (in credits) on the subjects of technical rationality. Another source of knowledge is the success of these subjects in the selection process for majors, where subjects like finance and accounting have traditionally been winners, not just in Finland but elsewhere as well (e.g. Kallinikos 1996). Roberts (1996, 56) suggests that in the analysis of the popularity of these subjects it is important to take account the instrumental interest that shapes the management education. The hope offered in business education is that the business student will be better able to control organizational reality and thereby to realize his/ her own interests through the organizations´ goals. There is thus a relationship between the instrumental interests of students getting their degree and the assumptions students are taught in different subjects. There is a strong pressure from students, a sort of impatience that all knowledge should come to them in a usable and controllable form. The students learn very quickly which subjects offer this compact 'knowing' and instant career prospects.

Consequently, management education as an institution seems to reinforce the students´ expectations (see Pfeffer and Fong 2004). For example, HSE advertises management education by slogan: "Are you too aiming for top jobs?" In the so called 'major fairs', there are lists presenting how graduates of different subjects have been placed (titles) just after their graduation. These lists are placed in note boards and maintained by the recruiting office.

But before getting these 'top jobs', students need to pass at least the first mandatory courses. Meanwhile, a novice's anxiety has not been eased. He/she is not convinced he/she would pass the exam without studying.

4. Relationship between knowledge and discipline

A novice is still afraid that he/she will not pass the exam without reading.

FK: *The rumor tells that in the book exam adequate answers to every question were required. This means that composing is not allowed. All knowledge outside the book is ignored. That's sad.*

Seppo: *If all knowledge outside the book was accepted in the school exams, the system would bore students more than develop them. Everybody can make the world a better place but who wants to work hard? Despite this, maybe the current system does increase the stupidity of the students. They are hopeless, they need not be developed. You can find nice blonde girls everywhere; they are not all blonds, but girls anyhow. Girls with s-problems and nice clothes, but that is about all they have.*

FK: *I agree that many exams (e.g. entrance test to the HSE) measure the noble skill of memorizing. Here, memorizing the details presented in one book measures the ability to absorb knowledge regardless of the correctness of those details. But as in the matriculation examination, the knowledge outside the books is a requirement to an excellent answer; this should also be the case at university. Of course this would be an impossible job to examiners to check the validity of the knowledge. However, this would support the idea of science-based university, which HSE states in its own business idea.*

A novice learns that taking an exam at business school differs from the taking the matriculation exam at high school. In the matriculation exam one can combine knowledge learnt outside the book more freely: from different courses, current affairs programs, newspapers etc. However, a novice interprets this as "composing", of which a more senior student was talking earlier. But I argue that this is a different category of composing. This type of composing endorses drawing from one's prior learning experiences, connecting knowledge and going outside (beyond) the text books.

A new discussant, Seppo, sees this as a threat towards business education. He reproduces an understanding that this kind of composing should not be accepted, because it would ultimately lead the system into decay. According to him, business schools should not allow ´essays of how to make world a better place` otherwise nobody wants to do the ´hard work´ of

studying[8]. His answer can be seen as a resistance against the novice's interpretation of composing or it could be seen as a defense of the current system, which does not satisfy him either. The novice echoes this dissatisfaction and claims that the current system grades students only by their ability to absorb knowledge and nothing more.

A novice is learning something essential of the practice of examination. Making the students absorb the subject-based knowledge mediated through textbooks and exam questions can be seen as a target of examination. As Kvale (1996, 230) writes: "The purpose of examination is to maintain the knowledge of different disciplines, to delimit its boundaries, and to incorporate new developments into the authorized body of knowledge. In this conception of examinations, high grades are rewards for those students who have given the clearest presentation of the discipline's knowledge. Correspondingly, low grades are punishments for not presenting the expected knowledge, of not giving it due respect." By participating in exams students learn to stick within contents and discourses that are accepted and legitimized in particular courses. This is a safe solution for a beginner. But as they learn to know which courses come from similar disciplinary fields and which do not, they learn to orientate to the right sources of knowledge outside the books.

5. The purpose of the examination

Big III: I do not believe that any sane examiner punishes for using knowledge outside the book. But there is a huge difference if a examiner passes a composer who has just barely scanned through the summaries a couple of times or if he/she gives an excellent grade to the student who combines the knowledge learnt from the books to the knowledge he/she has learnt otherwise.

I myself took the exam where a list of 5 sentences was asked from over 1000 pages. I sent a courteous email to the examiner. In that email I presented my annoyance regarding the unreasonably detailed questions with only a little relevance to the actual subject matter. The examiner's answer was as polite as my email. She/he replied that one has to ask too many details in order to separate the summary scanners from the students who actually have read the books.

To sum up: forbidding teachers to ask trivialities is not the same as forbidding the students to think. The one who is to be felt sorry for is the assistant who has over 400 papers from which to sort out the real answers from the nonsense. Of course the easiest solution is to pass all students who have enough text on the paper. Unfortunately, this happens too often at HSE.

As discussed by the students earlier, the professional development of the business students is not exactly the purpose of the examination. But in good enough business schools, the exam questions are, and are allowed to be, about exact text book knowledge. Personnel, examiners and/or assistants, are then the gate keepers, whose job is to maintain and protect the standards of subject based knowledge mediated through the text books. And consequently, they grade

and differentiate students based on that learning. Here the students produce an understanding that it is the assistants (not the professors) that do this dirty work, and therefore they are to be understood and felt sorry for their desperate mission to separate the summary scanners from the book readers. That is why students endure unreasonably detail-orientated questions and the insanity of examination –out of loyalty towards assistants and their mission to protect the standards of education.

This purpose of examination is learnt to be an essential part of education and is thus silently accepted among the students. As Boje, 1996, 182-183) points out, the purpose of examination is to segment, rank and differentiate students. Exams order good and bad students in relation to one another, distribute people by aptitude, quality, skill, and order penalty in terms of grades. And as the discussant points out, this purpose needs to be differentiated from the actual learning processes.

What do the students then learn if not to develop their intellectual abilities? Through the practice of examination, they learn to value their performance in terms of how well they have - as individuals - succeeded in comparison to others. They learn to measure their performance as well themselves against other students. It is not the grades, but rather the grades of others that count. And when this silently agreed arrangement fails, i.e. everyone is passed or given good grades, students get angry.

6. The game of the business school

Big III: *I don't doubt the assistants´ work ethics but the negative feelings attached to making somebody to fail. I have more than once been in a course where all students have passed the exam in spite of their level of competence. If anything I believe that students are passed because they do not want the image of being a bitchy subject or a person. The brashest students then go and complain why they did not get excellent or good grades with their tip lists. Thus, they want to be friends with us business students, although we know nothing in exams. No hard feelings to anyone by failing students in exams. They do not want to cause any unnecessary bad feelings to students by failing them in exams.*

As the students become more familiar with the practice of examination, they learn to see it as part of a more complex net of institutional practices. The students sense the competition for students and reputation, which prevails among the different subjects and departments in HSE. This leads, according this discussants´ insinuation, to a situation where teachers by giving good grades lure students to choose majors in their subject field in order to get funding and negotiation power within the HSE. Although this is not necessarily the case, the students learn to read that kind of behavior through "the customer (business student) is the king" –discourse. Students produce the belief that teachers want to give good grades hoping that students would remember the nice feeling of succeeding also in the moment of major selection.

Some students even learn to take advantage of this situation. As Big III argues: "The brashest students then go and complain why they did not get excellent or good grades with their tip lists." This kind of behavior is consistent with the overall conduct that the practice of examination favors: individualism (surviving alone), self-assurance (composing strategies and presenting self as competent student), competitiveness (comparing self with others), and finally arrogance (complaining and confronting) all label the practice of examination and are enhanced through the participation in the practice. Considering the magnitude and significance of this credit collection mechanism at HSE, it is obvious that those who adopt this way of presenting self are the winners in business education.

Summary of the students´ curriculum

The content of the students´ curriculum of the examination includes elements from both the situated and the hidden curriculum. The situated curriculum is needed to understand the role of learning and knowing the educational practices, where as the hidden curriculum is needed to emphasize the power structures of the business education and its wider connection to the reproduction of society.

Activities	Contents of the curriculum
1. Surviving through the intensive exam periods with the help of time management	• Learning to pass courses and maximize the collection of credits. • Learning to be efficient, finding exam materials from libraries and students´ book agency. • Learning that it is not necessary to actually read the required course materials. Finding and circulating book summaries and old questions and answers.
2. Becoming acquainted with different kinds of coping strategies.	• Learning the use of the composing strategy. • Learning the right vocabulary, including ideological messages, required in different subject's exams. • Learning to present self as a competent student with the help of a specialized vocabulary.
3. Finding out which exams are considered to be the important ones and deciding on the use of coping strategies.	• Learning the structure of credit gaining implied in the official curriculum. • Learning to prefer exams that may affect their possibilities of getting a major. • Learning to appreciate subjects offering technical rationality that match with their ambitions of getting a job and promise a comfort against the insecurities of business life.
4. Understanding the role of discipline-based knowledge in the practice of examination.	• Learning to stay within exam areas, learning the text book knowledge. • Learning to consider explicit course contents as knowledge and bypass the questions that require ´making the world a better place´ -reflections. • Learning that faculty members are gatekeepers of that knowledge.
5. Learning the operation mechanism of the institutionalized practice of examination.	• Learning to separate learning processes from taking exams. • Learning the purpose of exams as a mechanism of differentiation. • Learning to measure one's own performance against others.
6. Becoming aware of how the business school as an institution operates.	• Realizing the competition for students and funding constructing the realities of business schools. • Learning to take an advantage of the 'student is the customer' -discourse. • Learning to present characteristics such as competence, self-assurance and if needed, arrogance.

Conclusions

I argue that the concepts hidden curriculum and situated curriculum interact with each other. The hidden curriculum puts more emphasis on the political and critical view on practices, whereas the situated curriculum stresses the significance of learning and knowing that various practices produce. Practices of the business education do not only organize education and students´ experiences but they become learnt and known by students, who then actively (re)produce the situated/hidden curriculum of business education. In both approaches the question of agency becomes central: to what extent the students are able to produce they own ways (hidden or not) of learning and knowing in business education and to which extent they are just objects of educational practices. The discussion around the situated curriculum seems to offer a welcomed space for agency in business education, whereas the discussion around the hidden curriculum brings forth a kind agency often ignored in the design of educational practices.

Based on these starting points two things follow: first, students should be understood as academic workers who work/study, learn and innovate as the rest of us academic workers. The need of producing understandings and finding meanings: what to do, how to do and why to do, exist alike. Secondly, the practices of education do affect the ways students learn these things. The situated/ hidden curriculum that arises from students´ attitudes towards the formal curriculum often appears as 'a destructive curriculum' but it could also be 'a supportive curriculum´. It can work against or along with the official curriculum, is not intrinsically good or bad. We need to take students´ learning and knowing seriously, not just as something that take place in the so called educational situations but as something that is continuously produced through participation in even the most mundane practices.

This learning and knowing becomes important as it affects how the students act in lectures, how they relate with other students, with faculty members and encounter them in departments. If the students learn early in their studies the presented ways of studying, it is much harder - for both the students and teachers - to try to convert the direction later on. However, it is paradoxical that the situated/hidden curriculum, which emerges from the practices of business school, is rarely accepted by faculty members. This situation leads quite easily to double standards and increases the distrust between the faculty members and students.

I argue this gap between academic workers and students is to some extent unnecessary and artificially maintained. As Mäntylä & Päiviö (2005) point out, the researchers of academic work are frustrated by the managerialist approaches under which their work is put in recent years and thus claim more appreciation for the internal values of academic practices. In similar way, those students that would want to appreciate learning in its own sake and develop meaningful studying practices are put in the difficult spot. And, when it comes to intelligent business students, it is not realistic to think, they would just disregard the curriculum, which is a basis of becoming a competent and respected student of business education.

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Endnotes

1 The name of Ehrensal´s article crystallizes the idea of hidden curriculum: "Training Capitalism´s Foot Soldiers. The Hidden Curriculum of Undergraduate Business Education".

2 Note that about 400 students are accepted to HSE yearly.

3 Introduction to Mathematics, Introduction to Statistics, Introduction to Financial Accounting, Introduction to Management Accounting, Introduction to Finance, Principles of Macroeconomics, Principles of Microeconomic, Operations Management, Introduction to Management Science, Introduction to Business Law, Introduction to Information Systems, Business Policy and Strategy, Organizing work, Principles of Marketing, Introduction to International Business, Introduction to Entrepreneurship and Innovative Thinking.

4 The extent of the degree program is given in credits. One credit (i.e. study week) refers to an input of 40 hours of work from the student.

5 http://veppi.hkkk.fi/netcomm/ImgLib/2/58/Perusteet%202004-2005.pdf

6 According to official curriculum, 836 exams were arranged in HSE in 2003-2004. In addition, many teachers prefer having so called 'lecture exams', which are not mentioned in the official curriculum.

7 Consequently, when I and my co-teacher Keijo Räsänen asked, in the course called Professional Development, students to write an essay about one academic skill needing improvement, a considerable number of students chose a skill of time management.

8 Interesting point of view: Instead of asking: Apply the model/formula y to the situation x. Why do we not ask: How does the use of model/formula make a world a better place? Or does it?

Emerging Academic Practice:
Tempered Passions in the Renewal of Academic Work

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Introduction

The purpose of this paper is to contribute to discussions on academic work and its current changes. In particular, our[1] intention is to advance such accounts for academic work that tell about the life-world of ordinary university workers. We think that stories of ordinary life in academia are worth telling. In particular, these stories are needed to correct the balance favoring simplistic and politically one-sided representations.

Most public attention is paid to managerially re-contextualized accounts for academic work, highlighting "excellence" or the lack of it. Even the critics of this political stance can easily fall into the trap of reproducing, for contrast, a gloomy prospect, by forgetting to tell about the alternative futures under construction in various localities. Yet, life in academia is much richer and diverse than neo-liberal policy documents and managerial accounts suggest. As we ordinary, "mediocre" academics are, by definition, a majority, why should we not tell about our own experiences and ways of making sense of our own work? However, it is not easy deviate from the story lines of the acute political debate.

We have recently (re-)turned to 'practice theories' for help in writing about work in academia (Schatzki et al. 2001, Reckwitz 2002, Nicolini et al. 2003). In principle, the theories of practice should be of help in crafting meaningful stories, because the practice theorists share an interest in detailed studies of ordinary life and work, that is, in what people do and think on a daily basis. Before this opportunity and promise can be realized, one, however, needs to choose where to turn if one turns to practice theories. This set of approaches is broad, and what at first sight looks family-resemblance may prove out to cover significant differences.

Silvia Gherardi (2003, 356) has pointed out a helpful cue for our efforts:

> *"From my point of view, the interesting aspect of social practices is how they are guided by a practical reason which stabilizes them as habits but is at the same time passionate reason, so that it expresses a desiring force which destabilizes the habit. ...Besides this social and cognitive production of practical reason, I would stress its emotional, affective and aesthetic bases activated by desire and passion."*

Gherardi's interest in the passion for knowledge seems important (cf Ortner 1997, 157, and Miettinen & Virkkunen 2005, 450-451), because without considering emotions, meanings and moral reasoning we would not understand why we have done what we have done. Our local accounts are about efforts to renew academic work activities and working conditions. They are about persistent working against the subject positions shown to us both by the neo-liberal/managerial policies and by the academic games for reputation (or 'forms of capital'). For us, these efforts are incomprehensible – and even unjustifiable - as mere adaptations to available material tools and conditions, existing activity nets, or political games in the local academic field. Such accounts bypass what Alasdair MacIntyre (1981) calls 'internal virtues' of a practice, understood here as something being sought and not necessarily given or found.

Among the potential virtues of academic work, the "passion for knowledge" is a good candidate. It exemplifies the inherently emotional grounding of moral positions, although it does not necessarily serve as the general answer to the quest.

This paper thus presents a particular reading and use of the practice theories. We suggest that the identification of a new epistemic object, namely academic practice in emergence, can aid in crafting meaningful accounts for local efforts to renew academic work. This intellectual 'device' provides both a connection to resources of practice theory and a meaningful interpretation of what we, at least, have been doing over the last ten years.

In what follows, we will first outline the position from which we approach the literature of practice theory. Secondly, we will suggest a particular way of using practice theory in accounting for academic work. Thirdly, we will treat the question of how one can write stories that are based on this line of thinking? Fourthly, we will elaborate on the implications and complications of this view in relation to the theories of practice and studies of academic work.

Instead of presenting a review of the practice theories, we will specify points at which our search for the means and styles of accounting seems to meet specific discussions on practice theory. These meeting points provide foci for further work - both for us, and for those others who want to develop a practice theory by drawing on participatory studies in academia. Finding these meeting points is a task in itself.

Accounting for Academic Work in a Local Context: Sources of Inspiration

The Site and the Workers

The stories that we want to cultivate and share concern a particular site of academic work. This site is the disciplinary unit of Organization and Management at the Helsinki School of Economics. We authors are members in a group of colleagues working in this workplace. Over the last ten years we, and some other members of the faculty, have collaborated in various ways and combinations with intent to change and renew some of our own practices. This period is special in the sense that we have actually managed to make visible changes in our own work.

We have made efforts to renew our practices in a broad set of academic activities: teaching, research, external service, and self-governance. Moreover, we have intervened in the gendered practices of the workplace, and in interaction and communication patterns in other respects and contexts. While the same workplace has been the stage for most of the events, we have also acted at some other sites, that is, in other academic workplaces, conferences, and even outside the academic forums.

The intensive, but fragmented and distributed process, has also included attempts to write about our experiences, and we have produced a larger number of published and unpublished

documents. Now we use the term 'participatory research' to signify the research aspect of this work.

Thus, we are now writing about efforts by about ten people who work in the same workplace (of about 30 employees), and collaborate with a number of other people working for the same or other employers. The term 'community of practice' might perhaps capture well the nature of this collective, at least in the original meaning of the term (Lave & Wenger 1991).

The fact that there are many people involved in the events and activities poses serious challenges for any attempt to write stories about them: who is talking and for whom? This problematic is at the core of what we are trying to articulate here. How to account for the aspirations, deeds and accomplishments of a collective that has never had clear boundaries, a 'center of coordination', a joint plan, or shared understandings of what is going on. *The question is of how this 'accounting' can be done with the help of, and in line with, practice-theoretic ideas and research practices.*

The authors of this text are currently collaborating under the label MERI (Management Education Research Initiative). However, some others could equally well be called authors of this text, and within the MERI group it is hard to say how each of us has contributed to the production of this text, and whose views it represents. The text is an outcome of countless conversations on and in our work activities over the years.

A crucial aspect of the history is that our understandings of what we are trying to do have developed and broadened gradually. Once we started to rehearse intentional change efforts, we also started to write about the experiences and search for resources in other sites and texts. Some sources of resources have been especially important in finding ways to reflect on and account for our efforts.

Sources of Inspiration

Higher Education research has turned out be very important point of reference, after we realized that such a field exists. Especially the studies that approach universities as work organizations, that is, sites of 'academic work', have helped us in framing our experiences (e.g. Smyth 1995). It is work and work practices that we are engaging in and renewing - in certain working conditions and in varying employment relationships.

The studies of academic work provide accounts of the ongoing changes in universities (e.g. Blackmore 2002), of the increasingly 'managerial' form of control in this work (e.g. Fulton 2003, Currie & Vidovich 1998, Rhoades 1998, Willmott & Prichard 1997), and of their implications for, and reception by, the academic workers (e.g. Morley 2003, Ylijoki 2003, Churchman 2004). The studies of 'academic capitalism' complement the studies of work and its governance by describing developments in the political and economic regimes regulating universities (Slaughter & Leslie 1997). The studies of disciplinary cultures have provided resources for recognizing specificities in our local culture, and for respecting differences

beyond mere political struggle for survival within the competitive business school and national arena (Becher & Trowler 2001, Ylijoki 2000, Räsänen & Mäntylä 2001). In addition, the field of HE research has produced abundantly stories of specific practices, development projects, and approaches to development work in the university context.

What is especially relevant in HE research with respect to our experiences is that it acknowledges the multitude of academic activities, albeit its main attention has been to the teaching and learning activities. In contrast, in the field of science studies it is customary to concentrate on research activities only. In our world, the ordinary work in a university contains various tasks, and dealing with the diverse demands on our work effort is a basic and continuous challenge. Academic work means simultaneous responsibilities, or at least expectations to contribute to, a 'bundle of activities' (Kalleberg 2000, cf. Schatzki forthcoming).

As many commentators suggest, we have also experienced that our work is in danger of becoming more and more fragmented, due to the additional demands put on the universities (as instruments of national competitiveness). This kind of studies help in articulating how and why the search for ways to prioritize and even integrate the various activities has become a major issue in our daily conversations. This theme runs through the moves that we have made over the years. And, it is here that the theories of practice encounter a difficult terrain, because detailed analyses of single activities do not meet the experiences and needs of ordinary academics.

We have found another important source of resources and inspiration in the traditions and current versions of Action Research (Reason & Bradbury 2001). As we changed into a mode of improving our own practices also by doing research in these processes, the literature on AR and the people who practiced it seemed to offer a lot. In particular, participatory and critical version of AR (e.g. PAR) seemed to provide us with good ideas, examples and encouragement. While hesitating with their promises and ambiguities (Räsänen & Mäntylä 2001), we started to say that we also are doing PAR (see also Meriläinen 2001). Now the more general term 'participatory research' seems to best capture the research practice that we are aiming at.

Participatory research does not refer only to specific research procedures and techniques, about which 'the real action researchers' often remind those who start to use the term 'AR'. The fundamental issues are of ontology, epistemology, and politics (see e.g. Reason & Torbert 2001). For us, the main choice was to study 'our own world' as participants in the activities studied. The point is not to make others participate in something (like in the 'empowerment' of workers), but to accept that we are among the participants, and we need to do research "with others" and write "from within". This alters a lot, at least in comparison to the main academic tradition of representing the researcher as a neutral outsider.

The participatory view brings to the fore the questions of the relations between the researchers and others who live in the same life-world, of the nature of possible knowledges, and of the responsibilities of the researchers over their acts as 'interventions' (with

unavoidable political consequences). Democratic ideals illuminate this path, although the practice itself sets extreme requirements on reflexivity as to the motives and consequences of one's moves. In practice the ideals are hard to achieve, and reflectivity is accomplished only gradually, partly and at best as the sharing of diverging interpretations (cf. Rose 1997, van Manen 1995). It can be achieved only by learning new skills and ways of practicing reflection (see e.g. the specific arrangements for achieving validity in co-operative inquiry, Heron & Reason 2001).

Gender studies have been the third major source of resources and lessons. Those of us who have wanted to change gendered practices in the workplace have faced somewhat similar problems as those who have been trying to revise their teaching/learning practices or interaction patterns in faculty meetings. We have been searching for new conceptions of academic research together, and the joint interest in participatory research has especially enabled communication and collaboration across the gender front (cf. MacQuire 1987, 2001, and Reid 2004). This basis has made the unavoidable social divisions between (female) feminist and (male) pro-feminist members of the collective endurable.

Moreover, the gender studies have brought in discussions on experiences and phenomena that other research traditions have missed or considered secondary. The subtleties – and differences - of human experience, emotion, and interaction, understood in relation to the practices of power, have easily been omitted in the main-streams of social science, although there are exceptions (e.g. Fineman 1994). Thereby gender studies have enabled attempts at articulating some touchy issues as to the diversity of experiences in being or becoming an academic. The experiences have gradually become more discussable in the local 'community of practice' (Katila & Meriläinen 1999, 2002, Meriläinen 2001, Mäntylä 2000), which also strengthens possibilities for collaboration.

There is one more crucial source of resources to our activities. Narrative studies have proved to be a way to articulate our experiences and their diversity (Leppälä & Päiviö 2001, Mäntylä & Päiviö forthcoming). In this approach, one not only tells stories but one lives them. Experiences are 'stories' from the very beginning: we recognize them and deal with them as events in a story, albeit in many situations we have no grasp of what the story is – and what we are experiencing. The narrative form is also flexible as to its contents, in contrast to more formalistic types of academic communication. In principle, there are hardly any 'things' of which one cannot make a story. However, in practice there are limits to what kind of stories particular actors can craft, and where and when particular stories can be told and received.

The fact that we present this text also as a quest for stories and ask for means improve them is just a consequence of the interest in narrative studies. Moreover, we now regard as one of our major tasks to develop such stories that would nourish our search for meaningful forms of academic work.

(Re-)turning to the theories of practice: A promising possibility

At present we are working on how the theories of practice can contribute to our living as academic workers. In fact, it seems that the contribution can be significant. The practice theories, or more precisely a way or reading them, provide us with a new conception of what we have been doing and what the 'object' of our knowledge is.

For some of us this is a re-turn to the practice theories. In the pre-history to this account, that is in the 1980s and early 1990s some of us studied managerial work with the help of a conception of practice (Räsänen 1986, Kivisaari 1992, Eriksson 1991, Eriksson & Räsänen 1998, Räsänen et al. 1995). We were studying managerial practice in terms of 'managerial logics of action', suggesting that management is a divided actor with various logics of action (across managerial subgroups and over time). The first, direct source of this idea and concept was in Lucien Karpik's (1978) text, but later on we drew on Pierre Bourdieu's works (especially 1990). Based on these earlier exercises, practice-theoretical ideas have been inherent in our activities in the late 1990s. The nature of this connection has, however, mostly remained implicit, for we have not been concerned with social theory. We have bee trying to make the business school a livable place by improving our own practices and our conceptions of what were are doing in this disturbing working site.

After a few unplanned encounters with researchers who had been working on the practice theories we started to entertain the idea that there might be something for us in this 'turn'. When we read the literature and talked to familiar 'practice theorists' (e.g. those in the socio-cultural activity theory) it soon became evident that these theories are relevant as to the description of our work and academic work in general. It is still an unanswered question, how one can exactly use the practice theories in accounting for academic work, but a possibility will be tentatively elaborated in the rest of this paper.

A new epistemic object: academic practice in emergence

The possibility is that we will define – for our own research work – a new epistemic object. And this object is at the same time a re-interpretation of what we have been trying accomplish as a group of colleagues and practitioners of academic work.

The epistemic object is practice in emergence. By the term Practice (in Finnish: praktiikka) we refer to a specific form of academic work, that is, a particular way of doing academic work and engaging in academic practices. Here the term Practice is used in a similar sense as the term Praxis has been used previously in many contexts and for a long time. The German word Praktik is also often used in a similar sense. In English one can, for instance, talk about a particular 'therapy practice' approximately in the same sense (e.g. 'psycho-analytic practice') Among the current scholars, Alasdair MacIntyre (1981:175) has defined practice in a way that resembles our usage of the term here:

"... any coherent and complex form of socially established cooperative human activity through which goods internal to that form of activity are realized in the course of trying to achieve those standards of excellence which are appropriate to, and partially definitive of that form of activity, with the result that human powers to achieve excellence, and human conceptions of the ends and goods involved, are systematically extended."

MacIntyre's definition is demanding. Any form of 'practical activity' should not be considered a practice. This is highly crucial. All academic are participating in practical activities, but in some, special cases they can be said to rehearse a Practice. Therefore, we need to regard both practical activity and Practice as the object of research, assuming that in some special cases practical activity evolves into a Practice. Our main interest, then, is studying an academic practice in emergence. We are interested in how university employees try to develop a (collective) practice, under the contradictory conditions that fragment their work.

The emergent nature of practice has been emphasized by several authors (e.g. (Pickering 1993, cf. Czarniawska 2004). The challenge is in finding ways to study something in emergence. To us this challenge seems unavoidable, because we assume that many ordinary academics live in such a process of emergence. They try to figure out how to do their work in a meaningful and sustainable way. Success in these struggles may be rare and temporary. Being able to articulate the 'internal virtues' of' a practice and to live accordingly may be an extraordinary accomplishment (cf. van Manen 1994). Moreover, studies of academic work should not concentrate only on the extraordinary cases, while the majority of academics work in less special and coherent ways – and in less favorable circumstances. Stories of the ordinary are needed, too, and the "ordinary" is not necessarily something stable, conservative or ignorant.

A three-perspective conception of practical activity and practice

Thus, it is important to study practical activity without measuring it against the standards of any particular Practice. To accomplish this we entertain the idea of using the same construct that we used in researching managerial work, albeit in a modified form. By the term 'practical activity' we mean a specific set of embodied and social activities that make sense to the participants in this activity set, and possibly to knowledgeable outsiders, in terms of three questions and respective perspectives, interests and positions in a social field (cf. Räsänen et al 1995):

How to do this?	Tactical perspective
What to do?	Political (or strategic) perspective
Why to do it and in this way?	Moral perspective

In addition, the question of '*who am I, doing this*' may be relevant, but only in certain moments in the activity. The answer to the 'who-question' is assumed to come from the answers given to the three primary questions (cf. the 'doing identity' perspective). It becomes acute when the answers are missing or too contradictory, preventing (even paralyzing) all meaningful action. However, it is likely that such situations are not rare in academic work.

In using this terminology, practical activity becomes a Practice, when the actors can articulate and negotiate (relatively) coherent answers to the three questions and actually work according to their conceptions of good practice. However, it is not sensible to expect that any human activity is totally coherent and free from all hypocrisy. At best, actors may have a set of clear and convincing ideals and they try to realize them as well as they can. They can also switch perspectives of practical reasoning in a credible way (between tactical, political and moral frames of reference). What is more interesting is how 'ordinary' university employees search for and defend particular virtues and deal with contradictions between the ideal answers to the three questions – and between their ideals and their daily activities. The difference between a Practice and 'mere' practical activity is a matter of degree, and it can be only known through the judgment of those who are intimately familiar with a particular practice. The distinction may, nevertheless, be useful in defining an epistemic object.

Thus, we aim to study processes (or collective projects), the outcomes of which are not known. This is necessary, because otherwise we would miss such contemporary forms of academic work that do not result in success stories as to the development of a satisfying and recognized Practice. This is surely difficult, if not impossible, but trying it seems important.

Terminological Notes

We have suggested that it makes sense to study an emerging academic practice as an epistemic object. This poses various opportunities and problems to research work.

So far we have managed to tentatively resolve a few terminological difficulties. The distinction between 'practical activity' and 'Practice' seems useful. According to this terminology, it is sensible to call only specific forms of practical activity Practices. Thereby we do not need to assume that all academics practice a particular Practice (of their own), but can take it as an empirical question by who, when, where, and how particular Practices become created and sustained. What is even more important, we can study academics in the process of trying to establish a Practice of their own, and do this without assuming that the efforts have been, or ever will be, successful.

There still remains a need to use the term practice(s), referring to repeated sub-activities (e.g. conference practices). A Practice is a specific way of engaging in a set of academic practices, without necessarily being in the position to modify all these practices to one's own tastes. A Practice is also composed of engagements in various practices, although the set of practices can be – to some extent - peculiar to this Practice.

A way of tracking efforts in reorganizing academic work into a Practice is to focus on the accounts that the practitioners can give for their acts and activities. The accounts are inherent moments in the constitution of experiences and necessary in social activity (as coordination and justification 'devices'). While the accounts are a necessary element of a practical activity and a Practice, they also make the activity accessible for a researcher - and an object for reflection for the practitioners.

We have suggested that the distinction between the three perspectives and respective questions is useful in taking into account the possible incoherence in the accounts for practical activity. This leads into an analysis of answers given to tactical how-questions, political what questions, and moral why-questions.

However, the three questions are not mere technical devices. We suggest that practitioners actually encounter these questions in their work – even if they do not necessarily articulate them in terms of the question-answer logic. They are rather experienced as stances towards specific tasks, practices and working conditions: In a tactical (or technical) stance one is oriented towards performing the task, in one's own way if possible (cf. de Certeau on tactics in a space owned by others). In a political stance one is concerned with the consequences of performing a particular task as to its effects on one's position in relevant fields. In this orientation it is natural to reason what tasks to perform and how well (cf. Bourdieu's world of habitus, fields and forms of capital). Finally, in moral stance one is concerned with the values realized in performing a task and in a certain way (cf. Macintyre's world of internal and external virtues).

Thus, the three-perspective construct of practical activity can be understood as a way of approaching what is called 'practical reasoning'. And this construct allows for diverse stances in practical reasoning, including incoherence across the accounts given from different perspectives and positions. Moreover, this construct is rather 'tolerant' (in contrast, to strongly normative) as to the nature of the practical reasoning: all the three stances are relevant, interesting, and 'understandable' as positioning in relation to a social field.

One big question remains: when can we say that a Practice has emerged? Is it when the three account types are sustainable for a while, mutually coherent to a satisfying extend, and the accounts are (judged) authentic in relation to embodied acts by the practitioners and relevant others? In this view, satisfying 'coherence' would mean that switches between the account types are credible, in contrast to the expectation that they are coherent in the sense of formal logic or one integrated form of thought.

The attempt at definition feels dangerous, because the terminology used here does not (yet) accomplish its task. Anyway, an attempt may be better than silence, because it provides opportunities for others to suggest better formulations.

Accounts for practical activity: a few guiding ideas

Proceeding from the ideas presented above, what kind of accounts for practical activity can one expect to find? The conception of practical activity suggests the following starting points and guiding ideas:

(a) *The answers to the questions are part of the practical activity itself.* Social activity necessarily involves practitioners' accounts for how, what and why they are practicing something. Some of these accounts may represent what many researchers call 'reflexivity', and we originally called the three perspectives to practice 'forms of reflection' (in practice). However, accounting may serve also other, less 'intellectual' or ambitious, performance-related pursuits (like reporting, coordinating) or mere self-expression (of emotions like frustration, inspiration etc.) at work.

The guiding idea here is that we are interested in the actual accounts that the practitioners produce, however reflective they are deemed to be by somebody else.

(b) *In practical activity the main point and requirement is to act* (in the embodied sense), and in given timeframes and with available resources. Of course, speech acts are also acts. Accounts, and possibly also reflection, usually come thereafter. In this sense the accounts are secondary, but necessary.

The point is easy to understand by considering how people learn new practices according to the now available theories of situated learning. For example, most university workers learn teaching by doing it. You just receive a teaching assignment, predefined by others, and then you run the course in a given timetable. And, it is only afterwards – and maybe after several courses – that you start to wonder if it could be done differently.

The guiding idea here is that we are interested in the actual moves of the practitioners, while they become meaningful experiences to the practitioners themselves and knowable to outsiders through the accounts.

(c) *The order in which the three questions become acute and articulated is important and interesting.* In principle, we might expect that 'how to do this' is likely to be the first question one encounters in any practical activity and it has to be answered quickly (cf. point b). Once one can perform basic operations, then one may come to ask 'what should I be doing" (and achieving/accomplishing in this field). Finally, the articulation of moral issues is possible, only after one can handle to some extent the two previous challenges. A strong position is required before one can raise moral issues publicly, within the practical community or workplace.

Why this interest in the order? It is simply, because we do not want to assume too much from the practical actor's reflexivity (or 'rationality' in terms of cognitions). Rather, it is only

in special cases and after long periods of situated learning that a practitioner can provide (locally) credible and personally satisfying answers to each of the three questions. Some of the literature seems to assume that people first learn a moral and then derive from it both goals and means. In the end, the order is an empirical question, and the answers to it are likely to vary. The point is to appreciate practical reasoning as it goes and becomes expressed.

For an example: Ask a university teacher – or yourself - why she or he uses particular teaching/learning methods to teach particular substance? What she or he expects that the students learn by going though the particular operations (like sitting silently and taking notes)?

The guiding idea here is that we are interested in all of the three questions. Tactical moves and accounts are as important as political or moral reasoning.

(d) *We do not assume coherence in a practical activity, and especially, between the three forms of reflection*. This is a fundamental choice of position and the major ground for using the conception of practical activity.

In the studies of managerial work, we wanted to use a concept that can accommodate ordinary life, in its incoherence, messiness, and contradictions. We did not believe that we could find anything else amongst managers – and we did not. In fact, these are the most interesting aspects of managerial – or any other - practical activity, as a human, social and mediated endeavour. The term 'logic of practice' did not imply that a (managerial) practice is supposed to be "logical" in the sense of a coherent purpose/goal/means –scheme (i.e. "rational" in a universalistic sense). Quite the contrary: diverse, local 'rationalities' with their specific ways of dealing with (their inherent) contradictions were the centre of attention. Now we are concerned with academics, and like managers, we can also be seen – from a practice perspective - as talking and walking contradictions. Walking and talking together, in pairs/groups/ units does not make our practice any more coherent.

For comparison, Pierre Bourdieu's ideals of "reflexive sociology" demand a lot from academics to be able to account for our own practice, especially in research work (Bourdieau & Wacquant 1992). However, there are disagreements concerning researchers' possibilities to be reflexive (e.g. Rose 1997). The same problematic should concern teaching and any other academic activity.

For example, it is not difficult to find a university teacher presenting a monolog lecture on participation, while being fully committed to participation as a political stance.

The guiding idea here is that we are interested in stories that do not hide the possible incoherence, incompleteness, and change of reasoning in the practical activity.

Altogether, the guiding ideas are rather permissive as to the nature of the practical, human activity. Nevertheless, they put heavy demands on us who try to provide written accounts for practical activity, and especially for our own activities. A central aspect of these demands is to deviate from our learned ways of writing academic publications. Fortunately, there are examples in various fields of how one can proceed in such a task.

Towards Local Stories of Practice in Emergence

The foregoing treatment of intellectual resources makes the local history look rather clean and lifeless. What about different versions that would come closer to the way we experienced the renewal efforts? The actual work has not merely been about reading and writing, i.e. about learning in an intellectual sense. It has been about concrete persons with multiple/shaking identities, deeds in a certain time and place with limited tools and other material resources, ambiguous and constantly re-negotiated relationships, moral conversations, feelings and emotions – hope and despair.

The accounts should concern concrete work and embodied social life in academia, in contrast to theoretically sliced views on living actors. However, it is easier (for a researcher) to write abstractly than concretely, because concreteness entails multi-dimensional (multi-perspective) understanding and language. Fortunately, all accounts are partial and crafted from a particular position.

If we are to use the conceptual ideas presented above to craft accounts of academic work, then we have to resolve certain problems: First, how can we choose among the multitude of available (and partly even documented) stories, and fit them into academic publications? Secondly, what is interesting and important to tell regarding the practical activity or emerging practice? Thirdly, how can we tell about a collective activity, while almost all interpretations are contested?

We cannot propose solutions here to all of these problems, but we can present a few tentative ideas on how to proceed in working on them. The first tactic, touched upon above, was to elicit a few guiding ideas from the three-perspective conception of practical activity.

Another tactic that we pass in this paper is to outline categories with which to characterize an academic practice in emergence. One could, for instance, specify what practices a group of practitioners engages in and how, and how this set of practices develops over time. This would result in the mapping and naming of various types of academic practices (Räsänen forthcoming). For instance, we have already listed above the basic activities in university work, and one could identify the set of practices related to each of them (e.g. 'teaching practices'). Further, one could think of how practices are related to each other and suggest, for instance, that they form chains, nets or complexes (cf. Czarniawska 2004), and of how some practices are more interesting than others due to their position in these formations (see e.g. Swindler 2001, on anchoring practices).

Even further, one could focus on specific types of practices, depending on one's theoretical interests and practical position in academia. For instance, if one were interested in gender issues, one could focus on gendering practices, or if one were interested in power issues more generally, one could write about 'bordering practices' by which people are excluded from/included to certain practices and respective practitioner relations and positions. From this perspective, the development of a new practice requires work on these bordering practices, that is, gaining access and protecting presence in certain forms of work (cf. Lave

1988, Contu & Willmott 2003, Vann & Bowker 2001, Hodges 2002). This needs to be developed in another paper, as it cannot be done in a few pages.

The third tactic is to focus on a small and for us 'natural' (ordinary) story and reflect on its shadows, that is, what is ignored by a usual account for a renewal effort. We will provide here an example of using this tactic, but first we need to outline from which kind of a basis we craft any small stories.

Previous writings and the multitude of stories

We do not start from a scratch. We have rehearsed the task of writing about our experiences, deeds and working conditions.

Our first writings about academic life focused first on two, related themes: Documenting attempts to change our own teaching practices (e.g. Mäntylä & Räsänen 1996, Tiittula & Mäntylä 1999a), and telling stories from the everyday life of university researchers, and especially of its sophisticated practices of power (e.g. Räsänen 1995). Thereafter we have written essays and reports on the following themes: (a) academic practices: stories from everyday life (e.g. Räsänen 1996, 2000; Herbert & Räsänen 2001) (b) renewing teaching/learning, and other developmental activities in universities (e.g. Tiittula & Mäntylä 1999b, Räsänen 1998a), (c) changing gendered practices in academia (e.g. Katila & Meriläinen 1999, 2002, Korpiaho & Päiviö 2005) (d) academic work and identities in different disciplinary cultures (e.g. Räsänen & Mäntylä 2001, Ylijoki & Mäntylä 2003), (e) management education and work: learning as students, graduates, and professionals (Leppälä & Päiviö 2001, Korpiaho & Päiviö 2005, Herbert forthcoming) Moreover, some of us have produced a host of unpublished documents for internal communication within the disciplinary unit, and a couple of studies have concerned research work and its governance at VTT, a technical research center. (A full list of texts is available on request.)

Only a small fraction of the written stories have been published in international, academic forums, or in national, politically and professionally significant forums for that matter. The gap between the multitude of local accounts and their visibility in public discussions is precisely one reason that we now search for new ways to articulate our concerns.

An account and its shadows

The problematic of crafting accounts for an emerging practice can be specified and illustrated by first telling a story and then reflecting on it. The following narrative represents a usual way of reporting from an activity, in this case teaching. The question is: what is left in the shadows of this account in relation to the perspective outlined in the previous section?

During the first quarter of the year 2005, Kirsi Korpiaho and Keijo Räsänen taught a course named "Professional Development" for about 35 second-year students who had just chosen their major as organization and management. The course is about five years old and

its main purpose has been to aid newcomers in approaching the disciplinary, academic community in organization and management at HSE. However, the course has also had many other purposes, and various teachers have been searching for its concept and form. This time Keijo made his second attempt to find a concept for the course and Kirsi joined the team. For Kirsi this was her first assignment as a fully responsible teacher.

Keijo and Kirsi decided to try out a practice construct - the one outlined in the previous section of this paper. They designed the course to treat studying as "practical activity". The programme followed the order of the key questions and perspectives. In the introductory phase the students were introduced to a set of basic concepts and ideas: practice, situated learning and reflective practice. The teachers emphasized that learning makes sense only in an "authentic" activity, which in this case is studying at HSE. That is what all the students do and have experience of. Moreover, the teachers presented a map (i.e. a drawing) outlining different but relevant fields of practice: studying (as students), disciplinary activities (as members of the disciplinary community), professional (as business graduates in their jobs; or as people educated in other places in their jobs), and the civic field. The offer was: "In this course you (students) will have opportunities to reflect on how you relate yourself to these fields of practice, and especially, how, what and why you study."

After the introductory phase, the course proceeded by focusing on the three perspectives, one by one:

I. *Tactical perspective: How can I perform (in Finnish: suorittaa) the studies in organization and management.*

II. *Strategic perspective: What can I accomplish and achieve in my studies?*

III. *Moral perspective: Why do I want to study this and in this way?*

The order was carefully chosen, according to the teachers' understanding of the students' interests and the nature of the practical activity of studying. Kirsi and Keijo expected that (most of) the students were primarily interested in how to pass the exams and other points of assessment. Strategic issues were relevant to the students only after they had the feeling that they could survive (or succeed, depending on the level of ambition). And further, the raising of moral issues required that one understood the field in question relatively well and had an established position from which to ask and answer difficult and touchy questions.

The course was a success in comparison to the first effort by Keijo and two other teachers, and in one respect better than other courses taught by Keijo (since the early 80's). The exceptional aspect in the most recent experience was that the students actually reflected on their own action and beliefs. This has been hard to achieve, when the students have been "practically oriented" in the business school sense: For them "practice" is somewhere else, surely outside the business school. Now they seemed to accept the point that studying was worth focusing on, and they generated a host of interesting and personally important reflections on their "skills" (tactics), "goals" (strategy) and "values" (moral). This could be seen both in the texts they wrote, i.e. a report on study skills, an argumentative study plan, and an essay on a freely chosen issue, as well as in their written feedback. Only two or three

students among the 35 did not buy the approach. As one of them wrote in the feedback form: "This course did not concern anything practical".

What can be found in the shadows of this story crafted by the more senior teacher of the course, Keijo Räsänen, who has been a member of the activist group from the very beginning? A list of speculations follows:

1) The story does not pay attention to the various and changing experiences of the two, different teachers or of the different students. What the students wrote for the assignments or for the feedback form is coming close to this, but the story makes only a summary statement of them. Moreover, the assignments and forms are limited, institutionalized means for accessing student experiences, however 'innovative' the assignments would have been in terms of instructions and justifications. It is also likely that the two teachers experienced the course differently, because one of them has been teaching and renewing courses for about 25 years and for the other one this was the first real teaching task. The younger teacher has experienced the new working methods first in the student's role, while the senior one has been witnessing and advancing their entry to the local scene. We will come back to this point in a while.

2) The story is about one course, but it was grounded on a long series of attempts to improve various courses, teaching practices and the whole curriculum, and done by several teachers. Without the previous accomplishments and failures the course would have been very different as would have been its reception by the students. This legacy could be analyzed and narrated in detail: How were the (pedagogical and social) skills needed in doing the course in the specific way learned? How did the teachers come to know of the ideas, into which they molded the concept? Why were there two teachers who were able to collaborate and share responsibility (flexibly and rather equally, in spite of the difference in age, position and gender)? How was it possible that the teachers could take the risk and try a new concept in an obligatory, central course, and even with the support of some other members of the disciplinary unit? Even, how was the room's furniture and equipment originally negotiated to fit to the concept and working methods?

For instance, a story that we have been sharing every now and then concerns the furniture. Only after a long struggle did we get the permission to move the tables out of the room. Sitting in a circle of chairs is now customary and functional in many of the discipline's courses, but it took time, nerve and political skill to gain acceptance from the administrators for de-furnishing (simplifying) the room. Once they agreed to remove the tables, they brought in expensive and advanced technological equipment – of which we have no use. As if we went against the tide.

3) What gave the drive and courage to the teachers to try, again, something new and risky? Why did the teachers spend the extra time needed in planning and teaching a new,

intensive course, while they could have spend that time in research work? How was the course related to their professional identity projects and to their broader views on, and hopes for, teaching, courses, and education in the business school?

For instance, it is highly questionable why a full-time student of a graduate school would participate in teaching at all. Would it not be much more sensible to concentrate on writing a Ph.D. thesis? And why does a tenured professor keep trying new things in teaching, while his research record is questionable and he is feeling symptoms of "burn-out" after a distressing period as head of discipline?

4) How did the teachers work together? Why this pair of teachers and now? How did the composition of the 'team' influence the social dynamics of the class and the relationships between the teachers and the students? What were the students' expectations in this respect and how had they been influenced by what had happened during the previous years and in other courses?

5) What did the experiment mean to the other faculty members? What are its consequences for the other courses, the curriculum as a whole, teaching practices, and students' work in other courses?

The list above maybe long enough to illustrate how a course may be related to many other concerns and passions than merely fulfilling a teaching duty or passing one more course. The story is a part of, and gains its local significance in relation to, a wider set of narratives. Further, the story can be told surely in various ways. Another version of the same story illustrates something important that is missing and ignored by the first version above. This version records how one of the teachers, Kirsi Korpiaho, experienced her participation in the course.

After-thoughts and feelings on the PD course:

For me, the PD course was a kind of entry trial to the full membership of the academic world. As a course concept it was both pedagogically meaningful and in research terms interesting.

However, I did not think that the course was pedagogically new or miraculous or that I was participating especially in the development of teaching. As a student of the discipline, progressive - participatory and co-operative - teaching modes are familiar to me, even more familiar than the traditional lecturing mode. In fact, it was the traditional lecturing tasks within the course that made me most nervous both beforehand and during the course. Instead, the research side of the course was exciting for me.

I thought that the course was a part of the intention to connect theoretical concepts, familiar from research work, to practical activity, in other words, how theoretical concepts can help in developing practice or how practice can be understood in theoretical terms. In my master's thesis, I had studied bookkeepers' work by utilizing practice theory discussions and

now we had an opportunity to apply the same theoretical starting points in another, totally different context. Because studying, as work, was very familiar to me, I was not so much afraid that the theoretical discussions would not work in this connection (I believed strongly that they would). Instead I was worried over whether the students will join our attempt.

Revealing something about one's own work/studying requires special trust on the skills with which the issues are discussed. I had already met this fear and reluctance when I interviewed the bookkeepers that were very suspicious towards the HR manager and the unit's management in general. As teachers we represented precisely such suspicious actors, the intentions of which may differ from the students' interests. A teacher's intention may be to advance students' learning, but this is not always a student's primary goal. For example, if the students reveal how much time they actually use in doing the assignments, can it not be influencing our assessments? I believed that the teachers' and students' worlds should be brought nearer to each other in this course, but doubted if the situation will be safe enough to create sufficient trust. Will we be able to create such a situation that it would be possible to ponder issues relevant to practical activity? And now, afterwards, did we succeed in it? Yes, to some extent, but probably not fully. (In an ideal case the class size would be smaller, and students would learn to know one another and we would learn to know them better).

For instance, it was rather difficult to discuss jointly performing the studies. This was partly due to the insufficient preparatory work done by the students, and partly due to the fact that they did not want to share their performance tactics, especially if they were uncertain about each other. After this session I started to doubt, whether we really had a miraculous concept in our hand. Fortunately, the students' personal essays on study skills were much better and I gained more belief in the teaching task. So, it was much easier to treat jointly the choice of study strategies. At this point, the students definitely experienced that their and our interests were more congruent: we want them to complete their degree studies in our discipline and they want to make it in this major of ours. The moral conversations, on their part, were again much harder, and maybe my own energy was about to be exhausted by this stage of the course.

I noticed that it was much easier to talk about certain issues with the students than about some other issues. Maybe there are in practical work some areas that are more amenable to joint discussion than some other areas. Although we urged the students to talk also about the harder stuff, like moral issues, discussing about them was still difficult – it does not come about by asking for it.

The concept itself was exciting for me in respect to my own professional development. While I was teaching the students that in all practical work it is central first to get to know how to do it, and only thereafter one can think of what to aim at, and only in the end one can reflect on moral concerns, I thought that as a teacher I was myself only in the stage of worrying primarily over "how to perform this". And therefore I also feel now that my own reflections were not that fundamental. Anxiety concerning my own survival and ability to perform the task is even now the most striking memory. I know that, according to the theories

of practice, this is a necessary and central phase in learning a certain practice, but, still, it is easy to feel insufficiency due to the fact that one cannot simultaneously both participate in the teaching practices and reflectively discuss on them in depth.

I recall especially one session, in which I discussed Brown's and Duquid's article with the students. When we had gone through the given questions, one of the students asked: "What does legitimate peripheral participation actually mean?" And, while I was explaining how newcomers can participate in a practical activity and mess around in it by the permission of the community (although one cannot really perform the task), I felt really stupid. Was I not talking about my own situation, since I was learning to perform teacher's work? Although I was very well aware of this, I was not willing to admit it in that situation. It was my second session as a teacher: I feared that I would loose even the remnants of my weak authority that I was trying to build up to protect myself.

For me the meaning of the course was in more than a mere attempt to connect teachers' and students' worlds. Although this particular idea is interesting to me intellectually and I will continue to treat this problematic (with the contradictions and similarities) in my dissertation work, for me the striking aspect of the course was emotionally something else. I felt that I, as a teacher, dealt with similar issues as the students who had just chosen their major. I felt that I lived the theory.

The second account, by the more junior colleague, is surely different to the first one, written from the position of the more seasoned academic. The second account complements the first one with expression of emotions, personally challenging and rewarding experiences, and reflections. The first, neutralized account by the senior colleague, presents the course as a further move in a larger series of changes in teaching practices. Keijo is used to presenting stories of new courses to colleagues at the university. However, he could as well tell how he feels and thinks about the struggles to make sense of the tardiness in the improvement of the disciplinary curriculum, the complex relations of collaboration and competition among the faculty members, his uncontrollable work agenda and fatigue, and his shaky motives to continue with these struggles. And, he could also write about the excitement of working with the fast learning, younger colleagues who already master skills that it had taken him years to learn, and of the joy at the recognition that the way of teaching reaches (again) the students and makes certain ideals of management education more concrete.

Ordering narratives

Writing about practice in emergence will be a long-term challenge. In this paper we only can bring up the question of what kind of stories should come out of this exercise. The task ahead is to refine the existing accounts and generate new ones.

What we have got, so far, is an intellectually defined and practically justified 'order' for stories that will hopefully result from our further work. The stories will be based on the new

conception of our epistemic object and on the stories that we have been telling to one another and to some others over the years, both orally and in writing.

The point of interest here is whether the stories will make the epistemic object attractive enough to encourage further research work and whether they help in sustaining efforts at developing meaningful and morally rewarding/justifiable academic work.

Meeting practice theorists: Themes for discussion

Our re-turn to the theories of practice has resulted in a couple of positive insights. First, it has led us into an attempt to define an epistemic object that is new to us. This object is also potentially relevant to our practical activity, because it renames what we have been doing over the last ten years. This renaming may generate ideas of how to direct the continuation of the renewal (and defense) efforts. At the same time it expels too high expectations about our possibilities in creating something locally new, recognizable, and sustainable. Original Practices are rare, and the definitions of practice stated above make understandable why they are rare. While our aspirations concern only the local renewal of academic practices, those who aim to create something 'new' in the scale of international (or national) recognition must overcome much higher hurdles.

The exercise also results in the identification of specific *meeting points* for our local endeavors and the various strands of practice theorizing. Some of these intersections can be briefly listed here:

- Local moral conversations can draw on the works of such moral philosophers who share a kind of practice ontology or epistemology (e.g. Alasdair MacIntyre, Charles Taylor). Some practice theorists may be interested in local and diverse moral orders and in their role in practical activity.

- A locally new aspect of our academic activity is the use of participatory research both as a means of renewal and as a goal of the renewal efforts. We have studied our own activities and workplace, and we have intervened in traditional practices and tried to understand what happens due to our deviant acts (to us and others). Here we can identify a meeting point with the ethnomethodologists. Lynch (1999) emphasizes the point that the practitioners can "teach" a researcher (e.g. a sociologist of science in a natural science laboratory). Another ethnomethodological idea seems familiar, too: a culture becomes knowable by breaking its rules or norms, that is, by deviating from the standard procedures. A shared interest is also in the how-question of practical activity (and studying it).

- In our view, there must be a (bigger) junction where practice studies and participatory research can meet. While practice theories emphasize the situatedness of knowledge, action researchers want to create knowledge that is meaningful ("living") in a situation of action, and for those who act or are hindered from acting (e.g. Reason & Torbert 2001). As to their political views, these streams seem to have joint interests, too. Both

of them resist reproduction of knowledges and standards of knowledge that produce and legitimate unjust relations (cf. Lave 1988). In this sense, it seems odd that the two discussions have been separate. Fortunately, there are a few interesting exceptions (Nicolini & Holti 2001, Cronholm & Goldkuhl 2004, Edwards, in press; and the various approaches to professional development that rely on conceptions of practice, especially in teacher education, nursing and therapy professions).

However, there are two meeting points that can be opened up a little bit further: the role of passions in the emergence of practice, and the work that the suggested epistemic object can do for us as practitioners of academic work.

Theories of (Human) Practice: A crucial meeting point?

Those practice theorists that are interested in the experiential and existential side of practice could help in crafting stories that do not hide or ignore those sides of the stories. If somebody could add to the library of such stories, the theorist would have more material to work on. These stories would tell about differences in experiences, ambivalences in social relations, fallibility and multitude of identities, and emotions in practical activity.

In this respect some versions of practice theory are more useful for our purposes than others. Useful ones are those that can live with – i.e. do not ignore - human experience, emotions, meanings, and 'moral action' (cf. Gherardi 2003). Some versions of practice theory omit this side of practice: Praxeology has concentrated on the political perspective, that is, struggles over positions and forms of capital, explaining thereby reproduction in relations of domination. The activity theory has so far concentrated on the mediation by concepts and artefacts, proposing an intellectualised, material version of practice. Although 'subject' is a key category in the activity system model, subjects and their varying experiences have not been studied with a keen interest.

However, some activity theorists may be coming closer to the problematic that we have found interesting. Miettinen and Virkkunen (2005) ask for understandings that take into account the "changing cultural context of actions, the role of individuals… and their future-oriented moral agency" (ibid, 450), and how "… [t]he bricoleur improvises with a set of instrumentalities to adapt to the task at hand", and how the bricolage "… includes improvising, imagining, playing, and searching for new, unexpected cultural resources" (ibid, 451). Unfortunately their story of a development project does not tell much about these aspects, which in principle they emphasize and about which we as authors of our own experiences want to tell. The report of the case as a successful, systematic, activity theory-based intervention by a researcher could be complemented by focusing on such questions as: What did the work, and the project for its change, mean to the people whose work was being developed? How did they live through the period of change? How did their deal with inconsistencies in their own forms of reflection, between their hopes and possibilities, and in their identities? How did they take the researchers conceptual framework?

Nevertheless, Miettinen and Virkkunen (2005) are suggesting a direction that we find promising, too. Moreover, our small stories above miss much of the same aspects of academic practice in emergence as we find lacking in the comparable account. Bringing life to these accounts is a challenge, indeed, and not least because of the need to protect the people whose life and work is in question. There are stories that cannot be told in public. As practitioner researchers accounting for our own academic practice we may, however, be in a position to go further – at our own risk - than in the case of reporting from the world of some other actors (cf. Alvesson 2003 on self-ethnography in universities, Potts 2000 and Blaxter et al. 1998 on accounting for academic life).

While most variants of practice theory are devoid of emotions, like passion and shame, there are notable exceptions like MacIntyre's work. Activity theory comes close to the problematic by suggesting that contradictions in an activity system drives efforts at change, but studies done in this tradition have not told about how it feels to work in contradictory systems and how individuals and groups deal with their emotions and moral dilemmas. The medicine for contradictions seems to be intellectual, researcher-led analysis of the system with the help of a pre-given frame. Moral dilemmas in work are turned into re-conceptualizations of the object. Workers are turned into parts (so called subjects) of an activity system.

The question is: do practice theories lead to emotionally and morally empty – meaningless - analyses of material practices distanced from any human experience? If so, we need to generate a new version of practice theory or work with a parallel frame of interpretation. Non-human entities can be actors in some sense (as the actor-network theory suggested), but what drives the human 'entities' who do not know what and who they are? Should we also bring the category of 'meaning' back in into practice-theoretical accounts?

Sherry Ortner's (1997, 157) comment speaks to this problematic:

> Thus we are now in the ironic situation that the theoretical position [of Foucault/Said] generally taken to be more radical is that which excludes an interest in the "meanings" [of Geertz] – the desires and intentions, the beliefs and values – of the very subjects on whose behalf the workings of power are exposed.

Pointing out the bias in practice theoretical accounts is not a mere wish for the rehabilitation of humanism. It bears on the empirical analysis and developmental work: how can we be sensitive about the ways practitioners deal with their experiences? For instance, people participating in a developmental process may have gone through traumatic experiences in previous change campaigns or they may be working under a strictly disciplining regime (like Goffman's total institution), and therefore their survival strategies are rather de-personalization, colonization or conversion than active resistance, expansive learning, accumulation of (various forms of) capital or sharing of war stories (Räsänen 1998b).

By using the three-perspective construct of practical activity, the same problematic can be expressed in the following way: who is in a position to (publicly) condemn the tools, laugh at the strategies, or question the morals. "Mediocre" academics may also need sensitive spaces

to articulate their tactical muddling/cunning, political uncertainty/commitment, and moral despair/integrity. Neutral, detailed and intellectual analyses of 'material practices' and their effects may miss the practitioners' working conditions and possibilities for tactical, political and moral reasoning. They may also miss what all this means to the practitioners, that this, their frames of interpretation.

Perhaps our increasing interest in narrative studies has been a half-aware response to the problem of lost meaning. Narrative methods offer possibilities to communicate in ways that respect "the actor's point of view": meaning as representations and those particular practices "through which people come to believe deeply in those representations" (Ortner 1997, 145). Another concept that we have found useful is 'identity projects' (Harre 1983, Ylijoki 1997, Räsänen & Mäntylä 2001, Leppälä & Päiviö 2001, Herber & Räsänen 2001, Räsänen forthcoming).

Despite the weaknesses of 'identity' as a concept, a way of treating meaning in academic work is to identify narratives (or discourses) on which academics draw in accounting for their future-oriented projects: what can I be and what do I want be professionally, and how do my current efforts and troubles contribute to a desirable future. The term meaning (in Finnish *tarkoitus* or *merkitys*) means just this: what is the purpose and possible significance (even effect) of particular events, acts and occurrences as to an actor's beliefs, intentions, and values (i.e.moral positions) – her or his life projects? Moreover, among the conceptions of identity, the idea of 'identity projects', in special, emphasizes the emergent (and fallible, fluid) nature of identities: an identity has to be constructed over time, and like other projects, this construction work is hardly ever perfect, finalized, and satisfactory in terms of outcomes (cf. metaphorically, the discussions on the quality of actual house-building projects). An ordinary academic is likely to have several identity projects under way simultaneously (like the construction companies that fail to deliver any of them in time and in the expected shape). In narrative terms, academics live several stories simultaneously, or grapple with alternative accounts that would make their working life meaningful.

Material and political conditions may block the identity projects, repress (deny and ignore) respective stories, and temper the activists' passions, but this tempering can also be turned into skilful tactics of survival (c.f. Myerson 2001). Tactical action can be enough to keep hope alive over difficult periods, and even if there is no hope of better times, creative tactics may keep the space liveable and in one's own use (Certeau 1984).

Finally, and coming back to one of the previous point, participatory research may have something to offer for the development of this line of reasoning. It may even pose a challenge to (certain) theories of practice. Whence comes the drive to renew one's own practices and to go though the pains of reflection? Writers on practitioner and participatory research provide languages to express the spirit of their work, their values, and their moral dilemmas (see e.g. Reason & Bradbury 2001, or works available at Jack Whitehead's homepage: http://www.bath.ac.uk/~edsajw/).

Work to be done by the new epistemic object

To what use can we put the new epistemic object and what are its limits? A few thoughts may help in opening up discussion

Miettinen and Virkkunen (2005) write about how the development of a new practice involves the conceptualisation of a new "epistemic object". The only difference between this particular article and our approach is that for us the 'object' is we ourselves and our activities - not the activities of somebody else. However, (almost) all 'practice theorists' are also university employees and practitioners of academic work. We thus share a concern in making the university a liveable place, and the theories of practice should be put into use in this sense, too. Would it not be promising to think of daily worries and business as something that might one day form a sensible whole?

However there is one big question shadowing our suggestion to study academic practice in emergence: If we are seeking an academic practice that covers the basic university activities, we may be on a mission impossible. While integrated and meaningful academic work may be wish of many ordinary university employees, it may be a misconception altogether.

At the core of the problematic is the term academic work. What do we, and others, mean by using it? If it referrers to any work done in the university, then it is defined institutionally and by those who govern each university as an institution. This is problematic in relation to MacIntyre's distinction between practice and institution. According to him, an institution, e.g. a university, is needed to support a practice, but the internal virtues of the practice, e.g. open and honest communication, are not necessarily respected by the institution. Institutions are established and funded to realize specific external virtues, like competitiveness of the university's business partners. The maintenance of the practice may thus require taking critical distance from the demands of the institution and protecting the practice from undue institutional pressures. Moreover, Macintyre himself argues (in Macintyre & Dunne 2002) that even 'education' cannot se considered a practice in itself, because it only serves other practices (see, however, for contrary views in the theme issue of JPE 2003). If even this core university activity cannot be considered a practice, then how would it be sensible to regard any form of academic work, with the multiple activities, as a practice?

There are good bases to argue that the bundle of university tasks has no grounding in any academic practice. The set of tasks is a result of political struggles and negotiations, in which academics have not been able to realize their interests. Following this line of reasoning, it is not even desirable to aim at making a sensible whole of the various activities. Why aim at saving a contradictory and externally determined project? If we take this view seriously, then we should give up trying to integrate the various activities under a specific Practice. Such a practice is not possible.

However, as ordinary university employees we are not willing to surrender under the foregoing 'realities'. Fortunately, there are many others who are trying to find a way out of this dead-end. There has been a debate on whether and how the academic activities form a whole of interdependent tasks (e.g. Boyer 1990). Similar ideas have been presented while

treating the nature of disciplinary units as the site for work integrating the diverse functions (e.g. Becher & Trowler 2001). Several researchers, and activists, especially in the field of education, suggest that this is a question of 'academic professionalism' (Nixon, et al. 2001, Groundwater-Smith & Sachs 2002), and in particular, of the redefinition and renewal of what it consists and means. Some of the authors focus explicitly on the moral perspective (Fielding 1999, Nixon 2004), while others have also carried out action research projects to advance new forms of 'activist professionalism' (e.g. Walker 2001).

While we can find inspiring works and views that encourage continuing the search for a practice, it is, however, unlikely that there will be any general routes out of the dead-end. What is more likely is that there exists various local and incomplete solutions, in which academics manage to combine – or prioritize - some of the tasks in a sensible way. The number of possible combinations and logics of combination must be limitless. Some authors have already documented what they call 'hybrid practices' (e.g. Tuunainen 2004). The actors' institutional position surely sets limits on the variety of possible practices, but skilled players may aim to re-position themselves to get rid of some paralyzing contradictions. Consequently, it is understandable that universities have established diverse 'special units' like research centers (without teaching responsibilities) and business units (without research or teaching responsibilities) to avoid the problems faced by disciplinary units with the full agenda of university work. These organizational solutions may, however, be beyond the reach of many ordinary university workers, and at the same time questionable solutions to the dilemmas faced by the disciplinary units.

Anyway, there is much more richness and local diversity in the academia than the simplistic, governmental or managerial accounts recognize. Accepting the view that practices are often 'only' in emergence, and seldom full-blown and established, creates space for stories that tell about ordinary life in academia.

To appreciate the existing diversity in the forms of practical activity in academia, it seems sensible to bring together resources both from science studies, previously occupied with research work, and higher education research with its main focus on educational work. The epistemic object suggested in this paper may serve as an additional attractor for conversations that try to overcome the borders between the two streams of research.

Conclusion

The starting point of this paper was the suggestion that ordinary academics may be doing meaningful and important work, although their work and its various meanings are not recognized or respected by those who aim to govern it. It is our task, as higher education researchers, to account for this work in a way that others can appreciate what academics are trying to accomplish, how they do it, and especially, why they do it. As we cannot 'give voice' to others, or speak on their behalf, we draw on our own experience, and join those who already have produced similar stories.

We suggest a particular plot for stories of academic work as practical activity. This plot is about academic practice in emergence. Moreover, we claim that it is useful to approach practical activity, and practice possibly emerging from it, from three perspectives: tactical (how), political (what) and moral (why). As questions encountered in practical activity these are not merely analytical perspectives, but also suggestions on diverse stances that practitioners can take towards activities, or are bound to take due to their position in a social field. These ideas can be understood as a way of reading the theories of practice, and of taking them into local use.

The view on practices, entertained in this paper, is both broad in allowing for three perspectives, and permissive as to the practitioners' ability to deal with, and reflect on, the practical concerns. Practical reasoning can take many forms, and practitioners own accounts of their work should be taken seriously. The accounts can be incoherent and evolving, but these are precisely the interesting aspects of them if we are to study practice in emergence.

We have also identified particular meeting points with practice theorists. In relation to activity theory, we have found a joint opportunity in bringing back some live, and living people, into practice theory. By 'live' we mean here that the questions of experience, emotion, and moral reasoning are included in our narratives. The concept of meaning is central to this problematic. What representations, and practices that maintain belief in them, sustain the questioning of existing forms of academic work and the searching for a locally sustainable alternative?

Overall, the storylines that lurk behind this statement of programmatic ideas suggest a certain view on, and from, academic work. Passion for knowledge, and other potential virtues of academic practice, should be central. Maybe the passions are tempered in the current state of university affairs, but without them academic practices would never emerge or exist.

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Endnotes

[1] This paper reports on the activities and thoughts developed over the years by group of (about ten) colleagues. Especially the members of the MERI group, Anne Herbert, Kirsi Korpiaho, Hans Mäntylä, and Hanna Päiviö have contributed to this particular text in various ways, while Keijo Räsänen has been its main writer – for situational reasons.

All periphery, all the time: what citation analysis tells us about knowledge, knowing and learning in science.

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"…William Harvey said that what Bacon said science was, was the science that a lord-chancellor would do. He [Bacon] spoke of making observations, but omitted the vital factor of judgment about what to observe and what to pay attention to…"

"And that is what science is: the result of the discovery that it is worthwhile rechecking by new direct experience, and not necessarily trusting … experience from the past."

Richard Feynman, (1966).

What to observe, what to pay attention to, how much and when to trust experience from the past, these are fundamental questions for scientific practice, and yet many observers of scientific practice have noted that scientists sometimes fail to ask them (Abbott, 2001; Bateson, 1979; Kuhn, 1962; Latour & Woolgar, 1986; Polanyi, 1966). This paper addresses the question of what differences it makes to scientific practice if scientific communities take for granted the truth of knowledge received from the past. In Feynman's terms taken-for-granted-ness is the mode of engagement with knowledge where practitioners cease to re-check what they know. Taking knowledge for granted matters for the kinds of questions that are asked, and hence for the generation of new knowledge. How much scientists take things for granted also influences more quotidian practices related to scientific communication, and it is through analysis of the products of these practices that I attempt to understand differences between scientific communities in terms of the extent to which existing knowledge is taken for granted.

If we compare studies of how natural science is made (Knorr-Cetina, 1998; Latour & Woolgar, 1986) to studies of how social science is made (Abbott, 2001, van Gigch, 2002a, 2002b), it seems clear that taken-for-granted-ness is more common in the natural sciences. This is very useful for the present study because it provides us with an *ex-ante* distinction to investigate. In order to make comparisons between scientific communities, it is also necessary to identify practices that are common to all communities. In the sciences, several publication practices are nearly universal. Among these formal citation practice leaves an archival trace that makes it an ideal candidate for detecting differences in the extent to which knowledge is taken for granted. In contrast to the more direct take on science as local practice that comes via ethnomethodological work, this study relies on citation analysis to study the outcomes of a particular practice that is shared across scientific communities. Because of the universality of citations, citation analysis can inform us differences in this practice between communities, and allow us to make inferences about why these differences in practice occur.

My theory development relies heavily on prior work for a broad description of differences in patterns of learning and knowing between scientific communities. In the tradition and spirit of Lave and Wenger (1991) I assume that learning and knowing are situated and communal, and read accounts of scientific practice (Abbott, 2002; Latour and Woolgar, 1986; Knorr-Cetina, 1999) as accounts of communities similar to the ones Wenger (1998) and Lave and Wenger (1991) describe. I try to detect differences in a mode of engagement, taken-for-granted-ness, that can be used to explain when and why scientists in different communities learn what they do.

The contribution of this paper is to develop theory about the impact of taken-for-granted-ness on citation practice and to test it at both general and domain specific levels. This study also contributes by developing a method for comparing local expressions of a universal practice across a wide range of scientific communities. This comparative method, pioneered by Uskiden and Pasadeos (1995), is a different use of citation analysis than the more usual attempt to map a particular domain or honor a particular author. I find evidence of the anticipated differences in mode of engagement between the natural and social sciences (van Gigch, 2002a, 2002b), as well as between domains (Knorr-Cetina, 1999). At the domain level I describe in detail my conclusions about two cases, one where a community appears to be establishing core knowledge, and another where a community enacts exaggerated practices of *not* taking knowledge for granted. I propose that the latter case may represent a third pattern of taken-for-granted-ness. Finding evidence of different levels of taken-for-granted-ness leads me to question the concept of maturity as it has been applied to scientific communities. Is a community that takes core knowledge for granted more mature than one that contests it?

Taken-for-granted-ness, bodies of knowledge and communities of practice

Taken-for-granted-ness is one of many modes of engagement between scientific communities of practice and the bodies of knowledge that they propagate and extend. Other examples of modes of engagement between scientific communities and their knowledge are reliance on sensors (or not) for observation, reliance on large or small groups to do science, and reliance on experiment or field work. I assume that modes of engagement are largely communal and that the modes of engagement peculiar to a community are some of the things that community members learn as they move toward full participation. It follows that differing enactments of any mode of engagement systematically alter the kinds of practices scientists' follow, and hence their opportunities for learning and knowing (Knorr-Cetina, 1999).

My assumptions imply a division between scientific communities and the bodies of knowledge they sustain. Neither is a disembodied abstraction nor is either a unitary whole. Both are distributed among participants and situated in a larger embedding environment. Because the propagation of scientific bodies of knowledge involves publication, bodies of knowledge can escape the control of the communities where they originate. Bodies of

knowledge can be re-interpreted and revised elsewhere while communities stay the same. There can be many to one or many to many relationships: many communities can make claims on a single body of knowledge, and an interstitial community (Abbot, 2000; Friedkin, 1978; Leydesdorff, 1998) can make claims on many. Communities and their knowledge are intermingled, but they are not the same.

Communities don't treat all knowledge received from the past in the same way. Some knowledge is codified in curriculum and textbooks and is important primarily for apprenticeship kinds of participation, as Kuhn (1962) and others have pointed out (Abbott, 2001; Feynman, 1966; Latour & Woolgar, 1986; Lave & Wenger, 1991; Merton, 1968; van Gigch, 2002a, 2002b). I call this part of the body of knowledge core knowledge, and by it mean knowledge that is generally acknowledged to be important to the domain. Note that in labeling some part of a domain as core knowledge, I make no assertion as to whether the community takes knowledge for granted or treats it as tacit. Key oppositions, such as between realism and constructionism within constructionist sociology (Abbott, 2001) are core, but not taken for granted.

Core knowledge is not always taken for granted, but when knowledge is taken for granted it is usually core. In many communities core knowledge is seemingly ignored by experts, particularly when they engage in the production of scientific communication. This indicates that taken for granted knowledge is viewed foundational, that it is what science is built on, rather than something to be explored or questioned or even mentioned (Kuhn, 1962; Latour & Woolgar, 1986). It is "what every schoolboy knows" (Bateson, 1979). Not all science is like this, as is indicated by Abbott's vision of the social sciences (2000) as playing out fractal cycles of revision and challenge, where core knowledge is continually re-checked, re-labeled and re-framed. When core knowledge is not taken for granted, scientists learn to deal with what it means to consciously take positions toward core knowledge, and to know that there are different frameworks in competition. This doesn't mean they don't take things for granted as individuals, but rather that at the communal level, taken-for-granted-ness is not the norm.

Assessing taken-for-granted-ness through local enactments of universal practice

The level of taken-for-granted-ness enacted by scientific communities can be used to connect these disparate visions of science. It is possible to do so because the communication processes that present science to society are remarkably homogenous. Scientific communication is dominated by a process of publication that sharply distinguishes it from the presentation processes of spiritual leaders, technologists (Allen, 1997), artists or politicians.

The scientific publication process is characterized by several relatively universal factors. In most domains scientists are rewarded (either materially or with social capital (Latour & Woolgar, 1986)) for publishing novel contributions. Domains rely widely on specialized journals stylized citation practice and peer review (Abbott, 2001; Kuhn, 1962; Leydesdorff,

1998; Merton, 1968; Small, 1999; Starbuck, 2005). These practices distinguish scientific production from other ways that knowledge becomes public, such as through patents and technologies (Allen, 1997). While the details of the discovery and construction of knowledge depend in large part on disparate practices in specific communities, the homogeneity of scientific publication processes imposes a certain unity on science.

These unifying practices also serve to make scientific communication a very social process. In many domains studies and the publications that result from them are collaborative. Even when publications are single-authored, peer review and citation practice inject the community into the research project. The peer review system ensures that what is published conforms to communal practice and is supposed to serve Feynman's 're-checking' function. Consistency with existing knowledge and contact with the core are maintained partially through citations, the claims authors make on prior work (Leydesdorff, 1998). It is through the particular enactment of these relatively universal social processes in each community that differences in the level of taken-for-granted-ness leave a trace in the products of scientific publication.

The extent of taken-for-granted-ness in scientific communities seems to be associated with the availability of causal explanation and replicable forms of evidence about the 'factuality' of ideas (Elster, 1983; van Gigch, 2002a, 2002b). Latour and Woolgar (1986) describe natural science as a process in which scientists attempt to move their ideas toward acceptance as facts, in the face of resistance from the community. This process can be generalized to cover the social sciences as well, although many social scientists would reject the notion that they deal with facts. The difference is that in the natural sciences causal explanation and experimental replication play a much stronger role (Elster, 1983; Latour & Woolgar, 1986; Knorr-Cetina, 1998; van Gigch, 2002a, 2002b) than they do in the social sciences. Natural science has no problem with facts – instead, it takes them for granted. If experiments keep working in many labs, the community ceases to resist the factuality of the idea and finally comes to take the knowledge for granted (Latour & Woolgar, 1986; Lave & Wenger, 1991, Merton, 1968). In the social sciences, where the strongest explanations are functional at best, and where replication is seldom possible, it is much harder for communities to come to agreement on and cease resistance to any set of ideas. Ideas may be accepted as candidates for factualness, perhaps even widely, but the acceptance is always provisional.

The extent of taken-for-granted-ness in a community strongly influences what scientists learn and know. When taken-for-granted-ness dominates, scientists know, but don't say or cite, the core. This does not mean the core is tacit, since scientists do know it and can say it, if, as described in Latour and Woolgar (1986), an interloper asks for an explanation. Once knowledge is enshrined in the core and codified in text books and graduate courses, only novices and outsiders are likely to refer to it, especially in publication. This is a model of the expert as a participant with apparently simple solutions, where taken-for-granted-ness is the result of experience in what matters and what kinds of problems there are (Brown & Duguid, 1991). Scientists learn to rely on experimental processes while evaluating experimenters, to

read machines, to knit together multiple bodies of knowledge using causal explanation and replication. Scientists know that what matters is moving the ideas into the core, where they can generate social and scientific capital for their authors.

When accepted knowledge is *not* widely taken-for-granted, scientists must stake out explicit positions with respect to the body or bodies of knowledge they seek to extend or control. They learn to stake out coherent positions extending from core to periphery, to draw on multiple bodies of knowledge, to wall off areas they deem irrelevant, to rely on specific methods, and to do so while maintaining an active stance toward competing views. Scientists learn to build arguments and undertake explorations from the core outward: *if* we know X, then Z is interesting and at the margins of what we know we may find Y. The openness of conflict and the multitude of competing certainties contribute to the narrative of the social sciences as pluralistic at best, and chaotic and introverted at worst. Scientists know that what matters is staking and defending claims, since it is difficult to construct facts when it is hard to take things for granted.

Citation analysis as a method for detecting taken-for-granted-ness in science.

As outlined above, citation is an important and nearly universal element of scientific publication practice. It is very important here to emphasize that in nearly every scientific community, I anticipate that communal practice will make citation patterns highly individual and largely idiosyncratic. This is because one of the most important roles of citation is to establish the relationship between the citing work and its immediate neighbors and predecessors. Since to be full participants scientists need to stake out relatively unique individual claims, immediate predecessors and neighboring ideas are also relatively unique. In fact one way to make a novel claim may be to invent novel claims that recombine and connect chunks of knowledge in new ways. Citations become idiosyncratic as a result of communal pressures on scientists to make novel contributions. For citation analysis to be useful, we have to anticipate finding patterns in a complicated tangle of idiosyncratic claims.

Taken-for-granted-ness has direct implications for finding patterns in citation because it determines whether particular chunks of core knowledge play an *explicit* communal role in the struggle for establishing meaning. When taken-for-granted-ness is the norm, general agreement that a particular reference contains core knowledge means that the reference will be cited *less often* (Latour & Woolgar, 1986; Merton, 1968). In domains where taken-for-granted-ness is the norm, there should be fewer citations to items of core knowledge, and as a result, less overlap between reference lists and fewer citations in general. When taken-for-granted-ness is not the norm, authors need to establish an explicit position with respect to the core (rather than taking a position for granted). To do so they will cite accepted core references more frequently, creating greater overlap between reference lists and more references overall.

One of the things citation is used for is to establish the legitimacy of the contribution a new publication makes. When taken-for-granted-ness *is not* the norm, authors can do this directly by appropriating the legitimacy of the core. Where a reference comes from matters less than its being a core reference. When taken-for-granted-ness *is* the norm, this strategy is not available because only novices cite the core. To avoid being treated as novices or outsiders, authors working in a taken-for-granted-ness mode establish legitimacy by making reference not to particular works, but by ensuring that their references come from *sources* that are recognized as legitimate. This usually means referring to articles published in a domain's top journals or in some domains, to important books. When taken-for-granted-ness is the norm, authors will be more likely to cite different items from the same sources, since that's the available strategy for establishing legitimacy.

This leaves us with three related indicators of the level of taken-for-granted-ness enacted in domains: the number of references, the level of overlap between reference lists, and the homogeneity of the sources from which references are drawn. Larger lists have the potential for more frequent overlap and offer more occasions for the same sources to be referred to. The number of references and the level of overlap between reference lists are negatively related to taken-for-granted-ness while the homogeneity of sources is positively related to it. The natural sciences are generally conceived of as a context where taken-for-granted-ness is the norm, while the opposite is thought to be true of the social sciences.

Proposition 1: Articles published in the natural sciences will have shorter reference lists than articles published in the social sciences.

Proposition 2: Articles published in the natural sciences will have lower levels of reference list overlap with each other than articles published in the social sciences when the size of reference lists is controlled for.

Proposition 3: Articles published in the natural sciences will have higher levels of source homogeneity with each other than articles published in the social sciences when the size of reference lists is controlled for.

Patterns of citation in journal special issues

In order to understand how differences in patterns of citation reflect taken-for-granted-ness in scientific communities of practice, I looked at three kinds of special issues of specialized scientific journals. I chose to examine special issues rather than whole journals because the domains that support journals may include a variety of sub domains. In many domains, prestigious journals are seen as 'generalist' outlets by their communities, where to an outsider the journal charter seems incredibly narrow. It is because prestigious journals are generalist that citing work published in them can provide legitimacy cover without leading to high overlap between reference lists. Authors with very different agendas can find something to cite and therefore gain legitimacy from citation. Special issues cater to sub domains, and thus correspond more closely to the specialized communities where scientists work.

The three types of special issues I studied are conference based, special topic and festschrift. Differences in how articles are selected for these three types of special issues give us slightly different possibilities for detecting differences in taken-for-granted-ness. Because of these differences it is important to control for special issue type.

The most common type of special issue is conference based, where a journal publishes a collection of articles as a form of proceedings from a conference. Conferences are an opportunity for scientists doing research in a particular area to physically come together as a community. Perhaps more importantly, conferences are a mechanism for maintaining the identity of the sub domain-interested community by inducting and socializing newcomers. Conferences and conference papers are thus a place where it is more acceptable than usual to make newcomer errors, like making explicit references to taken for granted knowledge.

I defined special topic special issues as collections of articles on a selected topic that occupy an entire issue, solicited from a community without an accompanying conference. The topic and papers are usually selected by a guest editor or editorial team. The calls for special topics tend to be narrower than the calls for conferences, so that a special issue based on a single topic is more likely to represent a working community. Special topic special issues are less inclusive than conferences – they are less likely to include the work of newcomers, and more likely to include the mature work of senior members of the community.

Festschrifts are special issues of journals issues designed to celebrate the lifetime contributions of prominent scholars. Contributions to these special issues are typically from the honoree's students, colleagues and peers. Because festschrifts are conceived around the work of an individual, they represent an even more focused community than a special topic special issue. Festschrift special issues are much more common in the natural than the social sciences, and in the social sciences occur primarily in British journals.

The unit of analysis is the collection of citations referred to in the articles published in each special issue. Data were collected from the *ISI Web of Science* citation indices for the years 1999-2004; special issues were identified through text searches of editorial material for the relevant words. I collected data on 166 conferences. I tried to roughly approximate the proportions of each kind of special issue in natural and social science. In a deviation from random selection, for special topic special issues I tried to include multiple special issues from single journals to permit a test of the consistency of differences between domains, rather than test the propositions only between natural and social sciences. I made an effort to collect data from a wide range of disciplines and journals, including many I am not personally familiar with. Natural and social sciences are both represented in each collection of special issues, as are European, North American and Asian journals, in about the proportions they appear in the overall database. The list of 128 journals with special issues in the data appears as Appendix A.

For each article in each special issue I downloaded the cited reference list from the appropriate citation index and used the data to construct special issue level co-citation

networks. A co-citation network treats the cited references as nodes connected by the papers in which they appear (Leydesdorff, 1998; McCain, 1990; Small, 1999).

The first dependent variable is the average number of citations per paper in each special issue. I calculated the average number of citations per paper as the average length of the cited reference list of papers. Citations referred to more than once in a paper are counted only once.

I measured overlap between reference lists as the average number of citations shared between reference lists in each special issue. Overlap between reference lists in a collection depends on four things. The first is how many references authors cite. In domains where the norm is few citations, there are fewer opportunities for authors of different papers to cite the same work or outlet. The second factor is the number of papers published in a special issue. When more papers are published, there are more opportunities for a given citation or outlet to re-occur. The third is the extent to which the journal and domain are interdisciplinary. Some domains are interstitial, which would lead authors working in them to draw on a variety of source domains, which increases the number of possible core citations. The final factor is the extent to which community members take core knowledge for granted. This last factor is not directly observable, but can be inferred if the other factors are controlled for.

Similar logic applies to the homogeneity of sources. I measured the homogeneity of sources as the percentage of citations that referred to sources that appeared more than once in the special issue collection. I prefer this to a measure based on the influence of a single citation source (i.e. the dominant journal) because many sub-domains draw on more than one body of knowledge. My measure includes all sources that may provide legitimacy to authors, an approach that is consistent with Starbuck's findings that more journals are being cited over time (2005). My measure is significantly correlated ($r = .33$, $p < .01$) with the percentage of citations from the top journal in each collection.

To provide a better sense of the relationship between source homogeneity and the impact of a dominant journal, I include Figure 1. Figure 1 shows the distribution of top journals cited in two special issues, which were chosen because they have low reference list overlap and very different levels of source homogeneity. On the right of Figure 1, source homogeneity is low because not only does the most frequent source not occur very often, the next most common sources are even more infrequently cited. Authors make a lot of references, but not to the same items or sources. Even though this special issue had fewer papers than its counterpart on the left of the figure (15 vs. 36), it had more citations (240 vs. 236).

Figure 1. *Illustration of source homogeneity*

High source homogeneity   Low source homogeneity
Adjusted for number of papers, journal percentage of citations

Nucleosides Nucleotides & Nucleic Acids
Conference special issue
36 papers, 236 references

Social Research
Conference special issue
15 papers, 240 references
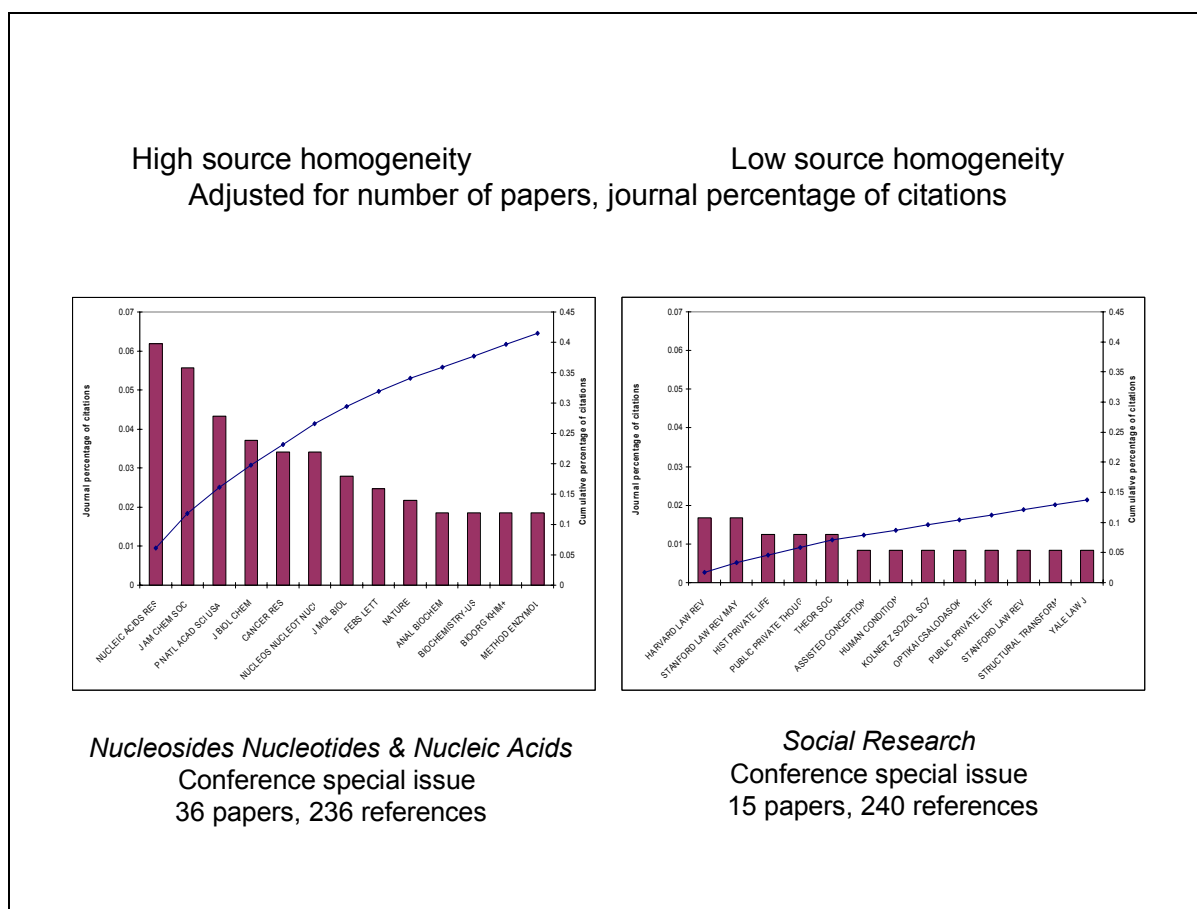
In contrast, on the left of Figure 1 is an example of a special issue where the most frequently cited journal is strong, and is accompanied by other strong journals. In this domain, authors cite relatively few references per paper but they come primarily from a small set of sources. This complex of differences is what my measure of source homogeneity detects.

Along with dummy variables representing the presumed difference between natural and social sciences and the categories of special issue described above, I also included as controls the number of papers in each special issue and a measure of the interdisciplinarity of the journal, the number of *ISI Web of Science* subject areas for each journal. Correlations and standard deviations are given in Table 1. It is interesting to note that the average overlap between reference lists is significantly correlated with the average number of citations per paper but not with the number of papers in a special issue, while the reverse is true for source homogeneity. Articles in special issues with more papers tend to have fewer citations.

Table1. *Descriptive statistics and correlations*

	Variable	Mean	Std. Deviation	1	2	3	4	5	6	7	8	9	10	11
1	Reference list overlap	.655	1.171											
2	Source Homogeneity	.238	.078	.040										
3	Average citations per paper	32.292	18.681	.488***	.101									
4	Number of papers in special issue	18.753	36.321	-.122	.193*	-.195*								
5	Interdisciplinarity of journal	1.518	.630	.045	.045	.125	-.072							
6	Natural *vs.* social science dummy	.500	.958	.419***	-.273***	.233**	-.128	-.141						
7	Special Topic NS	.187	.391	-.124	.148	-.087	-.050	.048	-.251**					
8	Conference NS	.169	.376	-.166*	.197*	-.216**	.328***	.141	-.236**	-.216**				
9	Festschrift NS	.205	.405	-.155*	.279***	.072	-.005	.033	-.266***	-.243**	-.229**			
10	Special Topic SS	.187	.391	.218**	-.333***	.204**	-.129	-.125	.251**	-.230**	-.216***	-.243**		
11	Conference SS	.229	.421	.212**	-.269***	.066	-.111	-.039	.435***	-.261***	-.245***	-.277***	-.261***	
12	Festschrift SS	.024	.154	-.006	-.013	-.141	-.030	-.130	.082	-.075	-.071	-.080	-.075	-.086

$N = 166$, * $p < .05$, ** $p < .01$, *** $p < .001$

Results of comparing natural to social sciences

The details of the distribution of special issues, with accompanying statistics are given in Table 2. The division between natural science and social science in Table 1 is based on which citation index (*Science Citation Index* or *Social Science Citation Index*) the journal is included in. The *Science Citation Index* indexes natural science journals.

Table 2. *Special issue type comparisons*

	Natural Science			Social Science			
	Special Topic	Conference	Festschrift	Special Topic	Conference	Festschrift	Total
Conferences	31	28	34	31	38	4	166
Avg. papers	14.97	45.14	18.41	9.00	11.39	11.75	18.75
Avg. Cites per paper	28.91	23.36	34.94	40.22	34.56	15.58	32.29
Average overlap between reference lists	0.352	0.226	0.298	1.186	1.110	0.609	0.655
Avg. Source homogeneity	0.262	0.272	0.280	0.184	0.199	0.231	0.238

There are significant differences between categories for most of the variables in Table 2. Natural science special issues tend to include more papers, which make fewer citations (except for the festschrift category). Sources are more homogenous in the natural sciences, and the difference is significant. There is significantly more overlap between reference lists in social science special issues: social science reference lists tend to have on average one citation in common with other articles in a special issue, while natural science articles share one reference with every third paper. These data provide a sense of the normal very high level of idiosyncrasy in reference lists. There are no systematic differences between special issue types.

The propositions are formally tested using a series of regression models, with the special issue reference collection as the unit of analysis and with dummy variables linked to the categories given in Table 2. The omitted category, represented by the intercept in each of the models shown in Table 3, is Natural Science Special Topic special issues. I included the number of papers in each special issue and a measure of the interdisciplinarity of the journal as controls. For the regressions on reference list overlap and source homogeneity, I also included the average number of citations per paper as a control, since it is potential contributing factor. The table entries are un-standardized regression coefficients (b's) , with standard deviations in parentheses.

Table 3. *Regression models*

	Cites per paper	Average overlap between reference lists		Source homogeneity	
	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	22.746***	-.261	-.582*	.202***	.240***
Special Topic NS	(4.887)	(.252)	(.292)	(.019)	(.019)
	-.056	-.001	.001	.477E-003**	.263E-003
Number of papers	(.041)	(.002)	(.002)	(.0002)	(.0002)
		.030***	.029***	.001	.001***
Cites per paper	-	(.004)	(.004)	(.000)	(.000)
	4.435	-.032	.063	.005	-.007
Interdisciplinarity	(2.264)	(.129)	(.129)	(.009)	(.009)
	-4.446		.007		.009
Conference NS	(4.792)	-	(.269)	-	(.018)
	6.319		-.227		.011
Festschrift NS	(4.394)	-	(.248)	-	(.016)
	11.969**		.528*		-.089***
Special Topic SS	(4.531)	-	(.260)	-	(.017)
	5.921		.605*		-.068***
Conference SS	(4.291)	-	(.242)	-	(.016)
	-10.940		.676		-.020
Festschrift SS	(9.491)	-	(.534)	-	(.035)
R^2 change	-	-	.05**	-	.25***
Model R^2	.10***	.23***	.28***	.04*	.29***

N = 166, $^*P < .05$, $^{**}P < .01$, $^{***}P < .001$

As shown in Model 1 of Table 3, the number of citations per paper is significantly higher for social science special topic issues than natural science special topics. Proposition 1 is only supported for special topic special issues. Proposition 2, that reference list overlap would be higher in social than natural sciences, is supported, as reflected in Models 2 and 3. Proposition 3, that source homogeneity would be higher in the natural sciences, is supported (Models 4 and 5). The citations per paper variable has the expected effect of increasing reference list overlap and source homogeneity. The number of papers and interdisciplinarity of the journal did not exhibit significant effects in the fully specified models. All propositions are also supported when the special issue categories are collapsed, so that the comparison is directly between natural and social science (not shown).

Figure 2 shows graphically how reference lists in the social sciences are more likely to overlap, while simultaneously referring to less homogenous sets of sources than natural science reference lists. I was interested to note the long social science tail to the right of the figure. To see how much this end of the distribution mattered I analyzed the models without the 13 special issues that have overlap values of greater than 2. Of these, 12 come from the social sciences, of which 7 are special issues in management journals (*Strategic Management Journal*, *Organization*

Studies, *Organizational Behavior and Human Decision Processes*). With these special issues removed, all propositions continue to be supported at conventional significance levels when using only the natural science-social science dummy. When the special issue category dummy variables are added to the model, Proposition 2 is weakly supported. Conference and festschrift social science special issues have greater overlap than natural science special topics, p<.10. Propositions 1 and 3 continued to be supported.

Figure 2. *Distribution of natural versus social science special issues*
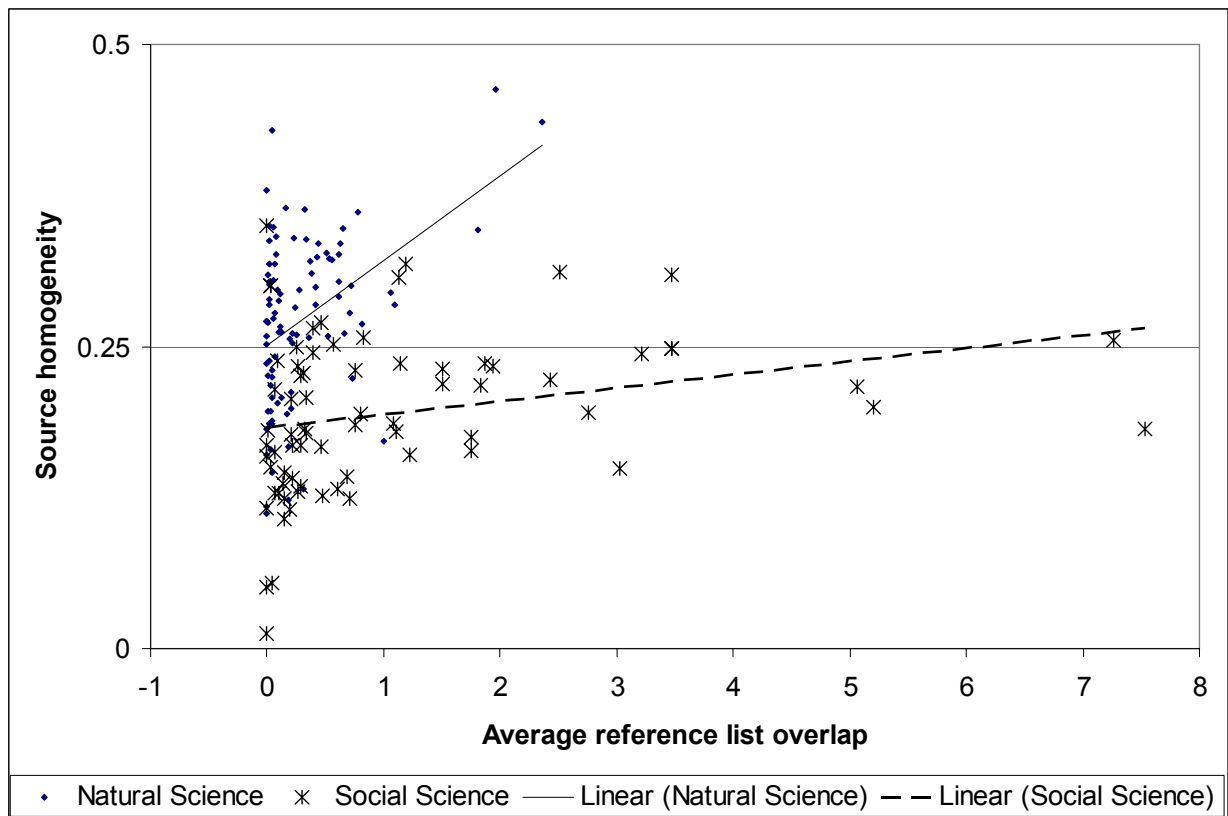
My interpretation of Figure 2 is that it adequately represents the distribution of these factors in the sciences. Exactly why some social science domains and sub-domains exhibit such high levels of overlap is a question for later discussion because resolving it is beyond the scope of the present study.

Results at the domain level

I also tested my propositions in the subset of special topics issues where I had multiple special issues from single journals, in order to probe for differences in taken-for-granted-ness at the domain level. The variables are the same, except that rather than dummy variables for conference type, the models include dummy variables for journals. Relatively few social science journals run frequent special topics special issues. The social science journals included come from business and information systems domains rather than psychology, sociology or economics. The journals are listed in Table 4, with means for source homogeneity and reference list overlap.

Table 4. *Special topic special issue journals*

Journal	Label	Special Issues	Source Homogeneity	Ref. List Overlap
Chemical Engineering Research & Design	CERD	4	.184	.019
Clinical Journal Of Pain	CJP	5	.278	.479
Deutsche Medizinische Wochenschrift	DMW	4	.315	.024
Journal Of Physics D-Applied Physics	PHYS-D	3	.294	.042
Journal Of The American Society For Information Science and Technology	JASIST	5	.137	.249
Prenatal Diagnosis	PREND	3	.377	1.443
Presence-Teleoperators And Virtual Environments	PRESENCE	4	.142	.175
Pure And Applied Chemistry	PAC	4	.289	.169
Strategic Management Journal	SMJ	4	.235	4.177
	Total	36	.243	.732

These regression models produced much the same pattern of results as at the higher level of aggregation: the number of papers and level of interdisciplinarity are not significant, and there are significant differences between collections for source homogeneity and reference list overlap. The models are given in Table 5. The omitted journal, represented by the intercept, is *Prenatal Diagnosis*. Given the small number of data points, significance tests and coefficients of determination are not especially reliable, but it seems clear that the general pattern is continued in this analysis: different domains exhibit patterns of citation that suggest different levels of taken-for-granted-ness.

Regression coefficients don't make it easy to understand whether differences within domains are less than differences between domains, which is key to making the assertion that differences in citation practice are communal. Figure 3 shows box plots for the journal groups. The box plot symbols show the median, interquartile range, outliers, and extreme cases of individual variables within journal. On the right are the distributions of reference list overlap within and between journals. From this figure we can see that it would be difficult to distinguish special issues from

CERD, DMW and *Phys-D* from each other in terms of overlap. Citations in these communities are very highly idiosyncratic. The two information systems related journals, *JASIST* and *Presence*, have comparable moderate levels of overlap, but the two chemistry journals do not, perhaps because one is a chemical engineering journal.

Table 5. *Special topic special issue regressions*

	Reference list overlap	Source Homogeneity
	Model 6	Model 7
Intercept (*Prenatal Diagnosis*)	.7170 (2.248)	.313* (.140)
Number of papers	.0010 (.043)	.0040 (.003)
Cites per paper	.0060 (.018)	.0010 (.001)
Interdisciplinarity	.2660 (.943)	-.0030 (.059)
Chemical Engineering Research & Design	-1.1010 (1.121)	-.205** (.070)
Clinical Journal Of Pain	-1.0460 (.630)	-.111** (.039)
Deutsche Medizinische Wochenschrift	-1.0690 (1.151)	-.0610 (.072)
Journal Of Physics D-Applied Physics	-1.0990 (1.333)	-.163† (.083)
Journal Of The American Society For Information Science and Technology	-1.114† (.621)	-.240*** (.039)
Presence-Teleoperators And Virtual Environments	-1.229† (.632)	-.220*** (.039)
Pure And Applied Chemistry	-1.0420 (1.139)	-.148* (.071)
Strategic Management Journal	2.524** (.861)	-.184** (.054)
Model R^2	.70***	.69***

$N = 36$, $†< p.10$, $^* p < .05$, $^{**} p < .01$, $^{***} p < .001$

Strategic Management Journal, *Prenatal Diagnosis* and *Clinical Journal of Pain* have the highest levels of overlap, suggesting that the communities underlying these special issues are still contesting the taken-for-granted-ness of core knowledge as it relates to special topics. *Strategic Management Journal* has by far the highest level of overlap in its citations, as was noted earlier. While the *Strategic Management Journal* special issues did not include articles that are

positioned as comprehensive reviews, inspection of the texts reveals that the articles usually include long and detailed literature reviews, which increases overlap.

On the left of Figure 3 are the box plots of source homogeneity. Again, the natural science-social science split is repeated. The three social science journals are among the 4 least homogenous in terms of sources and the fourth is *CERD*, the chemical engineering journal. One suggestion presented by this isolated journal is that an engineering emphasis may be distinct from the larger natural science type in having low overlap and low source homogeneity. This would be consistent with Allen's (1997) argument that scientific and technological publication differ in their reasons for citation. The three medical journals are comparable to each other, as are the two information systems journals.

Figure 3. *Box plots of reference list overlap and source homogeneity by journal*
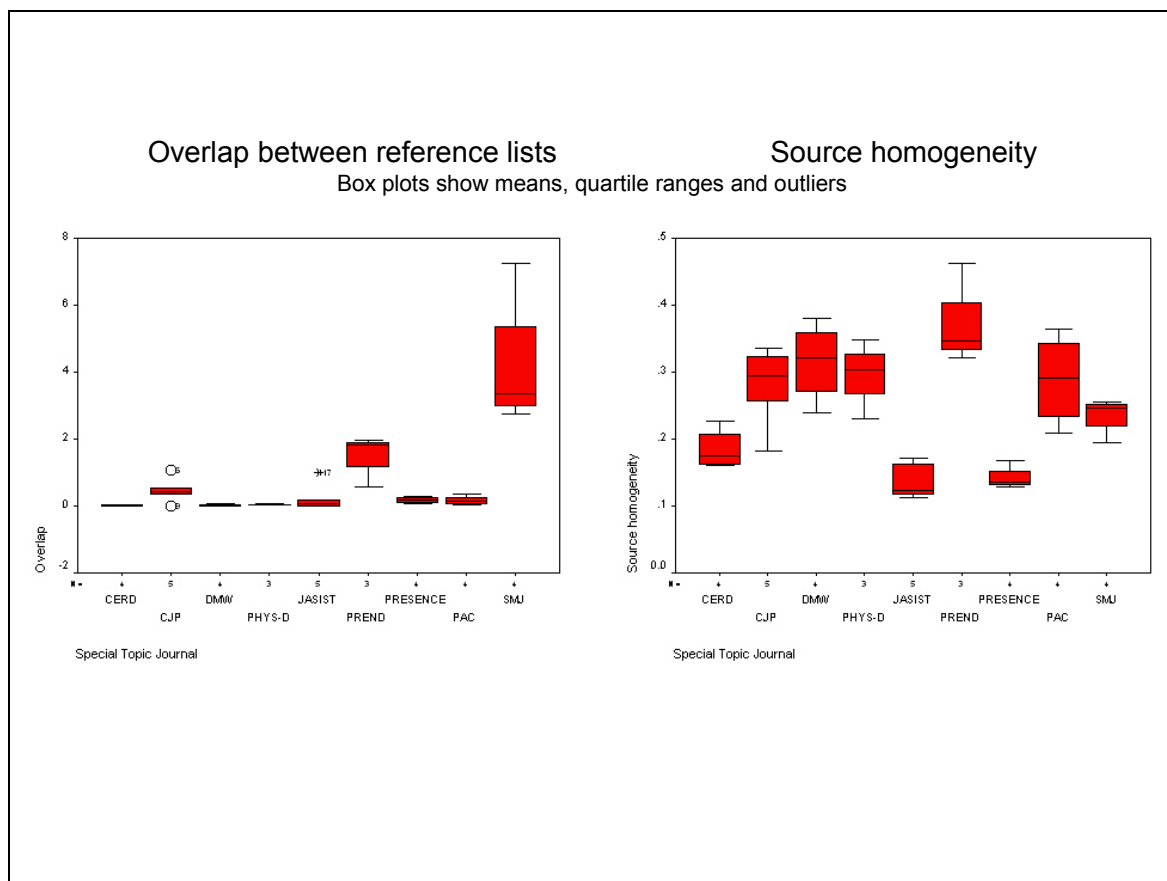
Examining the two sets of box plots together isolates *Prenatal Diagnosis* as an unusual case. The 3 special issues from this journal all deal with pre-implantation genetic diagnosis. Closer inspection of the data revealed that high overlap occurs primarily in one of the three special

issues. This issue includes two comprehensive review articles with many more references than usual and also included frequent references to several relatively recent methods articles. The co-citation networks for these three special issues are compared in Figure 4; the unusual special issue is depicted on the right. All three networks show clusters of references. In the network from the unusual special issue, clusters that are not connected in the other networks are linked (via the review articles), and the methods references are more strongly linked with each other (indicated by bold lines). Removing the review articles would reduce this network to a pattern of detached clusters similar to the other two. This suggests that the pre-implantation genetic diagnosis community is actually a typical natural science community, with low overlap and high source homogeneity. What we see in this data may be an example of the process of establishing new facts within this community. It also suggests the important role review and methods articles can play in overall levels of overlap and source homogeneity.

Figure 4. *Prenatal Diagnosis co-citation networks*
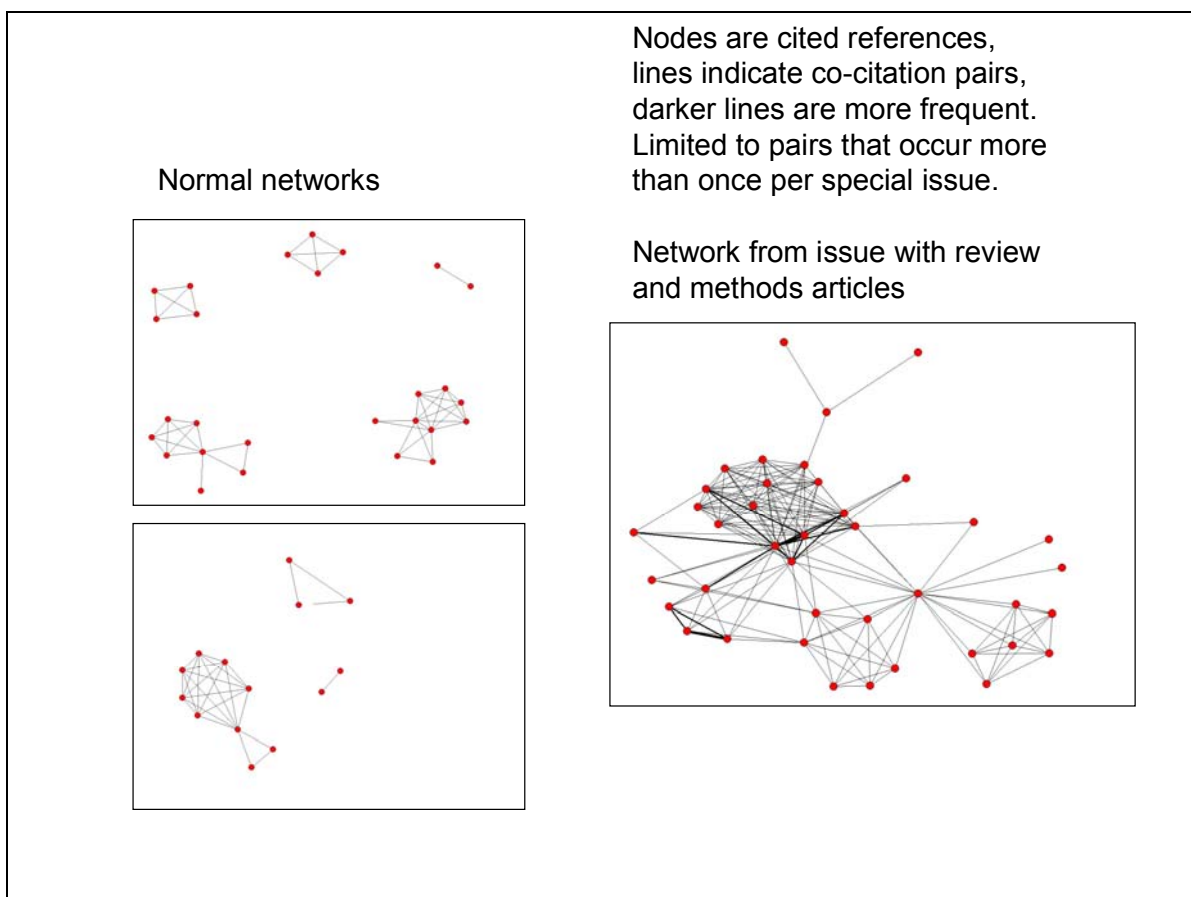
Discussion and conclusion

To recapitulate, the data support the propositions I offered, and therefore the idea that there are substantive differences between the natural and social sciences, and between communities within the different divisions of science, in terms of the level of taken-for-granted-ness enacted. This support is based in part on a claim that core work will be cited less often in the natural sciences, where it is presumably more frequently taken for granted. The second piece of support comes from the claim that the same communities will tend to cite references from a small homogenous set of sources as a means of enhancing the legitimacy of their work. In combination the two ideas provide a stronger indication of the extent to which knowledge is taken for granted. Controlling for differences in the size of the reference collection and combining the two indicators also sharply constrains the range of alternative explanations. The differences between domains and branches of science identified in this study do not appear to be artifacts of the method. Communal variation in a universal practice like citation in scientific publishing can be detected through archival means. While I can't assert positively that this study detects differences in taken-for-granted-ness, it seems certain that it detects the fossil record of some communal practice, with taken-for-granted-ness a leading candidate.

This support for my propositions suggests the social and natural sciences are more alike than they would otherwise appear, and that they appear more alike when they converge on similar levels of taken-for-granted-ness. That's what the dense cluster on the left of Figure 2 is: a region where norms of citation practice in the natural and social sciences converge. There is also considerable variation within areas and domains: sub domains of economics do not cluster any more than the sub domains of laboratory and field based biology do. Some sub domains may take things more for granted than their close cousins (Abbott, 2002). Finally, practice within communities is not constant. As communities' relations to bodies of knowledge evolves, different forms of practice may emerge. Thus there are moments in natural science when a sub domain like pre-implantation genetic diagnosis can take on the non-taken-for-granted-ness characteristics of a social science. The particular moment I encountered in the data appears to have marked a transition, rather than a permanent change. Permanent change could occur, but that would require a fundamental change in the orientation of a domain toward its facts.

This method can also detect unusual patterns of citation, as in the case of *Strategic Management Journal*, and the other management special issues located in the far right of Figure 2 (*Organization* and *Organizational Behavior and Human Decision Processes*). It is worth noting that these are for the most part journals that emphasize analysis at the level of organization and industry. In comparison to economics, general business and micro-level business research, citation practices in strategic management are distinctive. This conclusion is borne out in a recent study of the journal influence and citation practice in this area (Starbuck, 2005). The number of citations per paper in *Strategic Management Journal* is comparable to other organizations science

journals, but reference list homogeneity is three times greater than other sociology and organization science journals, while source homogeneity is double.

Is there something about strategic management that compels authors make so many references to core work? Strategic management is a domain where prominent scholars have been publicly debating the pluralistic nature of the paradigm (Cannella & Paetzold, 1994; Ghoshal, 2005; Pfeffer, 1993; Ramos-Rodriguez & Ruiz-Navarro, 2004; Starbuck, 1993) but it seems unlikely that oppositional pluralism would account for this level of overlap. Ramos-Rodriguez and Ruiz-Navarro (2004) examined the intellectual structure of *Strategic Management Journal* over time, and their analysis provides a richer picture of the domain. From their data and analysis it seems to me that this is a domain where knowledge proceeds by accretion (Weick, 1991) rather than by revolution or taken-for-granted-ness. Scholars attempt to combine ideas and methods from multiple areas, and make extensive references to each: for example, in one special issue authors use network analysis to study the 'resource based view'. While it makes sense for authors to make explicit references to a novel methods, in this journal they also seem to make extensive reference to the sob domain core. Understanding this domain in depth is clearly an opportunity for future research.

Another interesting finding of this study is the extent of the similarity in the ways scientists cite. The differences between most domains are a matter of degree rather than a pronounced qualitative difference in pattern: that's why the organization science and strategic management domains stand out. For most scientists in most domains, the citation process is highly idiosyncratic, which indicates both the predominance of narrow specialization and the extent to which core knowledge is taken for granted. Rather than an image of science as founded on communal bodies of knowledge, this paper creates an impression of scientific domains as congeries of monologues. If there is unity in most scientific domains, it is not unity of explicit claims on the past. Instead it is unity of practice and perhaps of shared values and beliefs coupled with taken for granted, largely unvoiced, shared core knowledge. Communal practices such as operating in a taken-for-granted-ness mode lets scientists develop unique specializations and contributions and still remain in contact.

Lave and Wenger (1991) famously identified legitimate *peripheral* participation as critical to learning and knowing for novices, while declining to privilege the center: "Peripherality suggests that there are multiple, varied, more- or less- engaged and -inclusive ways of being located in the fields of participation defined by a community." In this study we can see that in science *the central knowledge and practices of a community are sometimes privileged by being taken for granted*. The result is that full participants do not work in the center of a domain. I think Lave and Wenger's logic should be reversed, and that the key to situated learning by novices is legitimate *central* participation. Novices and apprentices work in the center, learning to know and

do the core. Full participation in processes of learning and knowing scientific knowledge could well be described as all periphery, all the time.

In conceptual terms this study continues the process begun by Uskiden and Pasadeos (1995) by extending the use of bibliometric analysis to examine the practices of communities, rather than the structure of knowledge. It does so by taking a comparative rather domain centered stance. One implication of this study is that future scholars should question the validity and utility of influence maps of domain knowledge. If there are cases where core knowledge is not commonly cited, then a map of citations and co-citations does not reflect the core knowledge of the domain, but rather the contested ground of the domain. By taking the conceptual step toward comparative studies of practice, this study also raises questions about the concept of the maturity of scientific communities. If there are qualitatively different patterns of practice, how will we say that one is more mature than the other, particularly if the differences ultimately depend on the availability of causal explanation and experimental replication? The social and natural sciences, and different domains with in them, are simply different – physics is not more mature because it takes things for granted. Just because the social sciences organize around contested knowledge does not mean there is no progress in them.

This study faced some limitations imposed by its method and data. It does not make direct contact with practice, and thus can't make direct inferences about taken-for-granted-ness. I control for enough alternative causes to think the indirect case is strong. This limitation points up the difficulty of establishing general facts in the social sciences: participant observation might produce direct contact with practice, but would be difficult to generalize, while my approach generalizes well, but does not make direct measurement or observation of its object. Taken in combination with the several participant observation based studies it draws on, the present study provides a very useful triangulation on the concept of taken-for-granted-ness as a key to practice. If we find taken-for-granted-ness in particular cases and its traces in a general survey of many domains, it is easier to move the concept toward 'factuality'.

The data also limit the study to a certain degree. Most of the journals indexed by *ISI Web of Science* are North American, and the indexes have more coverage of the natural than the social sciences. *ISI Web of Science* methods for classifying journals also limit the study. The classification scheme is not hierarchical: it does not classify Prenatal Diagnosis progressively as biomedical, obstetrics, neonatal, prenatal, but simply as prenatal diagnosis. The limits of this unstructured classification scheme makes it difficult to relate domains to each other, except by citation overlap. And, as I have shown, when core knowledge is taken for granted, there is little citation overlap within domains, let alone between them.

Another data limitation springs from the fact that the practice of producing special issues has not been widely adopted across domains. It is possible that there is some fundamental difference about domains that produce special issues, but it seems more likely to be inherited, as for

example the practice of producing festschrifts in the natural sciences. Maybe it is easier to honor a lifetime contribution when core knowledge is taken for granted.

It may be difficult to generalize this study beyond science, although it is clear that taken-for-granted-ness plays a role in most communities of practice. In the absence of the formal practice of making explicit claims on past knowledge, finding systematic traces of practice in archival data will be difficult. The idea that full participation in a community of practice means taking the core for granted while contributing on the periphery is very generalizable. Wenger (1998) provides an example of this kind of full participation in his case description of insurance claims clerks. Orr's classic study of copier repair technicians is another example (Brown & Duguid, 1991; Orr, 1990).

What this paper does is exploit local variations in a universal practice to make inference about practice across a wide variety of scientific domains. Doing so permits me to bring together seemingly disparate accounts of learning and knowing in the natural and social sciences by linking the differences to variation in taken-for-granted-ness. A social science community that accepts a dominant model may come to look like a natural science, as economics sometimes does. A natural science domain where taken-for-granted-ness has been challenged may come to look more like the social sciences usually do. Beyond this comparison, it is possible at this point that there are other patterns of taken-for-granted-ness in science. One such pattern, which is neither revolutionary or reliant on taken-for-granted-ness appears to be enacted in organization science and strategic management communities. What scientists learn and know depends on the conditions prevailing in the communities where they work.

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Appendix A: Special issue journal titles

Addiction Research & Theory
Aging Neuropsychology And Cognition
American Economic Review
American Journal Of Economics And Sociology
American Journal Of Public Health
Annales De L Institut Henri Poincare-Probabilites Et Statistiques
Anziam Journal
Applied Linguistics
Applied Psychology-An International Review-Psychologie Appliquee-Revue Internationale
Aquatic Botany
Aquatic Living Resources
Archives Italiennes De Biologie
Australasian Journal Of Philosophy
Australian & New Zealand Journal Of Statistics
Biological Conservation
Bioresource Technology
British Journal Of Psychology
Canadian Journal Of Earth Sciences
Cement & Concrete Composites
Chemical Engineering Journal
Chemical Engineering Research & Design
Chemical Engineering Science
Child Maltreatment
Chromatographia
Clinica Chimica Acta
Clinical Journal Of Pain
Communication Theory
Computerized Medical Imaging And Graphics
Computers & Chemical Engineering
Contributions To Plasma Physics
Counseling Psychologist
Designs Codes And Cryptography
Deutsche Medizinische Wochenschrift
Disability And Rehabilitation
Discrete & Computational Geometry
DNA And Cell Biology
Economic Journal
Economic Modeling
Educational Psychologist
Entrepreneurship-Theory And Practice
Environment And Development Economics

European Addiction Research
European Economic Review
European Planning Studies
Fatigue & Fracture Of Engineering Materials & Structures
Fortschritte Der Physik-Progress Of Physics
Harvard Review Of Psychiatry
History And Philosophy Of The Life Sciences
Humor-International Journal Of Humor Research
IEEE Transactions On Knowledge And Data Engineering
Industrial Marketing Management
Information Research-An International Electronic Journal
Information Retrieval
International Journal Of Educational Development
International Journal Of Manpower
International Journal Of Offender Therapy And Comparative Criminology
International Journal Of Plasticity
International Journal Of Technology Management
Journal Of Abnormal Child Psychology
Journal Of Applied Gerontology
Journal Of Applied Physics B-Lasers And Optics
Journal Of Biomaterials Science-Polymer Edition
Journal Of Business Research
Journal Of Clinical Psychology
Journal Of Econometrics
Journal Of Ethnic And Migration Studies
Journal Of Information Technology
Journal Of Intelligent Material Systems And Structures
Journal Of Language And Social Psychology
Journal Of Marriage And The Family
Journal Of Molecular Liquids
Journal Of Non-Crystalline Solids
Journal Of Optical Technology
Journal Of Personality Assessment
Journal Of Physical Chemistry B
Journal Of Physics D-Applied Physics
Journal Of Physics G-Nuclear And Particle Physics
Journal Of Psychology And Theology
Journal Of Pure And Applied Algebra
Journal Of Structural Geology
Journal Of The American Society For Information Science
Journal Of The Chinese Institute Of Chemical Engineers
Journal Of The Indian Chemical Society
Lithos
Materials Science And Engineering A-Structural Materials Properties Microstructure And
    Processing

Micron
Molecular and Biological Evolution
New Astronomy Reviews
Nonprofit And Voluntary Sector Quarterly
Nucleosides Nucleotides & Nucleic Acids
Organization
Organization Science
Organization Studies
Organizational Behavior And Human Decision Processes
Organizational Dynamics
Perspectives In Education
Philosophy
Physica A-Statistical Mechanics And Its Applications
Physica C-Superconductivity And Its Applications
Physics And Chemistry Of Glasses
Physics In Medicine And Biology
Polymer Degradation And Stability
Prenatal Diagnosis
Presence-Teleoperators And Virtual Environments
Progress In Neurobiology
Psychiatric Quarterly
Psychology & Marketing
Pure And Applied Chemistry
Regional Science And Urban Economics
Research On Social Work Practice
Review Of Industrial Organization
Rheologica Acta
Sensors And Actuators A-Physical
Small Business Economics
Social Research
Sociology Of Education
Solid State Ionics
Solid State Sciences
Statistica Neerlandica
Strategic Management Journal
Surface And Interface Analysis
Tectonophysics
Thermochimica Acta
Toxicology Letters
Urban Studies
Vie Et Milieu-Life And Environment
Violence Against Women

Socially constructing emotion <u>and</u> learning in organisations: A Pragmatist perspective

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Introduction

"…despite the plethora of theoretical directions that inform organizational learning, most are substantively under-theorized because of their lack of attention to emotion." (Fineman, 2003: 558)

"Emotions are not just the fuel that powers the psychological mechanism of a reasoning creature, they are parts, highly complex and messy parts, of this creature's reasoning itself." (Nussbaum, 2001: 3)

Although the study of emotions in organisations has come a long way in quite a short time (Czarniawska-Joerges, 1995), as yet, there have been only a handful of attempts to explore the relationships between emotions and learning in organisational settings. Key contributions have come from two main directions: social constructionism (Ashforth and Kreiner, 2002; Fineman 1993, 1996, 2000a; Harré, 1986; Hochschild, 1983) and psychoanalysis (Gabriel, 1998; Gabriel and Griffiths, 2002). Each of these traditions has much to offer, but each also has its limitations. Recognising this problem, a number of writers have sought ways of merging these different perspectives on the inter-relation of emotion and learning in organisations. (e.g. Antonacopoulou and Gabriel, 2001; Fineman and Gabriel, 2000; Vince, 2002).

Our main argument in this paper is twofold. Firstly, we suggest that the attempt to integrate social constructionist and psychoanalytical perspectives is likely to create more problems than it solves by obscuring crucial and perhaps irreconcilable differences between these two perspectives. Secondly, we point to alternative traditions that we suggest may provide a more fruitful account of both emotions and learning in organisations. In particular, we explore the Pragmatism of James, Dewey, and Mead, and the later implementation of their ideas through George Kelly's personal construct psychology (PCP). This suite of ideas is congruent with social constructionism, while also recognising the holistic (physical, mental and emotional) nature of human agency. It is centrally concerned with the actual experiencing of emotions, which has arguably been overlooked by social constructionist accounts.

The first part of the paper presents a brief outline of the psychoanalytic and social constructionist perspectives on emotions and learning in organisations. Social constructionist accounts of emotion highlight the inescapably social and dramaturgical nature of emotions (Goffman, 1959), but they have been less successful in providing a convincing account of the idiosyncratic and personal dimensions of emotion. Gabriel (1998) argued that psychoanalytic approaches are potentially able to fill this gap, but the essentialism of this approach is entirely at odds with the assumptions of social constructionism, so we question the extent to which these two traditions can in fact usefully inform each other.

The second part of the paper considers alternative perspectives that provide a more nuanced account of the personal and experiential character of emotions, but without resorting

to the essentialist and ultimately dualistic assumptions of psychoanalysis. From the early contributions of James (1884, 1890), to the subsequent clarifications of Dewey (1894, 1895, 1896) and Mead (1895, 1934), Pragmatism was concerned with transcending the dualisms that separate emotion and cognition (body and mind), by recognising the crucial interdependence of each of these facets of human experience. However, the Pragmatists never really extended their insights into a fully developed account of how different emotional expressions and experiences might be related to different forms of knowing and learning. It is here that Kelly's PCP (1955) offers a useful avenue for exploration. Kelly was profoundly informed by the Pragmatists, especially Dewey, to whom he acknowledged a significant intellectual debt. Not surprisingly then, PCP resonates with the anti-essentialist, anti-dualist, dynamic and pluralist ideas that characterise Pragmatism. Drawing on insights from Kelly's theory then, we propose new ways of thinking about the interactivity of emotion and learning in organisations.

Finally, the paper illustrates the utility of this approach with an example that highlights the interwovenness of emotion and learning in an organisational setting. Following Antonacopoulou & Gabriel (2001), the specific emotions of *love* and *anxiety* are selected to demonstrate the different emotional tensions that might arise in an organisation and the implications these have for both individual and organisational learning.

Psychoanalytic and Social Constructionist Approaches
to Emotions and Learning

The literature on emotion in organisations is broadly divided between approaches inspired by Freudian psychodynamics (Gabriel, 1998; Gabriel and Griffiths, 2002; Vince, 2001) and those that highlight the socially constructed character of emotions (Fineman, 1993a, 1993b, 1994, 1996, 2000, 2003; Hopfl and Linstead, 1993; Rafaeli, 1989a, 1989b; Rafaeli and Sutton, 1987, 1990, 1991). As Domagalski (1999: 841) has observed, "[w]hereas the psychodynamic treatment of emotions in organizations is premised on the assumptions that members manifest behaviors which have their roots in unconsciousness and that organizations are unhealthy patients in need of healing, a social constructionist position accepts a more active, interpretive role for organizational members." This closely mirrors the debate on emotions in wider social theory where there have been long-standing disagreements between writers who emphasise the naturalistic, instinctual, and uncontrolled character of emotions, strongly, although not exclusively, influenced by the writings of Freud (de Board, 1978; Diamond, 1993; Menzies Lyth, 1988), and those who depict emotions as consciously manipulable states that are inextricably tied to specific social and cultural settings (Averill, 1976; Denzin, 1983; Goffman, 1956; Harré, 1986; Hochschild, 1979, 1983; Ratner, 1989; Shott, 1979).

Where one stands in relation to these debates is particularly important when considering the interplay between emotions and learning in organisations. If one accepts the view that

emotions are primarily natural drives that sweep over us unbidden and, moreover, that there may be deep-seated and harmful consequences of suppressing them, then the relation between emotions and learning comes across as largely unidirectional. That is to say, it is mainly a matter of emotions influencing learning by setting the emotional tone of learning experiences, rather than themselves being subject to learning processes. Social constructionists, in contrast, regard emotions as being socially learned performances that have their own, often tacit, rules and norms depending on the situation and cultural context. The implication is that emotions and learning are necessarily intertwined, but there is nevertheless little accommodation of agentic action with its potential to generate unexpected outcomes.

Although social constructionist and psychodynamic theories of emotion are quite different, there have nevertheless been recent calls for a rapprochement between them (Antonacopoulou and Gabriel, 2001; Fineman and Gabriel, 2000; Gabriel, 1998; Vince, 2002). This is not dissimilar to earlier attempts to integrate naturalistic/organismic and social accounts of emotion, raising many of the same challenges (e.g. Kemper, 1981, 1987, 1993; Ratner, 2000). This section briefly outlines the respective contributions of psychodynamics and social constructionism to understanding emotions and learning. In doing so we will focus particularly on addressing the following question: to what extent is a rapprochement between social constructionism and psychodynamics possible or worthwhile?

Psychodynamics

There is a long tradition of applying psychodynamic concepts to the analysis of organisations (e.g. Bion, 1959; Czander, 1993; de Board, 1978; Hirschhorn, 1988; Kets de Vries, 1984, 1991; Kets de Vries and Miller, 1984; Levinson, 1972). Psychodynamics, inspired by the work of Freud, theorises a series of dynamic interactions between conscious and unconscious psychological processes that are presented as essential forces in driving human motivation (Freud, 1914, 1915, 1920, 1923). One of the defining features of psychodynamic approaches is their emphasis on the unconscious. As Gabriel and Griffiths (2002: 217) suggest:

> "The unconscious is not merely part of a psychic reality which happens to be concealed from consciousness, but functions both as a mental territory in which dangerous and painful ideas are consigned through repression and other defensive mechanisms, and also as a source of resistances to specific ideas and emotions which present threats to mental functioning ... Nor is the unconscious a marginal or pathological terrain into which we occasionally venture. Psychoanalysis views a substantial part of human motivation and action as unconsciously driven."

In classical Freudian thinking, the detailed dynamics of mental functioning involve an interplay between the four hypothesised psychological sub-structures of ego, superego, id, and ego ideal. Organised around their own distinctive principles (reality principle, moral principle, pleasure principle, and idealisation-devaluation principle respectively), the focus is on the conflicts and tensions that are said to arise between them. While the fourfold pairing

of classical Freudian mental structures and organising principles has been mostly discredited and abandoned by the majority of contemporary psychoanalysts (although the same can not be said of all psychoanalytically inclined organisation theorists, e.g. Kilburg, 1995), psychodynamics has retained an emphasis on the motivational role of conflicts and identified a variety of defensive mechanisms and coping strategies through which they are addressed (A. Freud, 1936; Horowitz, 1988; Klein, 1948; Westen, 1998).

In the organisational literature, the notion of psychological and social defences against anxiety has been applied to great effect. Examples, which typically draw on Klein's reworking and extension of Freud (Klein, 1948), include Bion's threefold typology of defensive strategies within groups, which he termed pairing, dependency, and fight/flight, each of which tend to be associated with particular sets of emotions (Bion, 1959); Jacques's hypothesis that one of the main forces binding organisations together is the collective need to reduce anxiety (Jacques, 1952); and Menzies Lyth's well known study of a hospital nursing service and the way that common social defences become embedded in an organisation's structure, culture, and routines (Menzies, 1960; Menzies Lyth, 1988).

Approaches applying Freudian insights to the study of organisations have been perhaps readier than most to consider organisational action and interaction to be much more than purely rational and conscious calculation, placing the emotionality of organisational life in a considerably more prominent position. This has been one of their major contributions. However, such approaches have not been without their detractors (e.g. Fineman, 1996; Hochschild, 1979; Ratner, 1994, 2000). Criticisms of the psychodynamics of emotion in organisations centre around three main issues.

Firstly, there is the suggestion that they rely too much on a view of emotions as primitive biological drives that are largely beyond the control of individuals. This is based on an implicit dualism between a rational and irrational self. Emotions, particularly negative emotions, such as anger, anxiety, embarrassment, and disgust, are portrayed as something that need to be endured, channelled, or tamed, arising involuntarily and mysteriously from beyond the horizon of the rational self. As Gabriel (1998: 298) notes, "Freud never ceased to emphasize the partly involuntary character of emotions ... Emotions are liable to being unpredictable, inconsistent, unmanageable, and even chaotic, despite the ego's ongoing attempts to control them, tame them, or isolate them." One implication of the dualistic underpinning of psychodynamics is that emotions and rationality appear to be in strict opposition. This is reflected in the clinical pretensions of organisational psychoanalysts who claim to be able to remove the damaging and distorting impulses of emotionally sick organisations so that they can recover their rational direction (e.g. Diamond, 1993; Kets de Vries, 1991; Vince, 2001). Kets de Vries (2004: 185) offers a typical rendering of this perspective: "In business as in individual life, psychological awareness is the first step toward psychological health. Organizations cannot perform successfully if the quirks and irrational processes that are part and parcel of the organizational participants' inner theater are not taken into consideration by top management."

Secondly, there is the argument that psychodynamics relies on an overly interiorised view of emotions. According to Ratner (1994: 325), "Freud's romantic and biological views of human nature led him to produce a particular conception of the unconscious as primordial impulses intransigent to social formation and segregated from consciousness." The result is a fundamentally asocial depiction of mental functioning; of individual minds hermetically sealed off from society and ultimately under the sway of unchanging natural impulses. Although it is fair to say that Freud was certainly not entirely unconcerned with supra-individual relations (e.g. Freud, 1921), these were largely treated from the perspective of their implications for individual psychology, thus preserving a methodological individualism. This is also evident in attempts to apply Freudian thinking to group-level and organisational phenomena. The characteristic manoeuvre in these instances is to take concepts from individual psychology and simply transpose them to an ostensibly collective actor. This leads to such anthropomorphic classifications as describing different organisations in terms of their neurotic characteristics, labelling them as dramatic/cyclothymic, suspicious, compulsive, detached, or depressive (Kets de Vries, 2004; Kets de Vries and Miller, 1984).

Thirdly, there is the criticism that psychodynamics is, ironically, insufficiently dynamic. By characterising the relentless resurfacing of innate and primitive impulses, either biologically driven or indelibly laid down in early life, there appears to be no escape from the tyranny of such impulses. According to Antonacopoulou and Gabriel (2001: 438), "psychoanalytic approaches insist that there is a primitive, pre-linguistic, pre-cognitive and pre-social level of emotions, an inner world of passion, ambivalence and contradiction which may be experienced or repressed, expressed or controlled, diffused or diluted, but never actually obliterated." This reflects an essentialism that tends to hamstring any real attempt at a dynamic understanding of the nature of emotions as an ever-present and necessary component of social action and interaction. Rather than considering individuals *in* society, there is a dualistic tendency in psychodynamics to think of individuals *and* society. That is to say, a tendency to start with some pristine pre-social and individual realm of natural impulses and emotions, and only subsequently insert the individual, complete with their pre-formed drives and motivations, into the realm of society. As we shall see in the next section, this is quite different to social constructionist theories of emotion that emphasise the co-development of individuals in society, where it is meaningless to speak of one without the other.

Social Constructionism

Averill (1980: 305-306) provides a good summary of the social constructionist position on emotion: "the emotions are viewed here as transitory social roles, or socially constituted syndromes. The social norms that help to constitute these syndromes are represented psychologically as cognitive structures or schemata. These structures -- like the grammar of a language -- provide the basis for the appraisal of stimuli, the organization of responses, and the monitoring of behavior." While, as we have seen, psychodynamics regards emotions as a

largely private affair, in the social constructionist view emotions are inescapably social in character, guided by socially shared expectations that are culturally and situationally specific. Rather than being mainly involuntary, emotions according to social constructionists are often the subject of conscious manipulation. They are social performances that are more or less successfully received depending on the qualities of the performance, the nature of the setting, and the co-present actors (Goffman, 1956, 1959).

A dramaturgical understanding of emotion is particularly evident in accounts of 'emotion work' involving the public display of particular emotions appropriate to different work roles (e.g. Rafaeli, 1989a, 1989b; Rafaeli and Sutton, 1987, 1990, 1991). However, it would be wrong to suggest that all social constructionists portray emotions purely as consciously artful performances that seek to display given emotional states, yet which may or may not reflect people's underlying feelings. In this version it is still quite feasible to maintain a dichotomy between an exterior world of the social display of emotions and an interior world of authentic feelings, resulting in much the same dualistic confusion as psychodynamics. In contrast to this there are those who have taken the social construction of emotions to even greater lengths. Hochschild (1979, 1983) and Shott (1979), for example, have suggested that it is not only the display of emotion that is subject to normative influence, but also the experience of emotions as well. According to Shott (1979: 1320, emphasis in original):

> "...how one interprets one's emotions and, to some extent, *what* one feels are guided (though not determined) by one's culture and its feeling rules; so that different societies are characterized by different emotional 'vocabularies of motive' ... The expression of emotion, of course, is shaped by cultural expectations as well, for people generally seem to vent their emotions, even powerful ones, in the ways prescribed by their cultural norms."

For Hochschild (1979), who proposed the concept of 'feeling rules', these are also accompanied in her framework by so-called 'framing rules'. While feeling rules are socially shared, often latent, rules about what it is appropriate to feel in different characteristic situations (i.e. sad at a funeral, happy at a party, etc.), framing rules are those "according to which we ascribe definitions or meanings to situations." (*ibid.:* 566), and as such provide the frame against which we, usually tacitly, measure the appropriateness of our feelings. In other words, it is first necessary to appreciate the nature of a situation before it is possible to 'decide' what feeling rules are likely to come into force.

This has been a major target of criticism against social constructionist theories of emotion, although there is arguably a good deal of confusion about what is actually being argued here. For example, Kemper (1981: 344) pointed out that, while there is a prescription within many cultures to feel sad at a funeral, this may not apply if, say, the deceased is a "personal enemy or a barbarous political tyrant." He goes on to ask whether one needs to turn to yet another set of rules to cater for this eventuality, leading to the impossible need for there to be an almost infinite number of detailed rules to cover every situation encountered. In fairness to Hochschild, such situational variations in appropriate emotions can arguably be

accommodated within the conceptual framework of feeling rules and framing rules. Although two individuals may share the same broad and culturally patterned set of feeling rules, they may differ quite dramatically in their emotional experiences because they frame a given situation differently. To return to the example of whether or not it is always appropriate to feel sad at a funeral even if the deceased is a barbarous political tyrant, one could imagine the framing of the situation to be quite different from the perspective of the tyrant's loving partner compared to a disaffected political opponent.

Perhaps more serious is the charge that social constructionists ignore the biological dimensions of emotional experience and over-emphasise the extent to which they are culturally determined or subject to conscious control. According to Carr (2001: 422), "... we find emotion commonly depicted as merely some kind of performative act or form of display that should be able to be under the control of the 'actor' - an extreme social constructionist view which, amongst other things, fails to reveal how and why our feelings can be at odds with rationality." In a similar vein, Kemper (1981: 337) has argued that "... social constructionists hold that there is great plasticity to human emotions because emotions are largely disconnected from biology ... This allows social and cultural norms ... to determine almost exclusively the emotions appropriate in given situations, or significantly to guide their construction by the actor."

However, it is rather difficult to find any social constructionists who actually adopt such an extreme position. Indeed, compared with many who follow what Ratner (1989) terms a naturalistic position (e.g. Ekman, 1992, 1999; Ekman *et al.*, 1983; Izard, 1977, 1983, 1988; Izard and Buechler, 1980; Zajonc, 1980, 1984), social constructionists generally appear to be more willing to attempt some kind of interactional understanding of biological and social processes. For example, Shott (1979: 1321, emphasis in original) depicts the interrelations between these dimensions as follows:

> *"The actions of individuals are influenced by their internal states and impulses in addition to external events and stimuli, for actors' perceptions and interpretations are shaped by the former as well as the latter ...* Physiological or psychological impulses, once noticed, form the beginning of an act and motivate the actor towards its consummation ... In no sense does the impulse determine the act, but it is a significant component of action and adds to its dynamic character."

Nevertheless, it is fair to say that the emphasis in most social constructionist studies of emotion is predominantly on their socially situated and consciously performative character rather than on their partly involuntary and biologically shaped nature. Despite careful claims to the contrary, there is a *de facto* social determinism in many social constructionist accounts that is potentially as damaging as the biological determinism detectable in psychodynamics. This is especially evident in the conceptualisation of learning that tends to accompany such accounts. Central to the social constructionist conception of learning is the notion of socialisation. This is frequently presented as the straightforward internalisation of pre-established social roles and scripts that individuals progressively acquire through participation

in different social settings, whether through the primary socialisation of childhood experiences or the secondary socialisation of later life (Berger and Luckmann, 1966). According to Berger (1963: 112):

> "A role may be defined as a typified response to a typified expectation … To use the language of the theatre, from which the concept of role is derived, we can say that society provides the script for all the *dramatis personae*. The individual actors, therefore, need but slip into the roles already assigned to them before the curtain goes up. As long as they play their roles as provided for in this script, the social play can proceed as planned."

The danger is of an over-socialised conception where actors are condemned to following the patterns already laid down by the 'typified expectations' of society. The pre-eminent position accorded to socialisation as the acquisition of established role expectations gives an extremely powerful position to social phenomena. It places the individual in a passive relationship to society, blindly following the rules, rather than portraying her as an active participant with a varying capacity to reproduce, resist, subvert, or transform the institutional texture of the settings within which she performs. In terms of the relationship between emotions and learning, the social constructionist view suggests that it is often only by internalising the socially established 'rules of the game' that it is possible for an actor even to know what to feel in a given situation. As Berger (1963: 113) goes on to argue:

> "Roles carry with them both certain actions and the emotions and attitudes that belong to these actions. The professor putting on an act that pretends to wisdom comes to feel wise. The preacher finds himself believing what he preaches. The soldier discovers martial stirrings in his breast as he puts on his uniform. In each case, while the emotion or attitude may have been present before the role was taken on, the latter inevitably strengthens what was there before. In many instances there is every reason to suppose that nothing at all anteceded the playing of the role in the actor's consciousness. In other words, one becomes wise by being appointed a professor, believing by engaging in activities that presuppose belief, and ready for battle by marching in formation."[3]

Possibilities for a Rapprochement?

From our brief outline of social constructionist and psychodynamic approaches to emotions and learning it should be clear that there are profound differences between the two traditions. At the risk of offering a caricature of each position, Table 1 provides a summary of the main points of disagreement. Thus, for psychodynamics, emotions are typically viewed as innate, biologically determined characteristics of individuals that are largely beyond conscious control and serve an important motivating function through the influence of mostly unconscious drives. In contrast, social constructionism conceptualises emotions as socially scripted performances that are largely under the conscious, if unreflective, control of individuals, and are enacted more or less appropriately according to the demands of different socio-cultural settings. In the former, emotion and cognition ultimately appear as distinct psychological functions that are often in conflict, thus preserving the conventional dualism

between emotions and rationality. In the latter, emotion, cognition, and action are closely interrelated in an ongoing chain of mutually constitutive, yet adaptive relations. In terms of their respective characterisation of learning, psychodynamics tends to depict learning as a primarily cognitive (and therefore not emotional) function that occurs at the individual level, while social constructionism portrays learning as arising from social experience.

Table 1. *Psychodynamic and social constructionist approaches to emotions and learning compared*

Psychodynamics	Social Constructionism
Emotions are innate characteristics of individuals	Emotions are specific to social/cultural settings
Emotion is biologically determined	Emotion is socially determined
Emotions are involuntary and largely uncontrollable	Emotions are consciously manipulable
Emotion as a natural, motivating drive	Emotion as a socially scripted performance
Emotion and cognition are distinct psychological functions	Emotion, cognition and action are inextricably intertwined and co-constituted
Learning is a cognitive function	Learning arises from social experience
Learning occurs at the individual level of analysis	Learning occurs at the social level of analysis

The key question remaining is whether the differences between social constructionism and psychodynamics make them incommensurable, thus effectively blocking any chance of a rapprochement, or whether they might offer alternative perspectives that can be suitably combined to theorise different elements of learning and emotion that neither approach adequately addresses on its own. An integration between psychodynamics and social constructionism might, at first glance, appear to have much to recommend it since they would each appear to focus on different, yet complementary, dimensions; one highlighting the intrapsychic and often unconscious elements of emotional experience, the other, more outward-facing in character, situating emotions relative to specific cultural expectations and social norms. As Fineman (1996: 557) has acknowledged, "... the doing of emotion work and the social regulation of feeling are both intrapsychic and socially located phenomena." However, it is one thing to say that any comprehensive understanding of emotion is incomplete without considering the interplay between social and intrapsychic phenomena, and quite another to suggest that this can or should be achieved through a melding of social constructionism and psychodynamics.

We would argue that the differences between the two approaches are too deep-seated to make such an integration possible. Their respective assumptions are simply incompatible and to bring the two perspectives together would risk theoretical inconsistency and paralysis. Both approaches, at their most extreme, have a fundamentally deterministic view of emotions where the determining influences are crucially different and mutually exclusive. For

psychodynamics, it is the determinism of an inner and largely unconscious mental life that is individual in character and strongly shaped by biological and early-life influences. For social constructionism, it is the determinism of social and cultural norms surrounding specific situations. In the first instance, people are effectively powerless to control their emotions; while in the second case, emotions are consciously manipulable, socially conditioned performances. It is difficult to see how to consider emotions as simultaneously voluntary and involuntary, biological and social, individual and collective, internal and external, within the deterministic frameworks laid down by the two approaches since they effectively exclude the possibility of acknowledging a complex interplay of influences. It is arguably more fruitful to begin afresh and consider approaches that are not trapped in such oppositional thinking. It is for this reason that we now turn to consider what the Pragmatist tradition, with its holistic and anti-essentialist ideals, can offer the study of emotions and learning.

Pragmatism, Emotion and Learning

Although we have highlighted some significant difficulties with the idea of rapprochement, this is not to suggest that the overall problematic driving the search for such an integration is an entirely empty one. On the contrary, there is something to be said for the psychodynamic critique of a radical social constructionism that seems to suggest that emotions are mainly socially conditioned performances that are played out, more or less successfully, according to the nature of different situations and the norms surrounding them. Equally, there is much to warrant the social constructionist critique of the mentalist and essentialist undertones of psychoanalysis where we are seemingly unable to escape the tyranny of our unconscious as we struggle to resolve conflicts in the different dimensions of our interior mental life. According to these opposing critiques, we are presented with a stark choice: either we accept, following psychodynamics, a broadly naturalistic view of emotions as internal, unconsciously driven, and largely innate; or we take the view that emotions are mainly social constructions that are subject to conscious interpretation and, within certain limits, quite plastic and malleable. Of course, this is an unhelpful dichotomy, but it is one that in our view can not be overcome within the terms of the debate established so far, nor with the theoretical resources outlined.

The present section considers the long-standing contribution made by Pragmatist writers as one especially promising way of overcoming the dualisms generated by this debate. Although we argue that Pragmatism is ultimately unable to fulfil its promise in this respect, tracing the evolving ideas of Pragmatist writers such as James, Dewey, and Mead is informative in two respects. Firstly, the critical dialogue that took place between these writers on the subject of emotions covered much of the same ground as the more recent controversy between social constructionism and psychodynamics, with the major difference that the Pragmatist debate comes closer to offering a sophisticated theoretical vocabulary for understanding the holistic character of emotions as an integral aspect of lived experience where conventional divisions

between cognition and affect, mind and body, nature and society, are dissolved. Secondly, an appreciation of how the Pragmatist view on emotion developed sets the scene for introducing, in the following sections, the closely related insights of Kelly's personal construct psychology that arguably approach even more closely to the goal of offering a balanced theorisation of emotion and learning.

William James and the Experience of Emotions

The starting point for much of the Pragmatist writing on emotion was Darwin's *The Expression of the Emotions in Man and Animals* (Darwin, 1872). As the title of the work suggests, Darwin thought in terms of a continuum in the emotional expressions of humans and other animals, providing a primarily naturalistic understanding of emotion and its role in the evolution of different species. He proposed three general principles of expression: 1) the principle of serviceable associated habits, where certain gestures originally developed because they were of survival value for responding to given situations are often preserved even though they no longer serve their original function; 2) the principle of antithesis, whereby movements of a directly opposite nature to those associated with one state of mind often occur with the directly opposite state of mind despite being of no apparent use; and 3) the principle of direct action of the nervous system, which proposes that certain actions are independent of volition and to a certain extent habit, an example being changes to the vaso-motor system associated with given emotional states.

William James and Carl Lange, working independently, criticised and extended Darwin's work on emotions forming what became known as the James-Lange theory (James, 1884, 1890; Lange, 1885). They suggested that Darwin's account offered an inaccurate sequence of causality. Rather than specific emotions causing certain physiological responses as Darwin suggested, the James-Lange theory proposed the opposite: certain stimuli induce physiological responses which are then experienced as emotional states. James (1884, 190, emphasis in original) put the argument as follows:

> "...we feel sorry because we cry, angry because we strike, afraid because we tremble, and not that we cry, strike, or tremble, because we are sorry, angry, or fearful, as the case may be. Without bodily states following on the perception, the latter would be purely cognitive in form, pale, colourless, destitute of emotional warmth. We might then see the bear, and judge it best to run, receive the insult and deem it right to strike, but we could not actually *feel* afraid or angry".

The emphasis here is not only on the *expression* of emotions, or their outward manifestation, but also on the *experience* of emotions, or what different emotional states actually feel like to the person experiencing them. As such, the main contribution of the James-Lange theory was to cast doubt on the view of emotions as first and foremost mental states with which given physical characteristics are secondarily associated. This leads to the position that emotions, portrayed as taking place purely in consciousness, can be separated from their bodily expression. For James and Lange this is a mistake. Mind and body are both

involved in the experience of emotions. According to Lange (1885, 675):

> "If from one terrified the accompanying bodily symptoms are removed, the pulse permitted to beat quietly, the glance to become firm, the color natural, the movements rapid and secure, the speech strong, the thoughts clear, - what is there left of his terror?"

However, it is a big step from suggesting that emotions are necessarily both mental and physical in character, to arguing that there is a definite and unidirectional sequence of events from stimulus to physical response to change in consciousness. By simply replacing one linear cause-effect sequence with another, the James-Lange theory ultimately does little to undermine the strong dualism between mind and body.

There were, however, other aspects of the James-Lange theory that prefigured the subsequent contributions of Dewey and Mead to developing a more rounded social psychology of emotion. Although James and Lange effectively continued to treat emotions in a mechanistic cause-effect fashion, albeit one in which the conventional sequence of events was reversed, they did set in motion a shift from the static classification of emotional types and expressions towards a more dynamic concern with the processes through which emotions are experienced and expressed. James, in particular, considered how emotions can only be fully understood in relation to the unfolding of experience. His ideas have important implications for appreciating the role of learning in emotion since he suggested that, to some extent at least, emotions can be voluntarily controlled by adopting certain dispositions, and that the emotional response to encountered situations varies depending on previous experiences. For example, James (1890: 475-476, emphasis in the original) characterised emotions in the following way:

> "*They blunt themselves by repetition more rapidly than any other sort of feeling.* This is due not only to the general law of 'accommodation' to their stimulus which we saw obtain of all feelings whatever, but to the peculiar fact that the 'diffusive wave' of reflex effects tends always to become more narrow ... The tendency to economy in the nerve-paths through which our sensations and ideas discharge, is the basis of all growth in efficiency, readiness, and skill."

However, although James made some interesting initial observations about emotion in relation to action and experience, he never really extended these to consider their inescapably social dimension (perhaps reflecting a more general tendency towards individualism in his work, c.f. Cronk, 1976). It was left to Dewey and especially Mead to address this crucial absence.

John Dewey and the Interplay Between Emotion and Action

In the 1890s Dewey wrote two articles specifically on the topic of emotions in which he attempted to combine, clarify, and extend elements of both Darwin's account and the James-Lange theory. The first paper (Dewey, 1894) mainly revisited Darwin's characterisation of the three general principles of expression (see above). To this classification he appended a

fourth principle drawn from James: the principle of analogous stimuli which suggests that we react similarly to stimuli that feel alike. The second paper (Dewey, 1895) takes the argument developed in the first and considers the implications of this for the James-Lange theory. In doing so Dewey significantly transformed the understanding of emotion away from a straightforward linear causality, or what he termed an "atomic or mosaic composition of consciousness" (Dewey, 1895: 18), towards understanding emotion as a concrete whole of experience taking place in an ongoing line of conduct. This challenged the apparent splitting of emotional experience into discrete stages by the James-Lange theory: the object or idea which operates as a stimulus, the mode of behaviour taken as the discharge of this stimulus, and the emotional state as the repercussion of this discharge. Rather than suggesting there is first a clearly identified stimulus, recognised as such, which results in particular physiological changes, which are then experienced as given emotional states, Dewey argued that they are all co-produced elements of the same concrete experience that are only separated through reflection from the point of view of an observer (the so-called 'psychological fallacy'). As Dewey (1895: 20) argued, "The reaction is not made on the basis of the apprehension of some quality in the object; it is made on the basis of an organized habit, of an organized coordination of activities, one which instinctively stimulates the other."

By locating emotion within a concrete flow of experience, Dewey also introduced the idea of different emotional states reflecting varying conditions of tension (or the absence of tension) between habituated behaviour and reflective action. Three main conditions were identified:

1. Affect or emotional seizure, in which there is a tension or conflict between habituated or instinctive conduct and reflective action. For example, on encountering a new situation, there may be a conflict between entrenched modes of behaviour and the new 'aiming-towards' of intelligent action. These are instances where emotional seizures are likely to occur as we attempt to bring the two aspects of experience into line.

2. Interest, which refers to conditions where the disturbance associated with affect has been resolved and coordination has been completed within a unified act. It is, for example, the state of being absorbed in a given pursuit.

3. *Gefühlston* (literally feeling-tone), which "represents the complete consolidation of a large number of achieved ends into the organic habit or coordination. It is interest read backward: that represents the complete identification of the habits with a certain end or aim. The tone of sense-feeling represents the reaction, the incorporate identification, of the successful ends into the working habit. It is not ... habit as habit that becomes feelingless; it is only the habit which serves as a mere means, or serial stimulus." Dewey, 1895: 32).

By identifying different tensions between habit and reflective conduct, Dewey anticipated many of the arguments later made by social constructionists on the issue of emotion. In particular, his ideas are quite consistent with the view that emotions are, partly at least, under the conscious (if tacit) control of individuals as they mould their behaviour to reflect

appropriate standards of conduct under different situations. However, he arguably went further in attempting to provide a unified view of consciousness as comprising instinctual, habituated, and deliberative conduct. As such, he gave simultaneous consideration to both the purposeful and involuntary elements of emotional experience; something that tends to disappear from view in some of the more extreme social constructionist accounts. As Dewey (1895: 15) argued: "Emotion in its entirety is a mode of behaviour which is purposive, or has an intellectual content, and which also reflects itself into feeling or Affects".

Dewey's characterisation of emotion also offers important insights for considering the interweaving of learning and emotion. The depiction of emotion as involving a conflict or disturbance in a given coordination is closely paralleled by Dewey's well-known notion of 'inquiry' which is driven by the need to resolve 'felt difficulties' and achieve a settled state of belief. Unfortunately Dewey did not fully explore the implications of his theory of emotions for the concept of inquiry or vice versa. However, it is not difficult to see how both elements could fit together. For example, it can be suggested that emotions are indispensable to the process of inquiry because they may be the precursor to interest. As habits and reflective conduct come into tension and that tension is potentially resolved, this feeds into subsequent actions as interest, or may be integrated into complex habituated actions as *Gefühlston.* In this sense, emotion provides the 'feel' that makes a felt difficulty relevant and drives the attitude of interest that potentially allows for expansion and change rather than the blind repetition of habit. Emotions alert us to problems that need to be resolved and consequently are an important component of the concept of 'attention'. As Dewey (1898: 114) suggested: "The significance of the emotion is the conflict and the need of adjustment between the formed element in the inquiry and the ideal element. It represents the lack of equilibrium between active power and tendency and aim."

George Herbert Mead and Emotion

The major contribution of Dewey to our conceptualisation of emotion was in breaking down the mechanistic logic of earlier accounts and seeing emotions as a necessary part of our unified actions in which purposive, habituated, and instinctive conduct combine as holistic learning experiences. However, while his other writing most definitely addressed the question of intersubjectivity, considering the individual self in relation to other selves, this is not something that comes across strongly in his work on emotion. In contrast, although there are only fragmentary reflections on emotions in the writing of Mead, these offer some tantalising insights into what an understanding of emotions as individually and collectively experienced and received within the context of unfolding social situations might look like.

In earlier contributions Mead covered much the same ground as Dewey. For example, in a paper initially presented in the same year as Dewey's first article on the theory of emotion and subsequently published as an abstract in the *Psychological Review*, Mead set out to complement Dewey's teleological statement of the emotions with a physiological theory

(Mead, 1895). Both authors shared the same view of emotions as inseparable from human experience, having a key role in the preparation for action by "giving the organism an evaluation of the act before the coordination that leads to the particular reaction has been completed." (Mead, 1895: 164). However, it is in the later work, especially the lectures that formed the material for *Mind, Self and Society* (Mead, 1934), but also to some extent in *The Philosophy of the Act* (Mead, 1938), that he made his more distinctive contribution on emotion by considering it within the context of social action. This begins with the familiar Darwinian argument about the expression of emotions having been reduced from their original function to be preserved as attitudes. However, Mead proceeded to offer a considerably more sophisticated analysis of the gestural role of emotions and how this relates to the emergence of the social self.

Mead argued that instead of consciousness being a pre-condition of the social act, the opposite is the case. That is, action that socially engages the whole (physical, mental, emotional) person, precedes consciousness. So, if we are to understand the emergence of consciousness, we need theory that is capable of simultaneously engaging with all aspects of the social being. Mead went some considerable distance towards this goal by elaborating the communicative functioning of gestural conversation. His theory of sociality emphasises the importance of mutual behaviour expectations; in other words, sociality exists when a gesture calls forth the same (physical, mental, emotional) response in the person making the gesture as in the person who responds to it; and because of this, it is possible for the gesturer to modify her/his actions in anticipation of the response that they will call out. The potential for the emergence of creative agentic, as opposed to either socially or biologically determined, action lies within this behavioural adjustment. The dynamic aspect of this theory is contained in the notion of anticipation. We anticipate the future based on our past experiences; so the process of anticipation provides for the temporal dimension of human behaviour and the continuity of human sociality. As Denzin (1984: 425) has argued:

> "The subject's world of emotionality thus appears to her from within this structure of experience ... She is not just a living body, not just a structure of physiological sensations. She is her lived body in emotionality. She feels her emotionality through a double movement in time. She appropriates a feeling toward an object, perhaps drawing it near, feeling herself in the feelings she feels towards the object. This movement, in turn, leads her into a temporal line of action which enacts the emotionality she feels and anticipates feeling. In this important respect her emotionality is neither in her nor in her body. She, her emotionality, and her body are located in a structure of experience made emotional."

Beyond Pragmatism: Kelly's Personal Construct Psychology

To summarise, our argument so far defines the Pragmatist view of emotion as an integral feature of the gesture and response cycle through which social meanings are constructed. Dewey (1894, 1895, 1896) and Mead (1895, 1934) were the main protagonists in elaborating this Pragmatist view, which emerged as a critical response to the evolutionary theories of Darwin (and others such as Wundt). Dewey and Mead rejected the view that gestures exist as mere psychological counterparts to emotional states of consciousness, serving only as vehicles to express emotions. Mead argued that while gestures do undeniably reveal emotions to the observer, this does not mean that their function is solely to give expression to emotions. Rather, he sought to explain gestural communication as a much broader and more holistic process of meaning-making that is grounded in human actions and the social processes of problem-solving.

Between them, Dewey and Mead formulated a comprehensive philosophical and theoretical foundation for understanding human social action in which the dynamics of learning and emotion are interwoven and interdependent. Although Mead provided a considerable degree of theoretical insight into this gestural process of meaning-making, his theorising nevertheless fell short of explaining exactly how gestures arouse responses, and how sociality is actually developed (Flavell, 1968). This justified critique of Mead has led us to a fruitful exploration of the personal construct theory of George Kelly (1955/1991), which resonates strongly with the philosophy of Dewey and Mead, but also goes into considerably greater detail about the 'how' of meaning-making.

In its simplest expression, personal construct psychology (PCP) is a theory of learning from intersubjective experience; it builds on the basic premise that in order for people to act, we must first interpret the world that confronts us. The Meadian notions of sociality and anticipation are threaded throughout Kelly's theory; indeed his fundamental assumption is that the anticipation of events is <u>the</u> objective of our psychological processes. In interpreting and anticipating events, we are simultaneously constructing a sense of self that is expressed through our system of personal constructs. It is important to emphasise here, however, that by 'personal' Kelly does not mean to imply an individual level of analysis; rather he is committed to the notion of the co-construction of the individual and the social through myriad social interactions.

Although PCP is not unknown in the organisational literature, our perception is that it has generally been used in quite a narrow way. In particular, the vast majority of references to PCP relate to the method of repertory grid, which is only one of several methods that Kelly proposed, and in fact occupies little more than one chapter in his two volume presentation of the theory. Hinkle (1970) commented that Kelly eventually came to regret publishing the repertory grid method when he realised that it was distracting readers from the substantive content of PCP. Although we cannot do justice to the entirety of Kelly's theory in this paper,

our goal is to present some aspects that have received little attention in the organisation learning literature. In particular, we point to Kelly's very deliberate attempts to dispense with the cognitive-affective dichotomy that characterises much of the theory development in psychology. Explaining this, Kelly (1969a: 140) said:

> "The reader may have noted that in talking about experience I have been careful not to use either of the terms "emotional" or "affective". I have been equally careful not to invoke the notion of "cognition". The classic distinction which separates these two constructs has, in a manner of most classic distinctions that once were useful, become a barrier to sensitive psychological inquiry. When one so divides the experience of man, it becomes difficult to make the most of the holistic aspirations that may infuse the science of psychology with new life, and may replace the classicism now implicit even in the most "behaviouristic" research."

Kelly begins his theory development by explaining exactly what is entailed in the psychological process of anticipation (Construction Corollary, 1991:35-38). He says that although life presents as a never-ending, monotonous continuity, we make sense of living by abstracting recurrent themes from this undifferentiated flow. These themes then provide a basis for making discriminations about events as they arise. So, for instance, we may anticipate that tomorrow will be similar to today in various ways, and also different from today in other equally predictable ways. When we construe, or place interpretations upon events, we are making discriminations about similarities to and differences from the recurrent themes that we have abstracted from our personal experience. A person who sees only similarities will be left "in a sea with no landmarks to relieve the monotony" whereas a person who sees only differences is confronted "with an interminable series of kaleidoscopic changes in which nothing would ever appear familiar" (Kelly, 1991:35). Further, Kelly makes the point that this process of using discriminations to anticipate the outcomes of events is not a purely cognitive or verbal process. Indeed, he notes the potential for pre-verbal or even non-verbal discriminations to be expressed physiologically; in this respect he comments on the unhelpfulness of the arbitrary boundaries that divide and separate the psychological and physiological realms. It is clear then, that Kelly is concerned with the actions and experiences of the whole (physical, mental, emotional) person.

Naturally, as we proceed through life, the discriminations we make can, and should, change (Experience Corollary, 1991: 50-54). The unexpected aspects that arise as events unfold, and our successive anticipations of their outcomes, provide opportunities to revise and refine our construing, and to uncover new patterns of recurrent themes. However, Kelly warns against assuming that these changes are necessarily for the better, and neither do they necessarily trend towards stability. They may equally lead to disruption and destabilisation of a person's construct system. Kelly talks about the construal of events as being equivalent to putting up working propositions that are then tested when these events come to pass. In other words, one's personal construct system, or sense of self, is continuously evolving through a process of reconstrual. This is what Kelly means by learning; a process which in his view may be enhanced by adopting a playful, 'as if' approach to even our most everyday construals

of events so that we might explore how they would appear if construed differently. This view leads to a definition of experience, not as what happens around, or to, a person, but rather how a person's life is enriched by her/his successive construals and reconstruals of what happens.

> "A person can be witness to a tremendous parade of episodes and yet, if he fails to keep making something out of them, or if he waits until they have all occurred before he attempts to reconstrue them, he gains little in the way of experience from having been around when they happened … It is when man begins to see the orderliness in a sequence of events that he begins to experience them" (1991: 52). In sum then, Kelly's theory sees learning and experience as inextricably intertwined through the processes of anticipation and reconstrual. Learning "is not something that happens to a person on occasion; it is what makes him a person in the first place" (1991: 53).

Construing "is to hear the whisper of recurrent themes in the events that reverberate around us" (Kelly, 1991:54), so our construct systems are never at rest as we successively reconstrue life's events. The whole person is necessarily engaged in the construing process, so emotions arise quite naturally alongside physical and mental actions.   In Kellian terms, the expression of an emotion, like any other action, may be seen as putting up a working proposition to test against events.   So for instance, we might see "a child's temper tantrum as a frantic experimental effort to articulate some urgent question about human relationships for which no one so far has been willing to give him a candid answer" (1969b: 293). This casts temper tantrums in a quite different light from that of other psychological theories and opens quite different opportunities for construal. Thus we see that Kelly's theory is an attempt to take a fresh approach to explaining all aspects (physical, mental, emotional) of human experience by means of the single overarching activity of the construal of meaning.

Although he dismissed the term 'emotion', this does not mean that Kelly disregarded emotional events, which, like any other type of human experience are subject to construal and reconstrual. He argued that it is "in the transitions from [abstract, recurrent] theme to theme that most of life's puzzling problems arise" (1991: 359), so the emergence of emotions is very much linked with changes in construing. In a practical sense, he focussed on particular conditions that have clear clinical relevance (*threat, fear, anxiety, guilt, aggressiveness, and hostility*), but rather than accepting common definitions of these from other branches of psychology, he redefined them in explicitly PCP terms. On first appearance, these definitions appear a little unusual because they refer to conditions in the construct system of the experiencer rather than to any external diagnosis of that person. Kelly's objective in doing this was to provide practical and useful tools for therapists to use in dealing with their clients. However there is no reason to restrict PCP to these six 'emotional states'. Following Kelly's lead, McCoy (1977) proposed PCP interpretations of other emotions that frequently appear in the mainstream psychology literature, specifically, *bewilderment, doubt, love, happiness, satisfaction, complacency, sadness, self-confidence, shame, contempt/disgust, contentment, surprise* and *anger*. Any of these emotions may arise wherever people engage in action, so not only are they relevant in clinical settings, but also they are an integral aspect of organisational life.

In the next section we will present an example of the interplay of emotions in an episode of organisational learning. We will focus specifically on two emotions, *love* and *anxiety*, which we have selected for no reason other than that these are the same two emotions discussed, albeit from a psychoanalytical perspective, by Antonacopoulou & Gabriel (2001) and Gabriel & Griffiths (2002). But first we need to define what each of these emotions means in the context of this paper. The PCP definition of *love* is the state of awareness that events are validating one's core sense of self (McCoy, 1977). It is the feeling of being accepted for who you truly believe yourself to be. The experience of *love* makes a person whole, so people will often defend a *love* relationship because it is intimately connected to who they are. To lose *love* is to lose one's self, which may explain why a person might choose to remain in an apparently unrewarding relationship, since the alternative may be even more painful to contemplate.

In similarly PCP terms, *anxiety* arises when the construer realises that s/he is confronted with events that lie at least partially beyond the bounds of her/his experience (Kelly, 1991: 365-370). There are no recurrent themes in her/his experience that provide an adequate means of construing these events, so, faced with the need for change, the construer has a variety of options available. S/he may bolster her current construct system as a way of resisting the pressure for change; or s/he may leap boldly into the unknown reconstruing on the basis of little, or fragmented, experience; or s/he may be tumbled into chaos by a succession of unsuccessful construals; or cautious incremental construing may limit the discomfort as well as the opportunities to learn. Ultimately to gain long-term relief from *anxiety* a person must be able to elaborate their construct system to the extent that they can construe these new events. Thus *anxiety* is necessarily associated with learning.

An example of Love, Anxiety, and Organizational Learning

This illustration focuses on the activities of a team of four architects as they worked together on preparing an entry for a design competition. In particular, it follows the experiences of one member of the team, providing, as far as possible given the limitations of third party reporting, a personal account of the shifting emotional character of collaboration and the often conflicting feelings that can emerge in such situations. This team member, who we shall call Greg (not his real name), provided data to us in the form of a written personal reflection, which we then followed up in an interview. Greg is an English-speaking Canadian architect who, having worked for a few years post-qualification in Canada, recently joined a small firm of architects in the United Kingdom hoping to further his career. Soon after joining the firm and being keen to establish himself within his new work situation, he saw an announcement for a design competition in one of the journals that he regularly reads and suggested to his colleagues that this was something the firm might consider entering. The idea was greeted with enthusiasm, especially by one of the senior partners, and a team was established to put together a submission. As well as Greg and the senior partner, David, the

team comprised two other architects; Nicola and Duncan, both associates with several years experience. Greg explained the excitement and sense of inclusion he felt at this time in the following terms:

> "David, Nicola, and Duncan were people who, although I had not known them for long, I could readily admire and respect, and whose company I enjoyed, so it [working with them] seemed like a not-to-be-missed opportunity. And actually I was feeling quite lonely in my isolation from home and friends [in Canada], so this collaboration became quite significant in my life. I very much looked forward to our meetings and I loved the excitement of generating new ideas as well as the wonder of seeing a new concept emerge from our marvellously generative conversations. I worked hard and it was great. Working with these people felt really affirming for me - it affirmed my decision to change jobs and it affirmed my sense of self as a professional architect."

Being able to work with people he respected and with whom he expected to learn and develop was, according to Greg, particularly significant in the aftermath of his move to a new job and a new country.

> "I left almost everything that was familiar to me behind - my friends, my colleagues, my culture, my home, the physical environment - all of these things I have identified with strongly in my life … When one moves to a different culture it is less comfortable in many ways. For instance, I can't talk in the ways that I do at home because people here wouldn't understand … we have a different way of expressing humour there, so I've been told here that I am humourless, but this is not true of me in Canada. The familiar vernacular that we use to communicate in Canada is not the same here despite our historical colonial connections. So you might say I'm experiencing a culture shock."

The joint endeavour of preparing for the competition offered Greg significant relief from these feelings of displacement and isolation while also affirming his professional identity and securing his position within the new organisation. And it was also important for his more general sense of self. Being a long way away from the safety of familiar settings and relationships, and having yet to develop social connections in his new environment, Greg acknowledged that he was quite dependent on his work colleagues for providing professional as well as social interactions.

> "Virtually all of my relationships in the UK were with my immediate colleagues, so they were very important to me. The problem was that I was working so hard to get myself established in my job … that I really didn't get round to seeking friendships elsewhere."

While Greg's initial experiences of collaborating with his three colleagues suggest a complex mix of often competing emotions (e.g. doubt, bewilderment, excitement), it is not too extreme to characterise the dominant emotional state at this time as *love,* at least as it is defined by PCP. For Greg, participating in the team was a self-validating experience. On reflection, he realised he was heavily dependent on the other team members for confirming his sense of himself, as well as for building up his feelings of belonging during a disruptive period of his life. To this extent, it was about being accepted for who he felt he was and providing reassurance that the course of action he had taken (i.e. the decision to change jobs

and move to a new country) was not a mistake. His feelings about the collaboration also crucially coloured his orientation towards learning through these joint activities. The optimism, excitement, and buzz of the team in its early stages meant that Greg had strong expectations for productive mutual learning, which in turn further fed his experience of *love*.

However, to depict the relationship in terms of *love* is not to suggest an entirely Elysian state of affairs. Greg's experience of this emotion is not only about acceptance and affirmation, but also vulnerability. By investing so much in the team, to the extent that his identity was significantly dependent on the success of these relationships, Greg was laying himself open to the risk of his validating self-construals being disrupted. Arguably he was more dependent on the team than the other members, and therefore more vulnerable, since David, Nicola, and Duncan all had their own established relations with friends and family, firmly outside the boundaries of their professional lives.

This vulnerability became particularly apparent when, from Greg's perspective, the activities of the team did not develop in the way that he hoped they would. After the initial excitement of the early meetings in which the outline of a design concept had been agreed between the architects, they each accepted the more mundane responsibility of going away and developing a portion of the design to a higher level of definition, coming together periodically to discuss progress. It was during this period that Greg became increasingly concerned that the design was not advancing quickly enough.

> "A lot of time was spent joking around and not actually getting on with the job. Initially I saw this as a necessary element of building our relationships and our trust in each other. But then, at least in my perception, time frames started to slip, allocated tasks were left uncompleted, or worse, untouched, and the competition deadline started to loom darkly over my horizon … I made several attempts over a period of some months to raise my concerns with my colleagues, but eventually it became clear that my signals were probably being interpreted in the joking mood that generally prevailed in our meetings."

These feelings of frustration rapidly escalated to intense *anxiety*. For Greg, the pain of potential failure was not only professional, although obviously it would not have been terrifically positive for his career if the first major project that he initiated was a failure. In addition, what was at stake was a good deal of his own sense of identity and self-worth. Eventually, these events climaxed in something of a personal crisis for Greg:

> "For me, the crisis came to a head following a Friday afternoon meeting at which, once again, we didn't make the amount of progress that I saw as being necessary if the entry was to be delivered on time. I am a planner; I could see all of the significant commitments that were crowding my diary from then until the deadline, and I knew that I no longer had enough time to see the development through to completion. This realisation precipitated a state of intense anxiety that wracked me for the following few days, plunging me into depression … It felt like there were two different parts of my identity that were tearing me apart – on one hand I wanted to disassociate myself from what seemed doomed as a less-than-professional standard of team performance, and on the other hand I really wanted to preserve the friendships that I had with my colleagues.

Ultimately I chose to try to act with as much integrity as the situation would allow by giving my colleagues as much notice as possible that I would not be able to fulfil my commitment to the project. Although this was a clear failure to do what I had said I would do, at least I was giving advance warning so that an alternative solution might be found."

In PCP terms, Greg's experience may be understood in terms of a conflict between two distinct aspects of his identity: performing as a professional versus sustaining his all-important collegial relationships. In his previous experience, these two aspects had never come into direct conflict, and so only now was he faced with an *anxiety* inducing situation that he struggled to construe. When he finally arrived at his decision to withdraw from the project team, Greg reported feeling a wave of relief, which presumably reflected the fact that he had found a way of construing this new experience. This feeling of relief was mixed with sadness about the potential loss of friends, and also happiness that he had maintained his professional standards. A complex cauldron of passions, indeed.

Greg says that he has learned a lot about himself through this episode, and the evidence does seem to support the assertion that his ways of construing and making meaning in his new environment have indeed undergone a significant transition. But what about the team's learning? We do not have data from other team members, but Greg did observe that David, Nicola and Duncan all reacted quite differently to these events. They were all initially taken completely by surprise when Greg announced his decision, which probably confirms his assessment that his earlier efforts at raising concerns had not been heard. Then, once they understood that Greg was not joking, their actions ranged from defensiveness to anger to withdrawal. Although it is not appropriate to speculate here as to the meanings of these actions, it is clear that Greg's crisis did stimulate emotional responses in the other team members. In Kellian terms then, there was learning in this for every individual.

Subsequently the team has met to discuss what went wrong. This conversation resulted in some new, shared insights into the operation of the group. The team members all agreed that they would like to work together again, but to facilitate this, they have agreed in future to have some very clear communication guidelines that can be used should any member of the team feel they are not being heard. Secondly, they have agreed to be a lot more explicit about their various time commitments before they undertake another collaborative project. Of course, only time will tell whether these new commitments actually become embedded as team and organisational learning, but in Kelly's view, the ripples from this episode will continue to influence the construing of those who have been touched by these events.

Discussion and Conclusion

Our intention in outlining this example is to highlight the usefulness of PCP for understanding and explaining the unfolding of different emotional experiences and their implications for organisational learning. The real value of this approach is that the theory

actively links emotion and learning as dynamic aspects of action rather than as mere drivers or outcomes of human processes. This provides for a fully integrated theory that recognises the learning potential, and associated potentials for physical, mental and emotional experiences, in every human action. Further, PCP naturally bridges between individual and social experience, allowing for an exploration of the dynamic interplay between levels of analysis. This is something that neither psychodynamics nor social constructionism are able to address adequately in their treatments of learning and emotion. Consequently, by way of conclusion, and in the light of the above example, we consider what PCP has to offer for the study of emotions and learning in organisations that neither psychodynamics nor social constructionism, nor indeed a rapprochement between the two, are able to provide.

The dynamic approach of PCP especially contrasts with psychodynamics in which "some of the emotions of all of us are and remain impervious to attempts to temper them, modify them, civilize them, in short, to manage them." (Gabriel & Griffiths, 2002: 218). However, faced with the immutability of emotions and other motivating impulses, this does not mean that psychodynamics has drawn the obvious conclusion from its own conceptual framework and seen the pointlessness of intervening to change something that it regards as immutable. Quite the reverse. The psychodynamic approach to emotion is very much therapist-focussed. It is concerned with providing the therapist with tools with which to 'fix' their patients. When this approach is transferred into the organisational domain, these tools then provide ways of 'managing' emotions of organisational members. By contrast, the PCP approach is more concerned with developing insight in the experiencer of emotions, so that s/he may learn better self-management. The benefit of this approach is that it informs understanding of emotional dynamics, and this in turn informs organisational life.

Moreover, this is based on a very different relationship between analyst and analysand. Psychodynamics is fundamentally grounded in a 'depth ontology' that promises to uncover a hidden reality that is obscured to those not suitably equipped with the necessary conceptual tools. A good example of this is the following claim by Kets de Vries (2004: 185, emphasis in original): "By making sense out of executives' deeper wishes and fantasies, and showing how these affect their behaviour in the world of work, the psychodynamic orientation offers a practical way of discovering how organizations *really* function." The analyst is placed in a superordinate position of expertise vis-à-vis the analysand, who is in a position of dependence on the former for revealing the true meaning of their own thoughts and experiences. In contrast, with PCP, as Jankowicz (1987: 486-487) has argued: "The applied psychologist's role changes. As an organizational consultant, the psychologist engages in dialogue in the organization's language, works on the organization's terms, and becomes part of the organization, sharing its language of problem definition and resolution, rather than acting as an outsider with the outsider's privileges of entry, expert pronouncement, and rapid departure." The emphasis is much more on the analyst working *with* the analysand to help them find ways of making sense of their own experiences and to develop the insight necessary to continue doing this unaided. In short, it is about self-reliance rather than dependence.

PCP, psychodynamics, and social constructionism also differ crucially in terms of how far they are able to portray the dynamic interplay of emotions and learning. As we have seen, one of the main weaknesses of the psychodynamic approach lies with its tendency to depict emotions as innate, largely immutable, and involuntary impulses that arise independently of the cognitive domain, which is where learning occurs. The implication of this is that the relationship between emotions and learning becomes effectively unidirectional. Emotions may colour learning experiences, but since they are biologically-driven and largely out of our control, they are not themselves subject to learning. This problem is partly addressed by social constructionism, which makes a strong case for emotions being learned performances that are dependent on different social settings and progressively acquired through social interaction. However, social constructionist perspectives often overplay the extent to which social settings determine the appropriate display and experience of emotion. The notion of socialisation, which is central to the social constructionist conceptualisation of learning, tends to be reduced *de facto* to the acquisition of pre-established roles and scripts which are themselves resistant to change. Thus, while on the face of it social constructionism appears to offer a more dynamic understanding of the interplay of emotions and learning than psychodynamics, it ultimately does not take this far enough because actors are depicted as insufficiently active in their participation in social situations.

In contrast to both psychodynamics and social constructionism, PCP weaves together emotions and learning in an ongoing and emergent flow of actions and experiences. This is significantly informed by the Pragmatist tradition from James to Mead, as outlined earlier. Of course, this tradition has been equally important in informing social constructionist perspectives, but it is arguably the case that PCP has gone further in taking the legacy of Pragmatism forwards into a genuinely integrative perspective that gives adequate consideration to the opposing terms of the dualisms which persistently plague the study of emotions, such as those between mind and body, cognition and emotion, nature and society, individual and collective. Furthermore, in contrast to the sharp distinction often made in the literature between positive and negative emotions, PCP points to the frequently ambivalent nature of emotional states. So for instance, whereas Gabriel & Griffiths (2002) see *love* as an essentially positive emotion and *anxiety* as essentially negative, the PCP interpretation in the example above shows how the positive character of an emotion such as *love* can easily transmute into an altogether more negative experience. And similarly, the experience of *anxiety* holds the positive possibility of more elaborated construing and greater insight into future events.

This brings us to perhaps the most important contribution that PCP can make to the study of emotions and learning in organisations. It provides a precise conceptual vocabulary that provides very clear explanations that are immediately useful in trying to analyse emotional experiences. This contrasts with the psychoanalytical approach where loose and conflicting definitions often lead to confusion. In the above example we have only been able to draw in a relatively limited way on PCP's vocabulary of emotions, focusing on the unfolding interplay

between *love* and *anxiety*. However, it should be clear that the analysis could be considerably extended to include a whole range of other emotional conditions (Kelly, 1991; McCoy, 1977). The challenge for the future is to take fuller advantage of the interpretative resources of PCP by applying them in a more elaborate manner across a range of empirical settings. Lack of awareness aside, the rather unfamiliar and non-intuitive character of PCP's definitions of emotion have no doubt been a barrier to their widespread use. However, it is only through use that the approach can expand and develop. As Bannister (1977: 34-35) has warned:

> "… it is only when we seriously undertake explorations of our own and other peoples' experience and behaviour in terms of constructs like guilt, aggression, anxiety, hostility, that we will begin to understand their meaning and their content. Till then, construct theory will appear impoverished by contrast with the richness of lay language as a way of talking about 'emotional' aspects of experience or the evolved usefulness of, say, psychoanalytic language as a way of delineating interpersonal drama."

Hopefully to encourage its wider use this paper has provided some justification for picking up the theoretical infrastructure of PCP and, in the spirit of the exploratory and forward-looking process of construing, having a go to see if it works.

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3   Many of the authors we refer to in this paper were writing at a time when the standards of acceptability surrounding gendered language were different and direct quotations from these writers will often reflect this. That we have not corrected the original texts is a matter of convenience and should not be taken as indicating acceptance of the gender bias arising from this.

Organizational Learning and Knowledge Transfer in Expanding Companies.
Findings from an Empirical Study on Austrian Companies Entering Eastern European Markets

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Background

In the times of the iron curtain Austria already played a privileged role in trade relations between Western and Eastern Europe. Austria had cultivated its role as a gateway to the Eastern bloc in economic as well as in political aspects. In spite of trade restrictions, several Austrian companies had managed to maintain their (business) relations to the East.

When the political changes that finally led to the removal of the iron curtain began to materialise, these connections from the past proved as a fertile soil for Austrian companies. Not only were they able to realize opportunities early on, they also had the advantage of local, cultural knowledge.

The collapse of the communist system and the economic liberalization that followed have provided new opportunities for western companies. Fast growing markets and low production costs have attracted western investors. Many western companies entered these markets with strategies to take over existing companies (including their brands and infrastructure) or to establish new affiliates and bring in their international brands.

But there were also uncertainties and risks: entering the Eastern European markets at an early stage meant stepping into a different world, a world heavily influenced by the communist system and the planned economy; a world that was in turmoil (at least in the beginning with all the political instability); a world that was very different to the one the western companies were used to.

The old system had also shaped the people in these countries. As a consequence, western companies had to deal with personnel acting by the a workforce whose logic was based on a centrally planned economy and the ideology of the communist party. The centrally controlled, hierarchical organizations had produced authoritarian managerial styles. Staff was used to obeying authority, showed a lack of trust in outsiders, paid much attention to rank and status, and believed in a powerful, punitive legal system (see Prokopenko 1992 quoted in Wiley 1994). In contrast, in the new liberalized market, managers in the East had to develop expertise in fields such as strategic planning, marketing, accounting and finance, as well as radically alter their values and practices (Wiley 1994).

As western companies tried to enhance the productivity of their eastern affiliates, they had to overcome such hurdles. Transferring the western knowledge embedded in standards and practices to the East was one approach, providing staff in the East with a great deal of training in previously unnecessary aspects another.

Knowledge transfer to other cultures

Institutionalist theory argues that organizations are embedded in a specific social, legal, economic and technological environment, which influences their activities. Therefore, the specific history of an organisation and the culture that surrounds them should also be

considered when investors are trying to increase productivity. This task requires different types of knowledge. Firstly, there is knowledge which is easily transferable and independent of the institutional set-up. Secondly, there is knowledge that cannot be easily transferred. One way of overcoming these obstacles might be to focus on creative teamwork leading to organizational adaptation. However, such teamwork depends on the cultural and institutional context from which the workforce is hired. For this reason, the possible bases for knowledge generation should be regarded as culturally dependent (Spender 1992).

Methodology

Based on our theoretical and practical work with knowledge management, our intention was to learn more about the knowledge management situation in Austrian companies, with a particular focus on those who had grown rapidly as a result of expansion activities in Eastern Europe. Consequently, the questions addressed by our research were as follows:

- Which experiences and insights did Austrian organisations gain from their activities in Eastern Europe?
- How did these Austrian companies manage their knowledge-transfer, either from west to east, from east to west or within headquarters? Which practices were established to induce organizational learning and knowledge transfer between headquarters and subsidiary companies and among the subsidiary companies in foreign countries?
- Did the "Go East" strategies have any impacts on the Austrian headquarters? If so, which changes did these strategies trigger in the long run (10+ years)?
- Do cultural aspects influence people's ability and willingness to cooperate and transfer knowledge? Do cultural differences have any influence on learning processes?
- Which strategies have been chosen by companies to cope with uncertainty, and the different cultural surroundings?

One of the main aims of this study was to gain a comprehensive overview of the different aspects of knowledge transfer affecting Eastern European operations.

Our research was conducted in a two stage process. In phase 1, we conducted twenty qualitative interviews with managers responsible for their company's development activities in Eastern Europe.

The major findings uncovered in these interviews led to phase 2: A questionnaire was designed to test the findings from phase 1 and sent out to approximately 300 companies in Austria. Although this second phase is now close to being finalised, its findings seem to underline the findings of phase, but could not yet be taken into consideration for the purposes of this paper.

Results

In this paper we discuss some major findings. From what we found, there are several issues that call for further research. We will outline some ideas at the end of the paper.

Dealing with Knowledge

A wide range of knowledge creation and knowledge transfer tools were used in the companies participating in the study. Knowledge of Eastern Europe initially had to be acquired and established primarily at the parent companies. During the set-up phase of the Eastern European subsidiaries, the on-site project teams played a central role within their parent companies as knowledge developers and repositories. The exchange and use of the knowledge and experience available in the project teams took place predominantly on a personal basis and not via documentation or other media.

As part of the market development process in Eastern Europe, a great deal of highly specific knowledge had to be transferred from the respective company headquarters to the new subsidiaries. Furthermore, the staff there had to be equipped with basic knowledge of various aspects of business studies and economics, knowledge that had not been necessary in a planned economy and a communist regime. Great importance was placed on providing different training options and developing the necessary knowledge of processes and standards. In comparison, other methods, such as project debriefings, lessons learned, good practices, job rotation, mentoring and sponsoring systems, quality circles, knowledge communities, etc. were used more rarely.

Based on the information received in the interviews, the focus in any company-wide knowledge transfer activities lay primarily on task/role or technology based knowledge (e.g. knowledge transfer through centralised support units). The use of any specific information and communication technology based instruments was relatively rare.

Only in isolated cases could any attempts be identified in the interviews to formalize knowledge transfer, i.e. through the establishment of appropriate organisational structures to enable or promote such activities. Above all, conscious attempts to transfer and externalise available tacit knowledge, i.e. knowledge that is difficult to communicate, were extremely rare. The deliberate transfer of knowledge of social or cultural factors seems to take place only at an informal level, in particular, among those groups of employees able to participate in specific transfer forums, e.g. trans-regional meetings. If such communication possibilities are not widely available and this kind of communication is not an 'official' requirement, it seems informal knowledge exchange across different locations can only take place primarily at higher hierarchy levels.

Effects on the parent companies

According to the interviewees, expanding in/to Eastern Europe did not result in any real threat to the identity of the parent company. Indeed, it seems more common for staff in the parent company to be proud of its internationalization activities and increasingly recognize the fact that the subsidiaries in the East contribute significantly to corporate success.

The consolidation steps already being considered in many places also seem to have had an influence on corporate identity and cohesion, and have already resulted in some resistance from the workforces. It is to be feared that the planned cost-cutting measures still to be implemented could also offer further potential for tension in the years to come.

As a result of the number of different languages now spoken in some companies, the question of a single corporate language had often become relevant. In general, the language options were either German or English, with various points considered for each of the two variations. However, the long-term effects of issues such as language on corporate identity were not really discussed or reflected upon by the companies researched. Most of the companies were just on the way to find their best ways with corporate language.

Dealing with greater complexity

The survey reveals that an adaptation of corporate structures to address the rapid increase in size and complexity, for example, through organisational and personnel development measures, often takes place with some delay. A "gap" of 10 to 15 years is not uncommon in larger organisations, underlining Chandler's "structure follows strategy". Only a few individual organisations were identified who – either as part of their strategic planning process or through a subsequent decision that turned out to be correct – had created structures to facilitate the way their organisations dealt with the increase in complexity.

As far as the question of how far any experiences gained through activities in Eastern Europe had been leveraged company-wide, it also became apparent that the organisations either (a) saw no need to do so or (b) rarely possessed the ability or knew how to go about consciously initiating organisational change processes based on these experiences.

Dealing with different cultures

In the interviews, it was not possible to identify the way companies deal/dealt with the different views and attitudes of their staff and organisational units. This would probably be easier to identify using the observation method. When asked to what extent their own corporate culture should be transferred to the subsidiary companies, many of the interviewees emphasised that the subsidiaries should establish or maintain their own local identity, e.g. "they should stay Hungarian". On the other hand, attempts were also made to transfer the business logic and rules of the parent company through standards, process definitions and structures. The commonly practised combination of transferring centralised standard

components with an appropriate and deliberate level of freedom for the subsidiaries seemed to offer a practical and acceptable alternative in many companies.

Further issues

The study also revealed a number of further issues, which provided some interesting and valuable insights both for the current research project and for business practices. When we take into consideration the fact that some companies are now considering expanding even further East, it would seem logical to assume that a systematic analysis of experiences to date would be a worthwhile exercise. Yet it was in this area in particular, i.e. the systematic processing of experiences and related knowledge, that very few systematic attempts could be found from a knowledge management perspective. There would seem to be reasonable potential for development in many companies in this respect.

Consequently, the results indicate the following possible relevant issues for companies:
- Driving knowledge management: does, and if, how does the growth of a company based on the expansion to the East, foster the awareness for knowledge management within an organization?
- Leveraging experiential knowledge: how can companies leverage their experiences so that the knowledge gained can be evaluated, shared and developed to form new knowledge?
- Consolidation, adaptation of organisational structures: in many cases, corporate growth through expansion into Eastern Europe took place without any significant change to organisational structures. Some companies dedicated little time to considering whether their existing structures still suit their company's current situation.
- Corporate identity: the various different languages and mentalities in the organisations affects corporate identity. Companies did not reflect on this issue (which is difficult to both pinpoint and measure).
- Management styles: did the experiences gained in Eastern Europe lead to a change in management style among expatriate staff? What effects did this have on their success in Eastern Europe and what use is being made of this knowledge?
- Stickiness of knowledge: Which experiences do companies make when transferring knowledge to Eastern European countries? Can the findings of Jensen/Szulanski 2004 on the factors influencing stickiness also be found in the context of our research?

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Pragmatic turn, "erotic epistemology", and new production of knowledge.
Dialogical encounters between several discourses on knowledge and learning in organisations

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Past Passions, Passed Passions?

Since the main theme of the Trento conference is *the passion for learning and knowing*, I will write personally, and start by quoting myself from 1974, when I was still a teenage student at an extraordinary, experimental high school (FGB) in Norway. Teachers and students, about 100 altogether, participated on equal terms, with full responsibility, in administrative groups, preparing and submitting all cases (from gardening to the recruitment of new teachers) to a general assembly of teachers and students, meeting once every week to discuss and decide on practically all matters[2]. I became a passionate believer in the possibilities our local, direct democracy opened up for organising and reorganising learning. Comparing our school to institutions, and workplaces, organised according to traditional hierarchical principles, I wrote:

> At FGB the situation is totally different. We have chosen a democratic structure. This implies a continuous critical evaluation of ourselves. (…) We may gather experiences from our daily practice in order to test our theories[3].

Although we had general assemblies once a week, broad participation in all kinds of administrative working groups, and all kinds of continuous discussions running in-between, creating an energetic public sphere for local affairs, and although we genuinely respected both differences of opinion, and decisions made democratically, there was a need for a space where we could meet without fighting over decisions with words, without defending or attacking specific partisan interests, or specific points of view in definite cases. To deal with this need some of us established a group called "Klekkring", Norwegian for a "hatch-ring", where we could "break out" of the roles we played in the ordinary activities in school, but also "hatch" new ideas on how to organise ourselves, and practise our everyday affairs. This first experiment with "Klekkring" lasted less than a year. But the almost 4 years I spent at this school working through direct democracy were formative. This formative experience has undoubtedly directed my later interests, my university studies, and professional career, which have all been attempts at understanding the meaning and significance of formative practitioner-experiences like these – my own – and how they can be used in learning, research, and political action[4].

This starting point raises some questions, however: Is my present passion for learning and knowledge an idiosyncratic and subjective emotion, a personal hang-up from my teen-age years, to be psychoanalysed or "matured" away, and replaced by more "objective" and passionless methods? Is it merely a subjective preference of which I have mine while you have yours? Some like it hot, others like it cold, some like knowledge and learning, others like sex, and drugs, and rock & roll!! Or, did I strike at something more universal, which could be justified as true, correct, better, common to all, or something like that? Could such passion have been "ignited" in many other ways? What hit me during the latter part of my

teen-age at this experimental high school? Was it merely a reactivation of some past emotional fixations, or was it some kind of pre-figuration of necessary practical ideals? My hunch, then and now, is that it was more than strong emotions.

Through the looking glass and back, re-collectively

I will maintain, at least, that a retrospective and "re-collective" approach like this is not just an apology to make my own long-standing passion for learning and knowledge sound credible. My personal approach merges with my professional interests in this. My career, following the formative years at the FGB, brought me – in search of understanding – through student politics, critical studies in the methodology of social research (e.g. Eikeland; 1985, 1995), philosophy (e.g. Eikeland, 1997, 1998, forthcoming-A) and action research (AR) (e.g. 2001, forthcoming-B), to where I am today as a research professor in AR and the pedagogy of higher education, having worked with explicit organisational learning projects continuously since 1990 (e.g. Eikeland & Berg; 1997). The fields I've been through are what I consider my "home base" discourses, which I mostly relate to in working with and thinking about organisational learning in collaboration with practitioners in the field, something I have been doing continuously since the last part of the 1980s. But my professional journey has also been border crossing and transformative in relation to entrenched divisions in most social research disciplines, between the researchers and the "natives" researched, the observers and the observed, the explainers and the explained, the knowers and the known. Turning, and travelling, from a "native approach" to organisational learning as a genuine participant at the FGB, through research methodology and philosophy, and then "turning back" to organisational learning through AR, has made some of the paradoxes of studying "the others", while simultaneously taking on the "constructs of the natives" emerge more clearly. Who and what am I in these transitions? A philosophically reflected, native-practitioner-researcher, a researcher studying "the others", or a researcher-gone-native, and what difference does it make?

The question now becomes: What do "natives" – as we all are in our own everyday practices – need in addition to their immediate state of submergence in practical experience, necessities, and localities? What do, or could, segregated, external research procedures offer? What happens to knowledge when it is produced apart from personal practice and desire?

Discourses – parallel, crossing, or converging?

These personal border-crossings are my starting points in discussing the so-called "practice turn" in organisational learning studies (e.g. Gherardi; 2000 & Nicolini et al.; 2003), and in the social studies of science (e.g. Schatzki et al.; 2001). There have been many "turn-arounds" in social research over the last 50 years. The most famous may be the so-called "linguistic turn". Since there has been a previous but similar turn "to practice" in philosophy, quite

impossible to pin down to a certain date, although certainly *predating* the publication of the "Pragmatische Wende" by Böhler et al. (1986), I would like to relate these turns to each other.

I will do this by relating my "home discourses" of (1) *philosophy* (after Aristotle, Montaigne, Vico, Hegel, Marx, Peirce, Dewey, Heidegger, Wittgenstein, Polanyi, and others), (2) *research methodology* (after phenomenology & hermeneutics, critical theory, feminism, and deconstruction), and (3) *AR* (relocating experimentation, counter cultural indigenous knowledges, practitioner research), as horizons for understanding *organisational learning*, to other well established, or burgeoning, discourses. The most relevant other discourses are on (4) *adult education* (e.g. Knowles et al; 1998, Jarvis; 2001, Foley; 2000), (5) *work place learning* (e.g. Marsick; 1990, Raelin; 2000, Boud & Garrick; 1999, Boud & Solomon; 2001,), (6) *organisational learning* (e.g. Cohen&Sproull; 1996, Easterby-Smith et al.; 1999, Easterby-Smith & Lyles; 2003, Grey & Antonacopoulou; 2004), and theories of (7) *socio-cultural and apprentice learning* (e.g. Lave & Wenger; 1990, Nielsen & Kvale; 1999).

All of these discourses overlap, and intermesh, of course. But having worked in Norway with organisational learning, mainly "looking out" from my three "home discourses", it would be useful (for more than me, I believe) to try to connect and integrate these more explicitly. The need for integrative encounters became even clearer after participating in an international symposium on working life learning in Copenhagen in November 22-24, 2004. My effort is to make such an encounter become, not a polemical confrontation at all, but a genuinely dialogical, and learning encounter to overcome "parallelism", acknowledging contributions from all discourses, trying to pull out learning from each approach, and see where they complement each other, even though this cannot be done uncritically, of course. My approach and attempt will be highly trans-disciplinary.

Turning to practice – in theory, or in practice?

It is a central contention of mine that turning the *gaze* of "close-up" spectators more intensely towards "practice" – in spite of all its merits – is insufficient and *not* equal to an *epistemological* "turn to practice". Practice based knowledge requires thinking through our own practices and practical experience – our own *habitus* inscribed in historical, institutional forms – not just *looking* closely at the practices of others from *within* given institutional divisions of labour. A practice-based approach – implicit in native approaches, in methodology, and in philosophical approaches – necessitates a personal, collective, and historical approach to both organisational learning, and research. So-called "basic historical concepts" (Koselleck, 2002, 2004) – enacted by practitioners in all fields – become central in understanding, rather than extraneous concepts used by spectators. Personal experiences from social and organisational experiments that facilitate and develop self-consciousness through openness and "public" exchanges, like my own from the FGB mentioned at the start, are important in order to connect personally and experientially to such basic historical concepts.

They emerge more clearly and consciously in circumstances like that, while other social arrangements suppress and submerge them.

Many people see a major transformation of the conceptualisation, organisation, institutionalisation, and practice of both social research, and teaching / learning, happening around us every day. This "turn", or transition, to an emerging new knowledge management regime, or a socially distributed knowledge production (Giddens et al, 1994, Nowotny et al, 2001), also implies, I believe, a "reshuffling" of methodological approaches where studying "the others" moves from mainstream to periphery, while studying "how-to-do-things", and "what-it-means-to-do-or-be-something" *as performers*, moves and must move from periphery to mainstream in social research. Basic historical concepts, as lived and performed concepts, help clarify. In order to see the distinctions more clearly, the highly differentiated conceptualisations of knowledge, made by Aristotle more than 2000 years ago, become important, distinguishing not only "theory" from "practice" but different forms of both "theory" and "practice", all of which are themselves candidate basic historical concepts.

The reshuffling, and the requirements for knowledge and learning in work life following higher knowledge intensity of products, use of new IC technology, higher educational levels of employees, and increased competition, also sets new standards for organising, collaborating, and leading through common knowledge and insights shared among equals rather than through hierarchical relationships and divisions of labour between thinking and doing, instruction and performance, command and obedience. Changes like these also represent another reshuffling of the borderlines between public and private spheres, between political relationships between free and equal citizens, and old domestic household relationships between masters and servants from which enterprise organisations have grown. Continuously developing and improving practices individually and collectively engenders an erotic epistemology of desire, however. Hence, these turns and reshufflings make the dialogical, "erotic epistemology" of (Plato, and) Aristotle discussed in Eikeland (1997 & forthcoming-A, cfr. Garrison; 1997) highly relevant, bringing it all back to the main theme of the Trento-conference, "the passion for learning and knowing". The full-length article will demonstrate how my AR-work over the last 20 years, trying to establish organisational learning capabilities in municipal organisations in Norway, relates to this emerging scheme.

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Endnotes

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[2]   Formally the headmaster of the school was still responsible towards the county authorities. This gave him or her a veto against decisions of the assembly. But to my knowledge, this veto was never used while I was at the school, and in the assembly the headmaster had one vote like everyone else.

[3]   Published in Angell et al. (1974:61ff.). The school's name was Forsøksgymnaset i Bærum (FGB), or The Experimental High School in Baerum (a suburb to Oslo)

[4]   My first major inspiration (in 1974) was Dewey (1938), then (from about 1976 to 1984) Habermas (1962), Negt (1971) and Negt & Kluge (1972), and finally and most profoundly (since 1985) my reading of Aristotle.

Projects as Learning agency at organization borders: a resource for organizational learning ?

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Abstract

This communication takes part to the discussion about project-based learning, learning boundaries and organization which follows logically the isomorphic development of the project-led organization in the so-called "knowledge society". Therefore the focus on project-based knowing and learning requests to think comprehensively about practices in projects within a framework that includes the structuration character of organizational learning. Our aim is to re-explore this perspective when projects are "located" at the borders of organizations and might be largely disturbed or even disrupted by what happen in performative context of the organization. To explore comprehensively Projects as "Learning agency at the border of organization" we intend to bring some empirical materials, results and elements of discussion about the issue of learning in two different projects within an R&D organization of the French agricultural sector. Acknowledging for project-based learning leads to the idea that given project practices are differently accountable towards a variety of contexts. A response to the tension inherent to the dialectic of division of practices occurs then in a manifold of contexts and this property of learning in project organization has to be explored symmetrically as a source for learning and forgetting.

Keywords: project-based learning, organizational learning, project organization, agriculture, innovation, R&D process

Introduction

This communication takes part to the discussion opened in *Organization Studies* about project-based learning, learning boundaries and organization (Sydow et al. (eds), 2005). Knowing and learning processes in projects developed within an organization are to be considered at the interface and the trade-off of different layers (Grabher, 2004) within and outside the functional borders of the project and outside the organization as well (says, the team of the project, the organization, the epistemic community and the social ties; all those layers being also each of them a level of analysis in the OS literature.

This perspective on *project-based learning* follows logically the isomorphic development of the "projectified" organization (Midler, 1995) and of the correlative managerial practices of project-team in many sectors of the so-called "knowledge society". Therefore the focus on project-based knowing and learning requests: (i) to think comprehensively about practices in projects within a framework that includes the structuration character of organizational learning[4] (Berends, et al., 2003) and (ii) to explore new perspectives when projects are "located" at the borders of organizations and might be largely disturbed or even disrupted by what happen in the "outside"[5]. Making sense of practice based situated experience of daily work becomes then particularly manifold for agents according to which organizational layers is considered.

The level of analysis is here the project, considered as an entity identified by the limited existence in time and space of a group or team of persons, sharing common objectives and mobilizing resources to achieve their goals. It seems important to approach the classical perspective on organizational learning and practices with a practice-based approach (Brown and Duguid, 1991; Gheradi et al., 1998; Nicolini et al.; 2002) with the idea of looking at knowledge expansion and boundary work at the level of a project (De Fillippi, 2002; Sydow et al., 2005) and to consider learning as an accomplishment and not as a "natural and normal" tendency of human agency in project organization despite we recognize that it might be a managerial purpose as proposed by Sanchez (2001) within the learning cycle of a competent organization.

Thus, to explore comprehensively Projects as "Learning agency at the border of organization" we intend to bring some empirical materials, results and elements of discussion about the issue of learning in two different projects within an R&D organization. Thanks to a case-study research based on practice-based-approach coupled with sociological interviews and documentary analysis we report on two R&D projects of a French Agricultural Technical Center (renamed OILYOIL for the circumstances). Exploring the narratives infrastructure of actors (Deuten and Rip, 2000) and taking part into these R&D processes following some action-research principles allow us to step forward in a renewal of the organizational learning research agenda (Nicolini et al., 2002).

Addressing the stimulating issues of comparing and contrasting project-based learning thanks to the framework developed by Scarbrough et al. (2004: 1583-1585) - but in our case within the same organization – we try to explore and question the existence and nature of the relations between project-based learning and organizational knowledge given a dependency to a performative context. We attend to consider learning and knowing as dialectically sticking to delimited areas of shared practices (underlined by Scarbrough et al., 2004.: 1583 *The divisions in practices associated with communities of practice constitute the ground for learning within particular settings, but also represent the primary barrier to the transfer of such learning to other setting*"). To this important property of project-based learning we would like to add the idea that given practices have to be differently accountable towards a variety of contexts. A response to this tension inherent to the dialectic of division of practices in a manifold of contexts has to be explored symmetrically as a source for learning and forgetting.

In a first section we will give some elements of understanding in order to describe the changing context of OILYOIL and of the two R&D projects and in order to present quickly the organization. In a second section we will firstly give some elements of methodology and then account for the two case-studies (one about the collaborative design of an early alert pest management system and the second about GMOs field trial) describing the conditions for learning and the project-based learning effects. In a third section we will question how knowing an learning at the project level was or not a matter of organizational learning in OILYOIL. We will conclude with a discussion about the issue of learning in organization as a normative approach of knowing and experiencing at the workplace since our results confirm

that project-based learning tend to stick to division of practice or to be embedded in competencies or even to collapse in organizational forgetting.

The organization put in context

The context

A large number of organizations and professions are oriented towards the expansion of purposeful and formal rationality upon practices of other professions, workplaces and organizations. This expansion has been described by Max Weber as a "*colonization of Lifeworld*" and still means to make practices affordable, predictable, efficient, legal and sometimes under the control of a center. Thanks to the scientific and technological enterprise of agricultural sciences (being more or else autonomous from this rationalization process), a permanent effort of modernization has prevailed for decades in agricultural, rural and food domains under a very positivist and technicist regime of knowledge production mixing science, technology, neo-corporatist and bureaucratic values (Barbier et al., 2004). In many western agriculture, the efficiency of this modernization process has relayed on a European political compromise and on a set of relations (institutionalized or not) between farmers representatives, administration, research institutions and agronomic high education, relations which are fairly well described under the recent Mode 2 society metaphor (Nowotny et al., 2000) but which seem to be constitutive of the social foundations of a mix of bureaucratic and neo-corporatist order.

Scientific and technologic activities have been highly involved in the public governance of agriculture and food system and the situation is much more contrasted at present among European countries (Cerf & al., 2004). In the French case, one could have difficulties to separate agro-business interests, professional interests and bureaucratic interest since what is called the "Agricultural Sector" is the result of a neo-corporatist compromise issued during the late 1960's under an ideology of progress for farmers which still mix humanistic values and the profitability of farm units. The history of this neo-corporatist apparatus who built up the agricultural sector in practices as well as in its institutional pillars is already well documented in the French sociology (Tavernier et al., 1972; Muller, 1984; Coulomb et al., 1990) and quite well known in the international community (Keeler, 1987; Colleman and Chiasson, 2000).

A real public and corporatist bureaucratic order has been developed based on a public research institute (INRA), technical institutes and development and extension services under the control of agricultural minister representatives and professionals. Along those '30 glorious years', bureaucratization and subsidizing agriculture, rationalization of activities have not been echoing much disenchantment until a regime of crisis transform the agricultural sector in a domain of professional disputes[6], disenchantment, environmental problems and food safety issues. And the forthcoming reform of the CAP is definitely going to end this paradoxical and transitory phase.

Not very differently from other sectors, the linear model of innovation has been the framework that guided French policy regarding agricultural innovation systems since the beginning of the 60's (see Cerf and Lenoir, 1987). According to this referential of designing innovation, research was carried out at INRA (public Institute for agricultural related researches), while R&D (Research and Development) was performed by applied research bodies which are specialized by products (cereals, oil seeds, fruits and vegetables, meat, etc.). Chambers of Agriculture were supposed to be in charge of designing extension policy at a local level. They also perform extension as do co-operatives or account offices. While research is financed by the national budget, applied research bodies and Chambers of Agriculture are mainly funded through levies on products and tax on productive land and are under the control of farmers' representatives. This is precisely a structure that is about to change, or should we say is still in a permanent regime of conceptualizing changes (see Cerf et al., op. cit.: 52-67). As French like to say: *"plus ça change plus c'est pareil!"*.

As long as the main issue was to increase the volume of the agricultural production in order to reach self-sufficiency at European level, this linear organization of R&D&E (Research, Development and Extension) proved to be efficient and echoes particularly well the European Common Agricultural Policy. But farmers are facing a crisis of identity due to a paradigm shift along which agriculture is viewed by the rest of the society as a source of environmental damage and unsafe food and waste of subsidies. Such a crisis affects also the R&D organizations through different channels but also ridge on the governance structure of these R&D organizations that are driven in an agro-chain perspective and under the pressure of its financial efficiency. After the food scare period and BSE saga, R&D organization of the agricultural sector were exposed - or at least had to pay attention- to public scrutiny and watch for controversies about harmful effects coming from farming and about the use of biosciences in farming and food production (Barbier and Joly, 2001). Of course those public issues might affect more or less directly the curse of practices within R&D projects because ordinary practices of engineers and technicians and the settings of R&D activities are precisely playing with boundary-work and translations in order to perform an output that precisely networks the R&D project, the resources and goals of the organization and answers or attention to the issues raised in important public controversies about sustainability of agriculture.

Until 2003, the organization of agricultural development have been relayed on some principles i) a co-management between central administration and representatives of the main trade-union, ii) a solidarity between professionals despite differences between territories and agrochains, iii) functional arrangement between various intermediary bodies like Chambers of Agriculture, co-operatives, trade-unions, extension groups (Evrard, Vedel, 2003). A reform of the French system in 2003 changed the financial rules (end of specific taxes)[7] and co-management is supposed to come to an end. This reform seems to admit an important turn since it contains what Lemery (2003) described as the collapse of a model of development which refers to an idea a farmer as a professional.

Presentation of OILYOIL

Our study deals with a Knowledge Organization, says a R&D organization, which goal is to propose knowledge package for action such as service, innovation, tools, reports, documents, expertise and the like, to farmers, advisors of extension services or firms of the oilseed agrochain[8]. OILYOIL was created during the 60's in order to developed techniques which ought to enhance the productivity of the crops it had in charge and to extend their area at French level (Thomas F. et Bonneuil C. 2004). In order to achieve this, this R&D body developed a two level organization: a national center dedicated to the enhancement of links with fundamental research and to the implementation of new applied research or development programs in close relations with scientific networks of agronomic research; regional experiment stations in which technical packages were tested at site level and then promoted among the extension services which delivered them to farmers. During this period, the role of the regional agents was (i) to implement recommendations made at national level by adjusting them to local agronomic conditions and by promoting them and (ii) to inform the national agents of problems met by farmers in applying their recommendations or met in their day-to-day work.

At the end of the eighties, more attention was paid to farmers' practices and the way they decide to carry out given cultural operations. Instead of developing recommendations that farmers should follow, a new track was explored by designing decision tools mainly directed towards crop monitoring. This new orientation was confirmed after the CAP reform in 1992 and in 1996 a chart was designed which attested the body engagement into the promotion of more environmental friendly techniques. Even if such a new orientation was mainly pushed at national level, regional agents agreed about it and the whole organization took a move towards this issue.

This new orientation did not really change internal relations between the national center and the regional stations: while agents at national level were in charge of the design of the tools, regional agents had to test the tools and the decision rules and then to implement the tools when test phases were considered achieved. Nevertheless, it drives some changes in the network of the different agents. When national ones were involved with new scientists working in more diverse scientific fields, regional ones developed new partnership with advisory or co-operative bodies in order to involve their agents in the test of decision rules. Such a partnership was viewed as a means to facilitate implementation as these partners were considered as promoting agents, e.g. promoting the tools amongst farmers.

In the mid of the 90's, like many other organizations, OILYOIL entered a structural change consisting in a semi-matrix like structure crossing on one hand a territorial implementation of resources for field experiments and regional implantation of Engineers with a direction at its head and on the other a set of two kind of departments ones being attached to the technocracy providing inner services and managerial control and others being dedicated to exploratory and R&D activities. There appeared a tendency to structure partly the organization with project that would mobilized internal resources (both at the center level and at sites level in regions

and being evaluated by the technostructure (a specific evaluation unit was established) according to the main goals and the strategic axis of OILYOIL.

Presentation of the case studies and methodology

Methodology

The two case studies were realized separately, without interference in the empirical work of the research process and without a common methodological platform[9]. At the end of each case study we entered in regular discussions about the design and the sense of our intervention according to the issue of learning. Nevertheless in both cases our scientific perspective was the same since we aimed at accounting for the social dynamics between acting and knowing in two R&D projects of OILYOIL that were particularly exposed to collective action at the borders of the organization. The comprehensive account of such creative knowing processes allows us then to address the issue of the possibility and conditions of organizational learning in a so called "knowledge organization" when reflexive practitioners learn within, and from, activity system that are situated at the borders of the organization, e.g. exploring new R&D issues in multi-actor experimental settings. The initial aim was thus in each case to depict and analyze what Scarbrough et al. (2004) proposed to call the "Condition for Learning", starting from the establishment of knowing and knowledge production in ordinary communities of practices within the organization and questioning the possibility, the existing procedures and the reality of the "transfer" of learning outside the boundary of the project or of those communities of practices. In both cases the purpose of the research work was project-based learning oriented.

The case study 1 deals with the participatory design and field test of an Early Alert Pest Management System (EAPMS) still in progress which should allow identifying the appropriate need for spraying pesticides at the farm level with a sustainability objective (Cerf, 2003)[10]. Central in this R&D project of OILYOIL – from 2001 to 2004 was the participation to a multi-actor design which had to be explored and performed as well by the team-project. The research activities were based on action-research methodology with the aim to facilitate the design process with methodological inputs at the team project level. The process was assessed in two ways: by the organization itself within an evaluation procedure still at work and by the researchers. The present communication is also a result of this reflection which enables to focus in our analysis on the way the project team has tried to co-design the alert system and its use through participatory design.

The case study 2 deals with the set-up of field trials of genetically modified organisms that OILYOIL started in 1995 within a regular and classical approach of agronomic trials in order to demonstrate the effect of genetically modified rapeseed. As reported, analyzed and criticized by many Sciences Studies and because of a wide European public controversy, transgenic crop trials became an issue in the public agenda. Security constraints on field trials started to be discussed and defined within expertise arena issuing a new public referential for risk assessment: bio-watch. Despite this public attention to possible environmental risk caused

by GMOs (and especially in the case of rapeseed because of seed dissemination biological properties) controversies got more political including issues about performing field trials. OILYOIL had thus to experience difficulties and even some "ripping up" of crops openly led by green activists. Knowing this evolving context that had questioned deeply the scientific managers of OILYOIL, we proposed them to carry on a 6 months sociological survey with in depth interviews, documentary analysis and some observation and dialogues about the practices of GMO trials along the last ten years. The purpose of this study was explicitly negotiated in order to assess and make visible or at least question learning that would have occurred in limited area of the organization and globally (Barrier, 2003; Barbier and Barrier, 2004).

Case study 1: the collaborative design of a Early Alert Pest Management System

A simplified Chronic of the case: setting alert pest management methods into a package

Benchmarking solution

At the beginning of the 90's and after benchmarking solution from Canada, OILYOIL developed a prototype of a kit the early detection of contamination of rapeseed by a given pathogen (called CLE here). During the following period, work has been undertaken to test the scientific validity of this prototype that is to establish a correlation between the results provide by the use of the kit and the effective contamination thanks to field sampling procedures since contamination depends actually on climatic conditions. At that time low attention was paid to CLE which was not considered by farmers and advisors as a major pest issue as far as they have means to prevent the development of CLE on their crops thanks to the use of pesticides.

But in 1996, OILYOIL decided to engage in a "friendly environmental chart" meaning the promotion of cropping techniques with low pest use and of environmental friendly methods for crop management. The development of monitoring tools were then viewed as a good way to ensure the feasibility and reality of new practices in pest management system as those tools allowed to make decision of spraying pesticide only if tangible proof of contamination had been given. The kit for CLE early detection appeared to be a good candidate to enter in such sustainable crop management, as it was proved to give a good account of the effective potential for contamination. OILYOIL decided to develop it as a decision tool, but meanwhile other prototypes of tools were also available and shared the same purpose and package of observation and data mining: (1) a grid based on crop rotation and climatic data and based also on some field observations, and (2) different climatic models simulating the pathogen development. Therefore, in 2000, based on first investigations with social scientists and agronomists, OILYOIL decided to start to develop this EAPMS exploring how type different tools could be combined and commodify in order to allow farmers or advisors (from co-operatives or extension services) to create information about the level of contamination at a given moment in a given area of land and have thus a procedure to decide if pesticides are needed or not in order to minimize economic losses and environmental damages.

Reshaping the project design and reshaping the prototype

Due to some difficulties met previously in the diffusion and use of such package, OILYOIL decided to adopt a different approach and tried to promote the co-design of the EAPMS and of its uses. Conscious that no skills were available in OILYOIL for that kind of approach, resources were allocated for some social research with the aim to support the search for appropriate methods to establish a co-design in practices. Simultaneously OILYOIL designated a project manager who was in charge of interfacing the routine work carried on to develop and test decision tools on one hand and the researchers' proposals of new working methods on the other.

This project manager for instance performed her task through the development of *ad hoc* protocols, which were then discussed with local engineers and experimenters and their technical manager. She also developed tests based on scenarii of various combinations of tools and use, and new statistical methods to assess decision criteria in order to allow the production of intermediary objects which were then used to debate about the possible shape of tools and their possible use with various group of farmers and advisors. This work allowed the team to develop a more complex vision of the possibility of developing new versions of the kit prototype according to users' requirements in terms of feasibility of the test.

Reshaping the prototype meets controversies

Nevertheless, the project team had to face various controversial issues around the effect of the project design. A first issue emerged within the organization about the protocols in use as they resulted of some changes in the routines primarily established with farmers and advisors in the test of decision tools. Controversies emerged as well among the designers and the users around two issues: Firstly users alerted designers of the fact that they will not use the EAPMS with the view to stop spraying pesticides but only to diminish their use owe to best positioning of it; secondly, there was uncertainty about the development of pest resistance to some pesticides and the need to use more expansive ones in order to fight against the pest. While some farmers or advisors deny the problem, some view it as an opportunity to develop more friendly environmental practices. These controversies hampered the co-design of the EAPMS and their use to a certain extent despite it was not jeopardizing the methodology itself. But this results in the emergence of a new perspective: to link an insurance service to the EAPMS so that farmers would be keen at avoiding pesticide spray when contamination is low.

In 2004, as the pressure on pesticides use increased, and more evidence was given to the development of pest resistance to pesticides, OILYOIL decided to start the final phase of the development of an EAPMS so that it could be "on the market" and the end of 2006. Rather than keeping on the idea of combining different alert tools, the choice was made to develop the new version of the kit, a "*more simple one*"…

Conditions for the structuration of learning process

Project practices

To be able to develop the EAPMS, the project manager had to broker between various practices : research, laboratory, experimental, local networking ones. Nevertheless, this did not result in specific management practices within the project as the work undertaken within the project was mainly defined through the procedure written under ISO 9000. But the development of the broker practice itself can be viewed as project practice as it redesigned the way to develop a decision support tool and more specifically redesigned the co-ordination between the center, the local stations and regional engineers. This was mainly achieved through the way protocols were build and performed. Such practices nevertheless were subject to controversies and contested within the organization by regional engineers: they had the feeling that their networking practices with extension services and co-operatives were denied, as well as their knowledge of local crop management practices.

After facing such controversies and eventually some misunderstanding with the scientific or technical direction, the project team chooses to develop some reflexivity about the work it undertook. The aim was to better capture the various stages through which the project went, and to analyze the stakes under the various controversies the project had to face. This was finally seen by the project manager as a way to capture what (s)he learnt through developing the co-design of the EAPMS and its uses.

Knowledge integration

The different prototypes and their potential for combining them into an EAPMS provided good support to knowledge integration between designers and users. Designers tried for instance to integrate farmers and advisors scares through developing the idea of an EAPMS associated with insurance service. They tried to integrate their practices by taking into account the way they were organized for the management of some other already used monitoring system (on other crop and pests). As well, the design of assessing and participatory protocols opened opportunities to support knowledge integration between the project people from OILYOIL and researchers (social and agronomists ones). Development of interview and focus group work, and moreover the development of scenarios required to get in depth understanding of the structure of the tools as well as relevant knowledge about farmers' and advisors' practices which was distributed among the team, the local engineers and the researchers who had carried on inquiries on them. The ability to get relevant feed-back for the designers as well opening some black-boxes between farmers and advisors can be a proof that such methods had benefit from all these people.

Project autonomy

During the 2000-2004 period, the CLE project was managed according to ISO 9000 management procedures established for the whole organization. No specific resources were allocated to the project, and the project manager had to negotiate them with the Programming and Assessing Unit (PAU) as any other person in charge of a given theme (here pest management). Through this usual procedure, the team could nevertheless mobilize and

combine different practices: experimental one, laboratory one, local networking one also. By pass strategy was also developed by using some funding allocated through research projects co-build with the researchers involved in the project. Such funding allowed achieving work with users like relevance and feasibility assessment which did not fit into the time allocated to the project by the organization. After 2004, the project starts to get a more strategic position, and became directly driven by the direction committee which decided to allocate specific resources to the project, so that negotiation was directly assumed within the committee. The PAU became then more a resource for both the committee and the project in order to define the reporting procedure. This procedure was designed to allow the management of emerging needs, the revision of strategic decisions while keeping the target.

Project to organization effects

Intra-project learning

Learning could be viewed here as distributed among the different persons involved within the project. The development of co-design and participatory methods was backed-up by various understanding of the interest of such methods, but finally it emerged that such method had allowed the team to think in terms of service instead of thinking only in terms of decision tool. But such a vision resulted in various learning processes among the team members. For some, finding means to get various users involved in the process of designing the EAPMS challenges their way to look at uses. As a matter of fact, trying to put tools in their use contexts, resulted in designing scenarios connecting tools, farmers and advisors in a frame of space and time, finally designing explicitly an organization of the EAPMS. For others, this meant developing a new local network so that assessment sessions or interviews could be relevant regarding the potential diversity of uses. For others also, this meant developing protocols or statistical methods to assess decision rules when they are link to various use contexts.

As already pointed out, the project manager learnt to become a mediator between researchers and regional engineers. Also such mediating role is actually a core competency for engineers working for a given domain within the Center, here it was more crucial as interactions with researchers actually challenges the networking skills of the regional engineers in a different way than their own manager. While researchers proposed participatory methods, their manager proposed them to be more market oriented. While the first ones spoke of service users, the second spoke of service sellers and buyers. As pointed out buy the self-assessment procedure developed within the project, this certainly hampers the work and remains a tension for the current phase of the project.

Project-to-organization

While a lot of new concepts and methods were apparently developed within the project which could really give strong basis for the design of new services, this remains within the project. The fact that a change in the project manager occurred in 2004 gave the opportunity to transfer the vision, some methodological and conceptual issues to others within the organization. The new manager adopted scenario-based assessment and participatory

methods. As well (s)he adopted the participatory perspective. Nevertheless, the organization did not really envision that this challenges their organization culture as far as their local networking activities were concern. Moreover it did not step towards a new strategic position among the professionals (farmers and extension services) with whom OILYOIL interact at local level in order to be able to develop sustainable crop management practices based on decision support services. The marketing culture and the transfer of technology one remains dominant while this was actually challenges within the project.

Case-study 2: the GMO project or setting-up GMOs field trials for biosafety[11]

A simplified Chronic of the case: The setting-up GMOs field trials for biosafety

By the end of 1994, the French Commission for Biomolecular Engineering (CGB) in charge of delivering authorizations for the experimentation and commercialization of Genetically Modified Organisms was confronted to the assessment of risks related to the cropping of Genetically Modified rapeseed resistant to an herbicide. At that time, industrial stakeholders and public policy makers estimated that GM rapeseed varieties would be cultivated on a large scale in Europe by 1998-1999 as it appears to be the case nowadays in the US and in Canada; several GM rapeseed varieties were submitted for market authorization in 1996. However, studies had shown that risks related to the use of GM rapeseed in agricultural conditions had not been fully assessed, since all field experiments had been conducted in restrictive conditions. To improve the assessment of risks, the CGB members were at that time looking for further research on risks related to the use of GM crops on a large scale, meaning particularly to develop field trial in order to assess flux of pollen and seeds in natural but controlled conditions[12].

First phase: assessing agricultural innovation: business as usual

In order to responding to CGB concerns about dissemination, OILYOIL initiated in 1995 a R&D program focused on the assessment of GM rapeseed crops in collaboration with two other technical institutes, in charge of beets and maize, in order to set-up what was called « experimental GMO platforms », researchers of public research institutes (INRA and CNRS) were also associated to this project. In three different locations in France (South, Center and East), GMO field trials were thus implemented by the end of 1995, associating different GM crops for the first time in the same experimental site, in so-called « agricultural conditions ». Three of OILYOIL's experimental stations were involved to carry out this program. Initially, the trials were set for 3 years, to produce data before the commercialization of GM plants. The scientific objectives were multiple but they were assembled in the purpose to assess the technical and economic characteristics of GM crops rapeseed, as well as to assess risk related to the dissemination of transgenes in the environment.

OILYOIL framed this research program as an answer to concerns of both public authorities and farmers since phenomenon of cross-polinisation between wild and domesticated species were known possible and had been a matter of discussions from year 1994. OILYOIL insisted very early on having a "neutral viewpoint about GM rapeseed", and to establish a clear

distinction from biotechnology firm strategy, in order to fulfill its mission of assessing the effective agronomic performance of new GM crops. Although documents from that period indicate some concerns over the reaction of environmental activists or public opinion about GMOs, the main argument for carrying out the GMO program was framed in terms of responsibility to farmers and oilseed producers: checking the agronomic benefit of GMOs. This motto has strongly shape the cognitive framework of people working in what started thus to become the OILYOIL GMO project and the rationale delivered by the manager scientific manager in order to justify a position towards claims.

Facing the construction of a new referential for biosafety rules and the threat of "ripping-up"

Initially set for 3 years, OILYOIL rapeseed field trials have been continued until 2003 without any cover-up since OILYOIL intend to act under public and stake-holders scrutiny. But the GMO project had to face many changes, as new objectives have been added through time, and it experienced troubles. Indeed, following the Mad-Cow crisis, just as OILYOIL field trials had been inaugurated in 1996, a public controversy over GMOs erupted in France and Europe and started to evolve in a public issue at both National and European level. In 1998, the perspective of a quick commercialization of GM rapeseed completely vanished, when Europe decided a moratory. In 1998, activists organized a first demonstration on a field trial but without any destruction, but in 1999 and 2000, field trial set by OILYOIL in a village of the South of France was ripped up by activists, and OILYOIL abandoned field trials. OILYOIL has subsequently engaged lawsuits in 2000 and 2003. With this legal claim, the issues about responsibility become therefore judicial, OILYOIL claiming that the activist behaviors were out of proportion.

Conditions for the structuration of learning process

Project practices

The GMO project was defined very early as a key and strategic project, meaning that the scientific director of OILYOIL took directly the responsibility of managing the project in close relation to the general director. The strategic character of the project evolved according to changes in context, shifting from an objective of assessing agronomic benefit and risk to a focus on environmental risk and biosafety. Moreover because the GMO project involved public researcher and CGB direct interests in risk evaluation, the scientific accountability of trials was a key point and OILYOIL had to elaborate more attention than ever on field trial protocols.

The ordinary practices of setting up agronomic trial were thus challenged by a high request of accountability and traceability. Moreover, the organizing of GMO field trials in at least three spots in France generated an attention to the synchronicity of action and the homogeneity of putting GM rapeseed in trial. A person was specifically recruited for that purpose and was assisting the scientific director and the engineer in charge of setting and checking protocols. At the local level of experimental station the GMO project was slightly bypassing the local structure of experimental farms. The ordinary procedure was that regular

agronomic trial were elaborated at a central level and then passed to the local director of the station who was then in charge of managing the implementation of agronomic trial among over. The GMO project tend to challenge this procedure since the strategic character of GM field trial accountability and the urge of reactivity installed direct flux of intensive exchange between the scientific director, the central engineers, the local station director and technicians at the work place counting seed and plants in fields or running and cleaning tractors for all seeds… Finally when field trial became a target for activists, the Regional engineer, the scientific director and the general director started to work regularly together in order to manage the crisis generated by ripping-up. From that moment a communication strategy was also designed by the general director in close relation to the national representative of the oilseed sector. This strategy issued the mobilization of new actors in the project since a permanent watch was realized on the subject and a web site open to FAQ and claims was initiated.

Knowledge integration

We already establish how the management of the GMO project was a matter of circulating and integrating knowledge about the How of putting GM trial in practices within a context of extreme scrutiny both from disclaimers and public controllers.

A second arena of integration was situated at the other side of the "chain of knowledge": the field trial itself. As a matter of fact, interviews and visit to the local station reveals that the ordinary practices of conducting trials in this context started to be extremely not ordinary at all. It is not that something particularly new was to be experimented in term of technical farming practices but much more that at the level of technicians - who are supposed "only" to implement protocols- setting new rules of bio-safety was at stake. They had to re-integrate at the level of trial-in-practice all the knowledge that was put in circulation directly in and around protocols but also according to a precautionary attitude to address problem in order to created or make the rule adequate to sometimes very simple techniques of cropping. Heavy to carry was the cognitive effort of assessing ordinary experimental practices and reporting as much on the way of "doing things" as on the result of trials. The integration of knowledge at that often called basic level and the quality of this integration had been crucial since the public controversy and the scientists or risk experts were more challenging the quality of trial results than that of protocol design. The cognitive load on technicians at the local level was revealed in our empirical work when we established that differences occurred between experimental spots not because of differences in skills nor protocols but because of differences in the local context since ripping-up occurred only in the South experimental spot.

Finally an other level and issue of knowledge integration about conducting field trial was clearly initiated by the decision to sue activist since OILYOIL was exposed publicly to media and therefore to the extreme attention of oilseed producers and to that of Ministry of Agriculture. Facing this kind of "hot situation", setting up public and back-office discourse requests to assemble information about experimental practices into a consistent narrative of the GMO project itself.

Project autonomy

As we already presented it the scientific manager ran the GMO project at the central level. At the time of starting the GMO experiment program OILYOIL people had never really experienced a large project organizational form bridging local activities in stations with central practice of running protocols and relation to the environment paying attention to quick evolving context. It is important to mention that the engineer who was recruited to assist the scientific manager in order to run the project became responsible of setting and running the Project Evaluation Unit. So then the GMO project has been also an opportunity to enter in a new organizational design where the meaning of project changed and shift from something close to a scientific conception of project as a way of producing science base knowledge for farmers to a managerial conception of project as a unit of action productive, accountable and related to the core strategy of OILYOIL. In depth interview with the scientific director and with the engineer established thus that the autonomy of the GMO project within the previous structure of OILYOIL was very high and it was common sense that this was strategic and obvious reason: GMOs!

It appears today particularly interesting to notice that the high level of autonomy of the project also tends to isolate the project practices from regular practices and developed a kind of organizational double bind. For the outside, experimenting GMO in field trial was advocate as something certainly risky and necessary but as something mobilizing the ordinary capacities and competence of running agronomic trials. But, in the inside, nothing was so usual firstly since experimental activities were not run within the regular framework of responsibility system but directly by the scientific manager and secondly because the challenge on engineers and technician was particularly high because of the controversy.

The second dimension the project autonomy is that the set of scientific questions that composed the GMO project was linking the field trials to a network of scientists involved at INRA, at CNRS and at University in the research on various aspects of the GMO existence. Moreover the GMO project was clearly highly challenged by the CGB – the National Commission notably in charge of ruling field trials and commercialization of GMOs- who institutionally relayed on some of the results of the OILYOIL GMO project to establish rules of trials consistent with the practices of agronomic experiments. Simply the fact of setting and realizing GMO field trial in a context of controversy became a matter of concern, whatever the results of those trials could be if we can put it to an extreme.

The conditions for learning

The practices of the GMO project were put particularly at stake in the context of controversies about biotechnology in general and the safety of field trials on one side (Joly et al., 2000; Marris, 2000; Roy, 2001) and also because that concern has been a major subject of scientific uncertainty and controversy, even though public regulations had been set up in the early 90's at the European level in order to define rules for experiment (European Directive 90/220) in relation to the boom of biotechnology (see the analysis of the EU regulation by Levidow et al. (1996). At the cross-road of this public and civic space of requirement for biosafety, the professional responsibility of GMO project members was paradoxically

addressed: unchallenged on one side because setting-up field trials was business as usual in ordinary practices of agronomic R&D thanks to a series of technical devices and stable professional norms that belong to a tradition of public agricultural engineering; and challenged on the other because the controversial character of GMO trials appears to put experimenters in the maelstrom of issues about precaution[13] when their practices intend to establish the boundaries of risk. This tension was present in all the areas of the GMO project from the field place to the strategic arenas of communication to the public.

Project-based learning effect

Learning within the project

A first important learning process took place with the incremental elaboration of Best Practices for experimentation in order to face the formal and technical definition of biosafety as requested by the general framework of Directive 90/220 and by the CGB. Inspired from quality management procedures, this « code for best practices in experimentation » sounded like a formal response to safety requirements but project members firstly conceived it as a guarantee for high quality of data and results in field trials. This code was elaborated by OILYOIL and approved by CGB as an essential component of the experimental protocols that were submitted to this Commission.

The elaboration of this code emerged from a major shift in the status of agronomic trial. This shift occurred because of the double civic and public attention to safety, field trial passing from a place that plays the role of persuading farmers and advisors by a visual experiment (Henke, 2000) to a place defined by its contribution to risk assessment with no "direct clientele" but under the scrutiny of Public authority Agronomic experimental work, especially in the case of GM field trials, requires experimenters to deal with ambiguity and local contingencies. Thus, the attempts to standardize the interpretation of safety rules had to integrate local adaptations. It is important to keep in mind that agronomic experimental work is structured in order to allow flexibility in the implementation of experimental protocols. As a consequence, experimenters play an important role, not just as basic data producers, but also as co-ordinators of various technical and scientific objectives since the objectives of GMOs platform trials were multiple: assess the agricultural characteristics of GM crops, assess the risk related to cross fertilization between different GM varieties, assess the dissemination of transgenes in the environment. The justification of this adaptation was not only invoked in reference to a lack of regulation standards but clearly as a prolongation of an ethos of agronomic trials.

In our interviews, experimenters insisted that they experienced many difficulties, especially during the first 3 years of the trial. Most of these difficulties concerned the application of safety rules, as a result we acknowledge for variations in rules implementation: some rules were interpreted in a maximalist way to avoid ambiguity, some rules were simply impossible to apply and then translated into alternative practices and others could appear contradictory to field practices but nevertheless implemented in compliance to regulation.

This set of new practices and constraints in experiments, such as safety rules and increased traceability, was positively valued by experimenters. Even the *code for good practices...* which was first seen as a burden by experimenters, was progressively considered as a normal feature of experimental work and even integrated as a part of professional values of the community of practices of GMO field trials: « *When you've been working for 15-20 years as an experimenter, you produce things, but people can only rely on what you say... And then, somebody says 'Okay, prove it'. Then you would like to say 'well it's my job, don't you trust me?' So traceability has become sort of a custom, a work habit. (...) It's a good shield, you can show what you've done, you can show that you've done what you say. (...) Experimental work is something square, so adding another layer [of rules] is not a problem. It's not complicated; it's a good natural thing.* »

The process of proceduralization and collective interpretation of safety rules took a step further in 1999, when the Ministry of Agriculture decided that agents of Regional Plant Protection Services would control the application of safety rules in GM crops field trials. From 1999 on, annual audits were performed by Plant Protection Services, and completed the usual internal audits. For many, this experience was stressful: internal audits had become common, but external audits were totally new. They feared that the application of external standards put into question the quality of their work. Actually, Plant Protection Services interpreted rules differently in some cases, but close discussions allowed OILYOIL and Plant Protection Services to agree on common interpretations.

The proceduralization of rules represents thus a shift towards a collective responsibility towards GM field trial since it supposed the existence of good practices at the Place of the trial and a general compliance of conducting trials along all the activities of OILYOIL concerned by those experiments.

A second important learning process concerns the exposition of field trials practices to public scrutiny and the retroactive effect of this exposure on sense making within the project. Information about trials is published in town halls, as required by the Law. « Public Information Forms » do not indicate the exact location of the trial; they are short administrative forms indicating in which town the trial is implemented, define the varieties experimented and contain an excerpt of the opinion delivered by the CGB. Since the exact location of the experiment is not given, experimenters have to visit neighbor farmers to explain that they cannot plant rapeseed, or that they will collect wild seed of rapeseed or similar garden crop in their field since the experience about risk of GMO dissemination implies to consider that dissemination could be possible and even effective. The real-life risk assessment of GMO possible dissemination becomes thus immediately a public local affair in the area of the place of the trial.

Our interviews show that engineers and technicians actually had to deal with some of the core issues of the controversy, both in their daily work and with their local environment. For instance, they faced conflicting options about the publicity of the trial at the local level (issue of transparency vs. Opacity: « *the problem is... you're in a field, doing your work, and then a farmer arrives, asks what you're doing. Then you start talking about GMOs, but you don't*

know the person, it can be anybody... At the beginning, it was okay for everybody to talk about GMOs, but after a few years, with destruction, going to court... (...) We try not to enter into debates. »). This kind of experience conduct to difficulties to make sense of possible conflicting engagement of responsibility in the civic or professional repertoire: « *you don't feel good. It's the same with your neighbor, you're not proud of what* you *do. It's like somebody who was involved in the mad cow crisis, he doesn't feel good. If my neighbor asks me 'what are GMOs?', what can I say? You can talk about genes, DNA and stuff, but when you talk about inserting animal genes into plants... Usually I say 'I wonder about it, just like you, but if I don't do my job, Monsanto will!'* »). Then, a comparison between teams of experimenters in different locations, at different periods of time – before and after the emergence of the controversy – allows us to account for the construction of different patterns of responsibility in practice that cross the internalization of the safety of trials within professional responsibility.

Project-to-organization effects

We had been particularly astonished to notice during our survey and meeting with project members that the GMO project had been put aside of the organization, meaning that those who did not take part to it were poorly informed of the reality of conducting field trial in a controversial and performative context. Even though we circulated the result of our sociological enquiry among project members and outside we did not gathered much feedback apart from the fact that the sociological account was realistic and of very good quality. The meeting we had with the scientific manager and the director did not issue any new purpose on learning though we had negotiated this purpose as the general framework of our study.

We, of course, tend to explore even with members of OILYOIL the reason of that tendency to organizational forgetting despite the fact there is still a European project going on co-existence of GMO and non-GMO cropping. We did not yet empirically explore the possible answers to that fact, but we conclude that the richness of what was experienced by project members clearly stick to the GMO community of practices within OILYOIL and do not affect or even possibly concern of interest those who work on other projects. It seems particularly paradoxical that the important role played by OILYOIL in setting the rules of biosafety is not valued that much inside the organization when the performative context of the GMO project is high in the agenda. Our hypothesis is that this has something to do with the inner contradictions of the neo-corporatist compromise in the French agriculture as exposed in a previous section which is perhaps not able to absorb an already strong divide about GMO in between farming communities in the institution of agriculture R&D…

Project-based learning in-between: some commonalties between the two case-studies

Before reflecting on those empirical materials and results, it is worth say that the two studies correspond to disruptive learning since project organization is geared by the purpose of creating singular solution (Grabher, 2004: 1493-1494). Nevertheless both projects practices

relay on ordinary settings and practices of R&D in agriculture, moreover disruptive learning is largely due to a performative context in the case of GMO. But it is important to notice that OILYOIL is not a fully project-based organization, a characteristic which is for us important and in favor of addressing the issue of project-based learning because actor of the project do not have necessarily a life in the organization which is based on a cycle of projects, many of them belongs to functional level and therefore are taking part to project as resource-person.

A second important organizational feature is that OILYOIL developed a purpose of project-led organization at the time those two cases studies were unfolding. So then, if not designed within a pure project-management framework the two projects we have been studied progressively stepped into the world of "projectification" particularly because the Project Evaluation Unit and the Quality Department started to be active during this time. If we simplify the situation we can describe a divided organization in three sphere of activities: one part of activities taking place at site level and being embedded in region and local order of the neocorporatism we have described earlier; a second part dedicated to the development of managerial instrument and infrastructure at the central level; and a last part largely involved in mangling a flux of ideas and information into competencies and project thanks. In this context it appears particularly interesting to consider how the projectification of the organisation impose a rationalization process in the entire organization but is not necessarily empowering transfer of project-based learning to the organization.

Thirdly – and this point has not been much underlined yet- if projects do have roots in division of practices and relay on the combination of skills for delimited objective, the self mobilization of person within the project represents the first step towards learning process in the project and this represent a fundamental path-dependent source of effects. "What are the capabilities that an organization can offer to project" seems to us a symmetric issue of that of "what is the transfer from project-based learning to organization". Both cases particularly well document the attachment of project to ordinary practices, which will still be there after the end of the project.

Forth, another common characteristic is that in those projects the relations established within the organization are as important as the relations engaged with actors in the "outside world". We underline in both cases the role of the context, using the notion of performative context to indicate that what happens in the agricultural sectors as a whole is having effect in projects. It seems to us that this kind of situation represent an interesting empirical matter of facts since the "ordinary" tension between learning at the project level and organizational learning is also containing a contextualized tension existing between the organization and its environment and that these external tensions are crossing or are even at stake in the goals or the practices of R&D projects. Within the neoinstitutionalist program of Grabher (2004:104) on Project Ecology the issue of learning in R&D project would thus be that the ecology of projects – and its corresponding various social forms of life in projectified organizations- not only "*denotes the ecology of organizational logic and socialized identitie*s" but is in co-evolution with it, and perhaps until the last barrel of petrol... What we indicate here is that project-based learning is not the inner part of a Russian puppet but that there is a triangulation between the project, the organization and the environment. In the GMO case for example it is

extremely important to see that project learning about the proceduralization of safety rules directly affect and event transform the environment of the organization while setting new rules for GMO field trials at the National level, when the GMO project has not yet been an issue or even disregarded at the organizational level. We have here the symmetric question of "what can an organization offer in order to transfer skills and passion for learning to project?": "what can an organization offer to empower, enable, facilitate, etc. organizational learning based on project learning?".

Finally, in both cases we acknowledged for project learning based on delimited areas of practices confronted to the exploration and boundary work at stake in projects. But we also notice the quasi absence of transfer of experience and learning acquired within the project to the organization. This would not be so important if one refuse to adopt a normative position towards learning boundaries (Scarbourgh et al., 2004: 1596). But we have to face there a paradox since what was explored in those projects is directly and explicitly linked to strategic issues of the organization. Project-based learning in these two cases show an expansion of s boundaries of knowledge within the project group but a very limited expansion and sharing of experience at the organization level. Our results tend thus to confirm that project-based learning tend to stick to changes in the division of practices despite a framework of project-organization in progress, but do not evolve towards organizational learning. Anyway should it be?

Concluding remarks

Remark 1: possibly an Organizational Learning Paradox

With the expression "Learning agency at organization borders" we intended to signify various properties of project practices: firstly we mean that, within the kind of project under studies in our case – says R&D project, they are not completely bounded within the formal limits of the organization, secondly that R&D project practices are permanently exploring through an organized boundary-work the kind of heterogeneous assembly that is going to fit to the problematization raised by the existence of the project, thirdly that those practices are fundamentally a mix of ordinary and routinized practices and of emergent idiosyncratic practices that may or not have a career within the organization. Looking at project in order to explore their potential agentic effects on learning and leads us to consider the issue of boundaries of project-based learning and the manifestation of transfer to organization.

We thus consider that the lack or weakness of transfer from project to the organization (the career of a new practice outside the agency of the project) represents a significant phenomenon of organizational life in project-led organization. Particularly when the goals and purpose of projects are deliberately challenging the overall goals and institutional missions of the organization in which they take place. We face here possibly an Organizational Learning Paradox.

Remark 2: transferring knowledge from project to organization is a political question of organizational change

The kind of knowing process - and possibly learning process- that agent enter within this kind of project (the conditions for learning) put them at the border of organization, in the sense that the search and problem-solving attitude they adopt is positioning them more or less collectively in a position where learning from the project experience request them to make sense of this experience in relation to the goals of the organization in the neocorporatist context that we have described and which tend to heavily question the consistency of its goals. What is thus experienced in project is having potentially agentic effect if referred to the organization itself. The relation between learning in project and organizational learning at the level of organization become then dialectic become it contains a tension between the identity of people and collective that results from long term project and the action of transmitting which suppose that such a group or collective could use such an identity as a transformation force within the organization. In our views introducing the triangulation of learning between project, organization and environment tend to transform the issue of transferring knowledge from project to organization into a political question of organizational change.

Remark 3: the more discourse about knowledge, the less the passion to empower learning

Our intention in this communication was to open the possibility of studying that kind of phenomenon, which appears to make the study of learning and knowing in projectified organization quite complex. Taking this as a practice-based oriented research purpose requests a certain kind of empirical enquiry based on long run contacts with agents based on empathy with agents and detailed description of projects on at least three or five years. Simultaneously the stimulating issue of project-based learning has emerged (DeFillipi, 2001, Scarbrough et al., 2004) and we had the feeling of running after Science when one can easily notice in the recent literature that the link between the theory and practice of activities within project and the theory and practice of learning in organization seems to be on the agenda. We therefore try to understand to which extent such a knowledge organization offer resources to allow individual commitment in collective experimental project in order to empower knowledge creation. Meanwhile we acknowledge for a tendency not to support any organizational learning practices, which would follow project-based learning. The confrontation of our empirical materials to the Organizational Learning literature of practice-based approaches leads us to frame some critical propositions to analyze learning processes located in the division of practice or at the borders of organizations. Moreover we explore the possibility of a paradox of the Mode 2 society : the more discourse about knowledge, the less the passion to empower learning.

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4 A general purpose based on structuration theory putting that "*activities making up an organizational learning process would be enabled an constrained by existing structure*" (op. cit., 1048) and that "*organizational learning can be interpreted as a process of structuration, by which practices get changed and which itself changed in practices*" (op. cit., 1052)
5 In order to understand our perspective let's think that the software industry, construction sector, and advertising factory would have to face controversial social mobilization meaning that not only daily practices on project would be difficult but that the objective and modalities of the project would be a matter of negotiation…
6 As mentioned here after the "sector" haw been for a long time an arena of redistributive negotiations and sometimes conflicts, but the reason of why enforcing modernisation has never been challenged until controversies occurred.
7 Para fiscal taxes on products that support the National Fund of Agricultural Development (FNDA) have been abolished because of compliance to European common rules, and replaced by voluntary contribution. A new agency of Rural development has been created to elaborate, fund and follow up a national programme of agricultural development (J.O du 31 décembre 2002).
8 This organization is serving French oilseed growers but its activities are also geared towards the public interest for environmental food-safety concerns. The main crops involved are rapeseed, sunflower, soybeans and linseed and are managed in specific supply chains by the professionals of the oilseed sector. All French oilseed growers contribute to funding this organization which also gathers some public funds for Research and development programmes. It is concerned with everything. It aims and R&D is largely dedicated to bring new solutions that enhance the value of oil and meal paying more and more attention to sustainability in agriculture.
9 Meaning the two research projects were designed and negotiated separately though we shared a common research culture of practices based approach and research-action orientation, see a collective manifesto in Cerf et al., 2000). Projects are said to be independent because each of them do not relay on the realisation of any tasks of the other, moreover productive goal and purposes are different. Nevertheless actors involved in projects are sharing organizational resources a common contextual reality like in any adhocratic knowledge organization.
10 Rationalizing crop management at the farm level is often based on intensive use of pesticides by farmers who might prefer to prevent a pest attack in order to maximise the profitability of crops (pesticides costs are lower then losses due to yield reduction after a pest attack). Nevertheless this decision is based on a limited level of epidemiological information on biopests population dynamic at the micro-regional level while regular use of pesticides can diminish their efficacy against a given biopests
11 This section relays largely on Barrier (2003) and on Barrier and Barbier (2004).
12 We simplify here the work done by Roy (2001) and Joly et al. (2000).
13 It is to be noticed that we never asked directly to the people of OILYOIL whether they were pro or cons biotechnology or GMO trials. But it was suggested in many occasion that some of them were not in favour of using biotechnology in cropping system but found particularly necessary to assess environmental risks and in a way could be professionally proud of doing it in a precautionary purpose. The ripping-up of trials was therefore a heavy momentum for them because it sounds like a denial of their own capacities and responsibility of conducting properly those trials.

ACCESS: How one gain access and consequences for learning

Dorthe Eide Bodø[1]

Comment: Here is included only the extended abstract. The full paper can be requested
by e-mailing the author. Comments welcome.

Extended abstract:

This paper is inspired by the practice based turn to organizing, knowing and learning. One can argue that, even when doing basically the same kind of work (profession, occupation), there can be rather large differences in what is learned depending upon *the kind of access* to work performance and development of the practices, which are 'given' by the others and the organization. The following thesis is elaborated: ***What and how one gain access are vital for the individuals learning to become and remain capable and committed actors, and for collectives learning***.

Based upon an ethnographic inspired hermeneutical study in four hotel organizations, core dimensions and typologies of different kinds of accesses are suggested, illustrated and discussed. Different kinds of access structures, opens up for, or hampers, what and how one can become, know, care(for) and hence learn as individual, but also it can structure the up keeping and innovation of the services/products, organizing, identity, etc. of the collective (section, team, organization) within and across sections and hierarchical levels.

Based upon the cleaners work there seems to be at least two core kinds of dimensions:

- **Dimension 1:** *The degree of access to varied tasks, self-organizing, and to new/different experiences.* In addition to varied tasks and to different experiences, there can be sub-dimensions such as: access to autonomy, flexibility, spontaneity and hence self-organizing. Strong standardizing in regard of what, how and when can represent low such access. High access to work experiences in the form of participation in more than one section can increase the becoming and the knowing about the organization and understanding of how the organization works (part-whole relations). Such across sectional work experience and understanding can increase the will and ability to interact and cooperate across sections and hierarchical levels. E.g.: Male employee: "If you do not know, it is easier to jell at others".

- **Dimension 2:** *The degree of access to participate in the development (up keeping and/or also innovations) of social practices:*
  a) Within the sub-unit (e.g. section, team, CoP) and/or;

b) Across sub-units and hierarchical levels.

Within dimension 2 are access to formal and/or informal arenas of relations-with and dialogue where one can:
- Express and process on experiences, ideas and views;
- Negotiate and construct (meaning, practices, products, identity, power) based upon experiences, ideas and views;
- (more or less) follow up the constructions in later actions, i.e. within here lays also different degrees of access to decisions and power.

Some arenas within and across sections may be informal arenas where one share experiences and might construct meanings and solutions, however the actors might not or only in a limited degree have access to make the decisions needed to follow it up (i.e. what has been processed on and constructed) into in-use action. Then the learning process may stop, be 'lost' and wasted, and in the worst case they can turn into negative talk and spirals.

Denied access in dimension 2, can be experienced even when there are arenas to bring up experiences and ideas, but when trying to participate in the development one tends to be related-with by the other(s) in excluding ways:
- **Passive ignoring,**
- **Counter arguments,** ending in hopeless 'battles' where one never or seldom really get to be an influencing 'voice';
- **Being 'punished'**, e.g. the other get angry, starts scolding or blaming

The tendency of experiencing not being listened to, understood and involved by others seems rather usual in organizations, independed upon being in privet or public sectors. *How to understand this? Potential reasons are discussed.*

Within both the two core dimensions there can be different degrees of sub-dimensions (not least access to: information; other people, and their experiences and knowing; to social support and care; new ideas; needed equipment and other resources; breaks).

Each of the two core dimensions can be considered on a continuum from very low to very high. What is high and what is low is however not a simple question, as it seems to depend upon the person, the occupation, organization, trade, time and other situating issues. When the two main dimensions (continua) are held together they make up an array of potentially nine ideal types of different kinds of accesses and hence different learning communities.

Empirically the paper starts out with the cleaners work. I suggest that the two main dimensions, and the sub-dimensions of access can be useful also in the study and understanding of other occupations and actors (individuals and collectives) organizing and opportunities for, and processes of, learning. The illustrations and discussions expands into a wider context, first by comparing with front line employees, by comparing across organizations not least in regard of management; as well as in regard of others studies and literature.

Identity and power both structure access and hence learning, and identity, power and access can be part of what are experienced, processed on, negotiated, constructed and hence learned. Does one have to stay only in the periphery (e.g. only clean bath rooms), or can one really participate (in task across sections and in developments of the practices)? Gherardi (2000, p. 4) argues: "Participating in a practice is consequently a way to acquire knowledge-in-action, but also to change and perpetuate such knowledge and to produce and reproduce society". One could further add, 'and hence also to the maintaining and innovation of society or organizations'. Wenger (1998) uses the term access, and elaborates on some dimensions. One can argue this paper partly support and partly extend the practice based (streams) claim about the role of the organizing and degrees of participation for learning and knowing. One potential difference is how my study elaborates not only about the role of access to tasks and identity within the CoP, but also to different activities across sections and hierarchical levels. The study also elaborates on power and emotional sides of access and learning, which are two phenomena that have been given less focus in learning theory, also in situated learning theorizing. Limited access tends to bring frustrations, tensions, and conflicts; or can 'blind', so that care and passion may fade out, and only carelessness grows. High degree of access to participation tends to increase knowing and learning, but also the experience of being: appreciated (as a knowing and learning person), involved and cared for, which seems to nurture the will and desire to know, learn, trust and care.

Endnotes

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Knowledge: distributed and impassioned

Piers Myers[1]

Introduction

This paper discusses the place of emotions in knowledge and knowing and, in particular, how emotionally charged interactions are integral to the knowledge that is possessed and employed in a distributed form in organizations. Learning, the development of knowledge, can be regarded as one variety of knowing, not so much imbued with varying degrees of 'passion' in the sense of enthusiasm, but rather 'impassioned', potentially suffused with the whole range of emotions. The paper is primarily conceptual, but considers the case of Enron to illustrate the implications of the argument presented. There is a focus on the knowledge in schemata, top-down models of the world enacted by individuals, groups and organisations and seen as central to sensemaking capability. These are often referred to as cognitive schemata, but there has also been support for the view promulgated here, that they are affective too, with thinking and feeling intertwined in the sensemaking process. In addition, there has been longstanding debate regarding whether organisational cognition is an aggregate of individual cognition, or whether the schema concept extends to a collective level (Lant, 2002). This paper adopts the latter viewpoint and argues that distributed schemata add further layers to the emotional as well as the cognitive anatomy of sensemaking, and are inherent in other forms of knowledge and in learning processes in organisations.

Impassioned sensemaking

Over recent decades many accounts of organisational knowledge have focused, firstly, on the distinction between tacit knowledge and explicit knowledge and, secondly, on the degree to which group or organisational knowledge can be considered separate from individual knowledge. Explicit knowledge can be articulated, for example through written or verbal communications. Tacit knowledge or 'know-how' is associated with capability. Nonaka (1991) and Nonaka & Takeuchi (1995) cite Polanyi 'we know more than we can tell'. While Nonaka & Takeuchi make no clear distinction between the nature of knowledge at individual and group levels, other authors do (Nickerson, 1993; Orr, 1990; Spender, 1996). In particular, the framework put forward by Cook & Brown (1999) distinguishes four categories of organisational knowledge. Individual explicit knowledge comprises concepts, facts, information, protocols and categories, while group explicit knowledge comprises, for instance, shared stories, jargon, and tropes. They propose that tacit knowledge can likewise be considered on both individual and group levels. For example, skills are individual tacit knowledge, whereas shared physical and social artefacts such as communication genres, workspace use, and heedful patterns of social interaction (Weick & Roberts, 1993) are group tacit knowledge.

There has been considerable debate about whether the concept of tacit knowledge as developed in management and organisation theory reflects Polanyi's earlier work (Tsoukas,

2003). Nevertheless, Nonaka and Takeuchi's work remains influential. The present paper takes up an aspect of their work, that they label the "cognitive dimension" to tacit knowledge. But the paper also extends this concept both in the light of Cook & Brown's framework and by viewing organizations as emotional arenas (Fineman, 1993, 2000). In his 1991 paper, Nonaka postulated that tacit knowledge has two dimensions (see also Gourlay, 2002):

> Tacit knowledge consists partly of technical skills - the kind of informal, hard-to-pin-down skills captured in the term "know-how." A master craftsman after years of experience develops a wealth of expertise "at his fingertips." But he is often unable to articulate the scientific or technical principles behind what he knows.
>
> At the same time, tacit knowledge has an important cognitive dimension. It consists of mental models, beliefs, and perspectives so ingrained that we take them for granted, and therefore cannot easily articulate them. For this very reason, these implicit models profoundly shape how we perceive the world around us. (Nonaka, 1991: 98)

While Nonaka himself uses the term 'implicit models', the tacit knowledge identified in the latter paragraph consists of 'schemata' (Harris, 1994; Neisser, 1976; Walsh, 1995) or 'knowledge structures' (Nisbett & Ross, 1980; Walsh, 1995), which allow the interpretation of organisational contexts. It is unnecessary to follow Nonaka in describing schemata as a dimension to tacit knowledge that is separate from the skills or 'know-how' with which tacit knowledge is often identified. An alternative treatment (Neisser, 1976) is to regard perceiving itself as a skilled performance, so that schemata can themselves be considered know-how. Nevertheless, schemata are of particular significance because they play a central role in the architecture of many other forms of tacit knowledge: perhaps all skills entail ongoing sensemaking. In this context it is worth noting that the knowledge in schemata is not only or simply an asset. Schemata constrain as well as promote sensemaking and decision taking.

Although schemata are often described as cognitive (Neisser, 1976; Weick, 1979), both interpretations and the interpretive process can be shot through with affect. That is, emotions and moods influence how situations are made sense of (Coutu, 2002; Hirschhorn, 1988; Vince, 2002) and frequently permeate the sense that is elicited (Fineman, 1993; Shrivastava et al., 1987). For example, a schema for new technology might lead staff to understand the adoption of a software package as either a burden, a challenge or an opportunity (or much else besides of course), understandings both infused and influenced by emotions such as apprehension, trepidation, determination, fear, excitement, frustration, pride, envy, etc. So this sensemaking aspect of tacit knowledge is affective as well as cognitive.

Schemata can be regarded as having content and structure (Walsh, 1995). The structure mediates how content, such as categories, norms, values, beliefs and symbolic meanings, interrelate and operate. Both content and structure have affective qualities. For example, the *content* of a schema for understanding executive behaviour might include an open office door as a symbol either of an invitation to talk or of being watched, laced in either case by appreciation, respect, disdain, fear etc. Equally, beliefs and values pertaining to executive behaviour may be emotionally charged. In addition, the schema content might itself concern

emotions. For example, it might include norms concerning the emotion work or emotional labour of executives and, no doubt, categories with respect to emotions expressed and their possible consequences. Different aspects of the content of schemata often imply contradictory interpretations of a situation. Here the *structure* of schemata can preserve coherence: in any situation in which executive behaviour is made sense of, certain interpretations implied by sections of the schema content will be evoked, while less weight is given to other content. But this too is likely to be a process influenced by passions. In interpreting an executive's decision to make staff redundant, feelings of optimism, depression or excitement could affect the weight given to values for consideration and for decisiveness in leadership, and hence the adoption of malign or benign interpretations.

In what sense are schemata *tacit* knowledge? In organizations, as elsewhere, people frequently cannot say what values, categories, beliefs etc they have applied in order to make sense of situations. More fundamentally, sensemaking *depends* on maintaining only a subsidiary awareness (Tsoukas, 2003) of the schema structure. The extent of this is ably demonstrated by the research of El-Sawad et al. (2004) that tracked the serial emergence of dissonant interpretations during interviews with personnel, without the subjects having any apparent cognisance of these contradictions.

Distributed sensemaking

There is now a body of literature to support the notion that schemata can be regarded as not just located in the individual but also pertaining in distributed form to the group or organisational level. Various terms have been used for such distributed schemata: organizational frames of reference (Shrivastava et al., 1987); negotiated belief structures (Walsh & Fahey, 1986); collective beliefs (Langfield-Smith, 1992); cognitive structure and process (Schneider & Angelmar, 1993). Here, too, schemata have a structure, much of which is external to the person, embedded in emotionalised power structures, rivalries and politics, as well as artefacts of communication and social routines. Again this is tacit knowledge in the sense that both the content and the structure of these distributed schemata may be unrecognised and, in any case, the operation of such a schema depends on a lack of foreground awareness. Psychological contracts can be regarded as schemata (Rousseau, 2001) and in this sense tacit knowledge. But a richer account of psychological contracts in practice is that they are distributed schemata. The social structure of a distributed psychological contract ensures that feelings and thoughts entailed in met or violated obligations are fostered, evoked, suppressed or crushed in social interactions with others. In terms of Cook and Brown's framework, both individual and group tacit knowledge have a sensemaking aspect that is infused with affective as well as cognitive processes.

The interplay between emotion and cognition here is complex. Emotions are part of the structure of distributed schemata, influencing the way that some schema content is applied, and some neglected. Organisational or group interpretations, the outcome of distributed

schemata, may entail not only understandings infused with emotion but also affect-laden ongoing conflicts over understanding. Feelings can also spread without awareness through a group via emotional contagion (Barsade, 2002). In any case, interpretations resulting from the emotional structuring of schemata may themselves lead to a strong emotional response that impact on future rounds of sensemaking (Greenberg, 1995; Isabella, 1990). Moreover affect also informs the tacit sensemaking capability of groups and organisations via social processes that either avoid feeling (Bion, 1961; Hirschhorn, 1988; Menzies, 1988) or respond to feeling (Fineman, 2003a; Frost, 2003; Huy, 2002).

The case of working life at Enron prior to the collapse of the company illustrates the pervasive influence of distributed schemata. For example, the system of employee appraisal that became known as 'rank-and-yank' (Fusaro & Miller, 2002) evoked a web of sensemaking. To regard the sensemaking surrounding the rank-and-yank system as a distributed schema is to associate emergent understandings of organisational context not only with individual cognition and affect, but also with social and other artefacts that allowed the understandings to surface. Central to the rank-and-yank system were Peer Review Committees that would meet every six months. These committees would rank employees on a forced curve, which meant that 15% of employees would have to be given rank 5 and redeployed, in most cases out of the company ('yanked'). Cruver (2002) has written a personal account of the Enron debacle. With exquisite irony, even as the corporation approached financial oblivion, he was part of an Enron team developing financial products to protect companies against third-party bankruptcy. Cruver set out some of the other rank-and-yank schema content that informed sensemaking. These included 'cutting a deal' between employees to exchange positive feedback, managers 'trading' the fate of employees so that the forced curve could be maintained, and the 'No 5' classification with associated emotions of fear and shame.

According to Fusaro & Miller, the 'rank-and-yank' system led to a proprietorial attitude to new business and 'an environment where most employees were afraid to express their opinions or to question unethical and potentially illegal business practices' (p52). There was also however a prevalent interpretation, infused with pride, that Enron had an elite workforce, characterised by innovation and teamwork. Jeffrey Skilling, Enron's then CEO, explained the 'rank and yank' personnel evaluation process in May 2001:

> We needed to bring in people who could handle their boss being transferred in their third week on the job and their business being restructured in their sixth week.... If you're creating something new, you have to make sure *everyone's working together and aligned...* If I have 10 people reporting to me, when you change an organization, I can guarantee you maybe four people get it. Three probably say they get it but they really don't, and there will be four who are actively hostile to what you're trying to accomplish. (Cited in *Los Angeles Times*, January 27, 2002, emphasis added)

As a distributed schema, rank-and-yank interacted with other domains of interpretation within the company. Thus Cruver details how it was enacted in the Risk Assessment and Control section of Enron, the department responsible for assessing the viability and

profitability of contracts. The interpretations manifested in this department of the yields from new deals directly impacted the bonuses of senior managers whose views could be fed into the Peer Review process. So staff in Risk Assessment and Control were subject to intense pressure to inflate the value of deals, and this pressure yielded the required outcome: grossly inflated earnings estimates. Here, while cognitive models charged with pride, fear, shame and greed are structured in such a way as to allow sensemaking to be disambiguated at an individual level, at a collective level these processes mingle with power/authority relationships and office politics heated by these same feelings to give credence to certain ways of seeing the corporate environment, and not to others.

Conclusion

Fineman (1997) describes management and organizational learning as emotionalised in two ways. In the first place, emotions can interfere with or contribute to learning (Argyris, 1990; Coutu, 2002; Fineman, 1997; Vince, 2002). In the second place, learning is an emotional process (Fineman, 2003b; Pratt & Barnett, 1997; Salzberger-Wittenberg et al., 1983; Snell, 1988). A third aspect discussed in the literature is that emotion work and emotional labour can themselves be learnt skills (Fineman, 2003b; Höpfl & Linstead, 1997).

On the other hand, Cook & Brown make the point that seeking new knowledge is itself a form of 'knowing' (Blackler, 1995), interacting with the world using knowledge, individual and distributed, explicit and tacit, as a tool. If learning is identified with seeking new knowledge then the relationship between learning and emotion is reframed:

1. New knowledge that is learnt, not just knowledge of emotions, is itself likely to be impassioned; at least insofar as tacit knowledge is involved. Tacit knowledge entails schemata, individual and distributed, which are affective as well as cognitive domains.

2. Learning, and indeed failure to learn, draw on established knowledge that is distributed and impassioned. From this point of view, passion in the learning process emanates from (tacit) knowledge and, in particular, impassioned schemata employed in the learning.

This means that learning incorporates not merely a linear affective spectrum ranging from lack of passion to passionate enthusiasm and commitment, but the full gamut of passions such as trust, love, joy, excitement, hate, irritation, envy, shame, and so on.

At Enron, Cruver described the beginnings of learning to see Enron's modus operandi in a new light:

> What Middleton dumped on me that day was the systemic reality of the magnificent Enron – that if the people in the business units wanted to survive the PRC [Peer Review Committee] process and meet their personal bonus targets, then they often needed to inflate the deal value (which was the estimated value of future cash flows from a deal)... based on commodity prices that were pulled from someone's ass...
>
> When I reached my desk I pulled up the Enron press releases for the big EES deals. I remembered in 1998 when Enron signed one of the coolest deals imaginable. It was the deal that first ignited my fascination with Enron and the deal that first shaped my eagerness to

work there... after I reread the details of the Pacific Bell Park deal, I started to feel sick. (Cruver, 2002: 79-82)

Clearly, here, new explicit individual knowledge is gained, but it is via a tacit sensemaking process drawing on previous knowledge that Cruver views deals as 'pulled from someone's ass' and re-views 'one of the coolest deals imaginable' as sickening: previous eagerness informs present contempt and disgust.

Finally, it should be noted that this paper has examined sensemaking knowledge through the prism of individual and distributed schemata and has discussed these schemata in terms of their content and their structure. This perspective is useful insofar as it highlights that the skill of interpretation is by no means dependent only on schema content such as values, beliefs, categories, expectations, ideals and symbols, but is hewn also from tacit intrapersonal or interpersonal processes that brings these elements into play, sometimes one at the cost of another. However, the analytic divide between content and structure, while useful, does not reflect lived experience. Schemata are the skill of sensemaking in practice. They can be mapped (Huff, 1990), but what is mapped out is not the mental map-in-use itself which, whether individual or distributed, is tacit knowing situated in a particular interpretive context (Choo, 1998; Tsoukas, 2003). To separate content and structure is to employ a metaphor. So, to hijack Korzybski, a map of the schema is not the schema. But the importance of individual and distributed schemata is that, as maps-in-use, they *are* often largely the territory that they interpret: 'In a socially constructed world, the map creates the territory, labels the territory, prefigures self-confirming perception and action' (Weick, 1990).

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Endnotes

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What is the role of unlearning in organisational knowledge?

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Abstract

Much is written on learning and knowledge, but there is less discussion about the notion of unlearning and its role in successful knowledge creation. It is argued that organisations succumbed to crises because top managers, bolstered by past successes, are living in worlds circumscribed by their cognitive structures and, as a result, misperceive events and rationalise their organisations' failures. Consequently, genuine turnaround options are not perceived and responses are often superficial remedies and delays. This paper explores the need to include unlearning as an element in processes designed to gain the knowledge needed to maintain or develop competitive advantage. It is posited that, unless organisations recognise their need to unlearn certain accepted routines, thereby altering accepted mental models, they will be unable to recognise and implement new ideas. The paper is based upon a case based project which sought to determine the nature and possible success of organisations in terms of becoming Learning Organisations. The objectives of the study were: to understand how organisations prepare for and meet the challenges of an increasingly complex, competitive and globalised world; to understand how organisations prepare their members for these challenges and to compile an inventory of key enablers and barriers to learning organisation development. It is argued that organisations should be considering the potential role of unlearning far more as, unless the deeply rooted, instinctive behaviour patterns are, firstly, identified and then, secondly, changed such that it seems that it will be luck, rather than judgement, if they are successfully overcome. Many change programs will be undermined by the fact that the desired behaviour is contrary to the current learnt patterns and the strength of the currently held mental models will make change problematic unless the potential for lack of unlearning to prevent change is understood and managed.

Introduction

Much is written on learning and knowledge, but there is less discussion about the notion of unlearning and its role in successful knowledge creation. However, one only has to observe how long it takes to get used to relatively simple changes in routine, such as driving in a car where the windscreen wipers and the lights are on different sides from that which the driver is used to, to realise that unlearning may be more important than it seems. Where there are deeply ingrained routinised behaviours, finding ways to change such routines will become of great importance (Hedberg, 1981). Unless the deeply ingrained habits become redundant, new ideas are unlikely to emerge. Each time the windscreen wipers are used instead of the lights there is an instant feedback loop that indicates to the individual that they have made an error. However, even with this instant feedback it still takes some time before the behaviour is so deeply embedded that it is still remembered at times of crisis. As organisations learn they encase their learning in programs and standard operating procedures that members execute

routinely; if these become so ingrained that they become difficult to change then these procedures can generate inertia which increases when new members are inducted into these procedures and rewards encourage conformity to them. It can be argued that the first stage of learning must be to identify, and then unlearn such specific routines (Weick, 1979; Sinkula, 2002).

Hedberg (1981) illustrates how organisational crises have been worsened by top managers remaining with old learning and reacting upon previous experiences and ideas, despite the context and problem having changed. It is argued that these organisations had succumbed to crises because top managers, bolstered by past successes, were living in worlds circumscribed by their cognitive structures and, as a result, misperceived events and rationalised their organisations' failures. Consequently, genuine turnaround options were not perceived and responses were often superficial remedies and delays. Marks and Spencer demonstrated examples of such behaviour where, despite obvious and increasing problems, managers continued to use 'tried and tested' solutions, although the problems had changed and the solutions were working (Mellahi et al., 2002).

Initially this paper will explore the notion of unlearning, particularly relating it to the relationship between learning and new knowledge development. Case study research will then be used to explore the potentiality for unlearning in organisational strategy and change. Subsequently, the role of understanding and recognising the need to unlearn is considered as an element for inclusion in processes designed to evaluate and learn in order to gain knowledge needed to maintain or develop competitive advantage. It is posited that, unless organisations recognise their need to unlearn certain accepted routines, thereby altering accepted mental models, they will be unable to recognise and implement new ideas.

Learning, Unlearning and Knowledge

It is generally accepted that learning is a process that leads to the creation or application of knowledge in some way (Blackman, 2001). There are two major schools of thought regarding how the process of organisational learning leads to the creation of new knowledge: processual learning which brings forth knowledge via reflection of the real world and constructional learning which brings forth knowledge as it is experienced by those who are involved in the learning process at the time (Easterby-Smith 1997; Easterby-Smith and Araujo, 1999). The literature on organisational learning all seems to have a common view of the routines that will lead to knowledge. The process will begin with a new input in the form of an experience, some data, some information, or a new version of some current knowledge. Through processes of assimilation and accommodation (Glover et al., 2002) this input will be acquired by an individual and then shared to become part of organisational knowledge. Consequently, the usefulness of the knowledge output and potentially new behaviours, will only be as good as the input and processes being used. If individuals frame the new knowledge in different ways, the knowledge is being interpreted so that, not only will it not necessarily be accurate,

but it may reflect what is already understood and known by those within the organisation. This corresponds with a constructed nature of knowledge which holds that all knowledge is constructed in social contexts and is inseparable from already held understandings (Nicolini and Meznar, 1995; Cullen, 1999). Whether the knowledge is gained via reflections upon the real world or reflections upon experiences, it appears probable that the knowledge already held within an organisation will frame any potential for the acquisition of new learning and, therefore, new knowledge development. This probable difficulty with moving outside the current organisational cognitive frames is why some authors advocate the need for unlearning prior to new learning.

Nystrom and Starbuck argue that "before organizations will try new ideas, they must unlearn old ones by discovering their inadequacies and discarding them" (1984, 53). In many cases learned routines are so organizationally inculcated that only a crisis will lead to their review. Sinkula (2002) argues that a way of developing such unlearning routines is to understand the mechanisms that can be used to enable the organisation to deviate from the culture in which it is embedded. In other words to consider mechanisms that will enable the organisation to expand and change its bounded rationality (Simon, 1991). Something needs to be done to force unlearning in order that the organisation will recognise its weaknesses and be ready to substitute new routines and understandings.

However, to be aware of ones own weakness and potential areas of ignorance is a very high level of self-awareness that many organisations may have problems with: "Specifying ignorance is possible only in those organizational contexts in which dialogue and inquiry into unknowns is an established cultural norm" (Harvey et al., 2001, 451). For this reason much unlearning is cited as occurring during periods of crisis when the areas of ignorance are much clearer (Hedberg, 1981; Sinkula, 2002; Nystrom and Starbuck, 1984). Whether such systems of unlearning are more generally applicable is not so widely discussed. Sinkula (2002) indicates that the use of double-loop learning strategies (Argyris and Schon, 1996) will support, and be supported by, unlearning strategies; but these routines too are triggered by problems. It is possible that in many instances organisations may not perceive a need for unlearning because there is nothing apparently wrong. Blackman and Henderson (2004a) argue that the strength of the mental models already in place within an organisation will have a serious impact upon the way that the organisation learns and develops plans for its future.
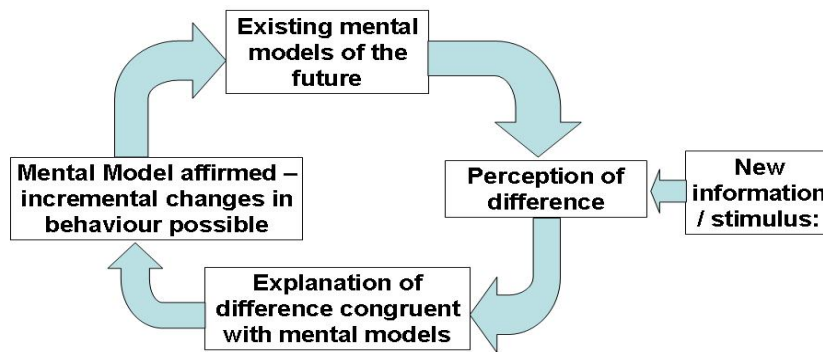
FIGURE 1. *Foresight Affirming Routines*
Source: Blackman and Henderson, 2004a

In figure 1 it can be seen that learning is triggered by the perception of new information or a stimulus (Klimecki and Lassleben, 1999). The first potential problem can be seen here: if the organisations and/or individuals fail to observe a difference, even where one exists, the learning process will never be triggered. This may be why the unlearning literature is so focused upon crises – this is a trigger that proves difficult to ignore. The difference, once recognised, will then be compared with the current mental models in place. Explanations of the difference are formulated and many of these can be accommodated within the existing mental models. These explanations are accepted and, as a result, are used to affirm the accuracy of currently recognised knowledge, true or not. This does open up possibilities for incremental knowledge development and change, but does not provide any certainty that such new knowledge will be in any way nearer to an accurate representation of the truth or the real future. Those thinking deeply about the difference may develop some explanations that are incongruent with existing mental models. These explanations will have to compete with congruent ones. They may be simply ignored or dismissed or various reasons are found to reject the new idea because it does not fit with the current view of the world (Blackman and Henderson, 2004a). The stronger the mental models in place the more likely it is that any new differences will be either ignored as irrelevant (Mellahi et al., 2001; Chapman and Ferfolja, 2001) or made to fit the current world in a way that reaffirms and strengthens the models in place. This leads to a form of organisational closure which will lead to potential organisational myopia (Blackman and Henderson, 2004b)

It can be seen, therefore, that the notion of unlearning is of interest in the development of knowledge as its absence may explain why organisations fail to perceive the difference that is needed to trigger new learning. This failure will prevent the input being considered. For there to be unlearning, organisations must be positively considering either, what areas of

knowledge they have so deeply routinised that they need to be challenging it, or where their potential areas of ignorance lie. Such self-awareness will need to be rooted in routines within the organisational framework in ways that ensure that ongoing reflection, leading to self-awareness occurs. This research sought to find such unlearning routines and, if they were found, to consider what triggered the awareness of their necessity. Where such routines were missing the research considered the possible impacts of such omissions long term.

Methodology

The paper is based upon a project undertaken which sought to determine the nature and possible success of organisations in terms of becoming Learning Organisations. The objectives of the study were: to understand how organisations prepare for and meet the challenges of an increasingly complex, competitive and globalised world; to understand how organisations prepare their members for these challenges and to compile an inventory of key enablers and barriers to learning organisation development. Because understanding both the character of the problem being researched and the cognitive structures within the organisations was critical, a qualitative approach was adopted (Cresswell, 1994). This enables the researcher to explore the phenomena being researched and induct new theory from the data. A richness of data was needed owing to the exploratory nature of the questions; thus, open ended questioning, set up in a format that would permit comparison between companies, appeared to be the appropriate design.

It was the location of the companies that was of initial interest in order to consider how learning and knowledge were being developed in Western Sydney, Australia. Accordingly, the sample was mixed as it was thought that different patterns might emerge in different sizes and types of company, and that such differences could then be explored. Data was collected from nine case companies ranging in size from 5 to 4000 employees (although this large company is split into divisions and only one product and area only were researched), of which some were owner run and managed, whilst others were major corporations. The sample had a range of those facing crisis and those who appeared to be in a relatively stable situation.

Within the data there was a subset of 3 chemist companies who had all self selected to be researched. Their reason for interest emerged as being related to the new legislation regarding the provision of pharmacies within supermarkets which will greatly affect their environment, prices and business in general. This is also happening at the same time as the free trade agreement provisions may also lead to challenges to the current pricing strategies. As a result they were experiencing a clear crisis and this gave a clear comparison between their behaviours and those of other companies which did not have such a crisis. The large company was analysed with interest as it had already had a crisis and much of the data was about how they had had to learn from this and what it would mean for the future – they would need to reapply for their franchises in 18 months time from the point of interviewing.

In order to get as broad an understanding as possible of a range of voices the method was designed to get a picture of the views held throughout the organisation. Semi-structured interviews were undertaken with employees from differing levels within the companies and some focus groups were also undertaken in order to consider if discourse changed when employees were in groups rather than being interviewed differently.

The data was then entered into NVIVO and coded for themes. The themes of interest in this paper were those that pertained to how the organisations created new knowledge for the future, what processes they used for learning development and evaluation, how they evaluated themselves in terms of understanding their current situation and how they predicted their strategic futures.

Findings

The organisations were asked a range of questions about how they learnt and how they created new knowledge for the future. The questions included: 'Can you outline the types of processes which enable your organisation to develop new ideas and implement them?'; 'Does this organisation encourage you to learn and gain new knowledge and if so how?'; ' Are you encouraged to undertake personal development and /or training and if so how is such development managed?'; 'How much freedom do you have to choose your development and how easy is it to feed it back into the organisation?'; 'Do you believe that learning and development are core parts of your culture?'; 'Do you think your current structure enables individual learning to be transferred within the organisation?'; 'How do you prepare for your organisational future?'; 'How well do you think the organisation reads its environment?'; 'How do you evaluate the changes that you make as an organisation?'; 'How do you ensure you are realistic in your self-perception?'; 'How does the current knowledge base get updated?' and they were asked to consider a definition of a learning organisation and determine whether they thought that their organisation displayed such behaviours. The definition was "Learning Organisations encourage risk taking, innovation, problem solving and critical thinking in all their members. They continually update and renew themselves in order to enable them to achieve and maintain competitive advantage. They do this by continually enhancing and utilising the skills and knowledge of their members. They foster cultures of career-long learning, continual reflection and evaluation. They learn from their mistakes and every new program or restructure is evaluated for its effectiveness before implementation. Management listen to employees and actively seek their opinions, ideas and feedback on organisational practices and policies" (Pearn et al. 1995).

These areas of study can be subdivided into three key objectives: establishing the nature of the organisational processes in place to encourage and support learning; establishing how well the organisation challenges and evaluates its own behaviours, changes and knowledge; and considering how the organisation amasses and utilises its knowledge for the future.

The nature of the organisational processes in place to encourage and support learning

All the companies studies have a strong focus upon encouraging individuals to learn but the potential success of this seemed variable. In all cases, when asked about how they encouraged and supported learning, the responses were mostly focused on training and how training is supported. Appraisal was seen as fundamental, but there was also a great deal of discussion about the role of the leaders and managers and the issues of risk. One of the issues that became apparent was a difference of opinion about how learning was achieved and how effectively it was achieved at different levels of the organisations. For example one manager stated that *"Without a doubt, because everyone has different qualities; also different backgrounds and consequently, there is a transfer, always between the individuals of what they know and what you know, and everyone is encouraged to put their opinion across, of how they think something should be resolved, or some thing new they've learnt. And with the training courses we are sending people on, they bring back more information of what's new in the industry, and that's always learning, we never stop learning in this business. If you do that, that's the time you should leave"* [Company 8]. This implies that there is a breadth of knowledge being created. However, another member of the organisation stated that: "*But in terms of training staff - so you got a depth within the organisation that you can call upon - I think we've decided that we are going through a particular niche, not getting too large ... but to do something that emphasises what you do well'* [Company 8] and another that as far as training was concerned *"it's mainly to do with new technology, so my job would be to find out what that new technology is; find out what training we need to do for the services, sales or installation people"* [Company 8]. The argument here is the organisation will focus upon what it perceives itself as doing well and what it thinks it needs. This will be driven by the mental models and can be seen as beginning to lead to possible closure as the appraisals and training will be linked to what is currently understood as being important. Company 9 also indicated this potential closure as they indicated that promotion would be more likely to be within the company if someone had been seen to be enthusiastic about education and learning, as defined by the organisational requirements.

Issues of culture were discussed in terms of supporting and encouraging learning*; "we have a very open minded management style which encourages open questions and, I guess, open answers"* [Company 9]; *"experimentation ... we say 'go away and research it and bring it back and let's turn it into action'"* [Company 2]; *"we say rough enough is not good enough"* [Company 8]. Many were encouraging some risk taking and problem solving and talked of cultures that meant that it was permissible to fail. It was accepted that experimentation was important *"The process I guess is a culture that we have tried to develop, culture that does not penalise mistakes and error, one that encourages culture that encourages experimentation"* [Company 2]; but some felt that the organisations were not able to take risks as they needed to: *"We are not encouraged to take risks, as I mentioned earlier. There is not a lot of enough innovation in the industry that we have. There certainly is problem solving and some critical thinking. We seem to make the same mistakes too often*

and continually ask ourselves if it is because of it's people person trouble - or it is a process problem, systemic problem, that we have" [Company 8].

Overall the processes described by all the companies would encourage some knowledge development but none were in any way unusual. There was no discussion of reflection or challenge and, whilst there were discussions about problem solving, nothing was suggested to ensure that ideas emerged that were unrelated, either to direct work development, or to a specific problem. In terms of the difference need for learning to commence, there will be some triggers perceived, but no likelihood that the processes in use will force either organisational openness, or spontaneous processes of unlearning.

How the organisation challenges and evaluates its own behaviours, changes and knowledge

Initial answers to this were focused upon whether money was being made or not and whether objectives were being met: *"We tend to evaluate changes on the basis of whether it's profitable or not. We made some few changes, and within a short period of time we can see that financially it was not the right way to go. So we tend to always comeback to that"* [Company 8]; *"Everything from staff evaluation to actually project evaluation, as well as the money side, and often because we are so busy we tend not to do those things. We try to and we have in fact introduced things like key performance indicators, different feedback mechanisms to gain a better evaluation of our business"* [Company 8]; *"My region started from a "we need to make money" focus"* [Company 2];. *"I'll believe we're successful if we get the next few tenders right"* [Company 2].

However, other less obvious considerations were raised and some respondents showed concern about their evaluation effectiveness: *"Not very well; that's only from my management training I suppose. I would like to see a lot better evaluation systems, and try to encourage those. Everything from staff evaluation to actually project evaluation, as well as the money side, and often because we are so busy we tend not to do those things. We try to and we have in fact introduced things like key performance indicators, different feedback mechanisms to gain a better evaluation of... Not only changes we make that everyday, but the work we do. We 're still a long way short in my opinion"* [Company 8]; *"We seem to make the same mistakes too often and continually ask ourselves if it is because of it's people person trouble - or it is a process problem, systemic problem, that we have. What is the reason why we are continually making the same mistakes?"* [Company 8]. It seems very telling that although the definition of a learning organisation used to discuss each organisation included the concept of reflection, very few interviewees commented on the use of reflection as a process within their organisations. Even when the respondents did consider their organisations to be learning organisations they did not always discuss this. Interestingly, where there were discussions of reflection they were found in Company 2 which (a) had had a serious crisis 18 months previously and (b) has to renew all its contracts in the next 18 months. Moreover, it has to bid for new business in an ongoing manner throughout this set of contracts. This was the only

company where reflection upon both successes and mistakes seemed to be undertaken in an ongoing manner as part of the regional processes *"Continual reflection and evaluation, they learn from their mistakes, yeah we make some mistakes but I think we use them"* [Company 2];

One company considered that the gossip system provided scope for reflection, but as this was a company with an apparently wide divide between management and employees, the accuracy and usefulness of the gossip would have to be a concern.Most of the evaluations were against their plans and strategies but there were mention of some other measures, particularly staff retention, where long term staffing was considered advantageous, regular and useful training plans and whether Head Office was pleased with their performance.

An area of interest was that, when asked whether they were involved in plans for the future, many individuals felt that they were not consulted as much as they could be for future development, even though in several cases, their managers thought that they were. It seemed that managers still felt they had ownership of the future and they should have the knowledge required to be able to map it. This would then reinforce the concerns of Hedberg (1981) that the dominant management rationality will frame the organisation. This finding also confirms concerns raised by Coopey (1995, 1996) who argued that the dominant power and politics of an organisation will prevent real openness to new ideas. When this is considered in term of whether the learning processes will be triggered at all, it seems likely that whether there is strong management, taking a central view towards strategic development, there will be a greater propensity for the learning processes to be stifled or, in extreme cases, even reversed (Blackman, 2001). This perspective is further strengthened by the fact that the organisation that had had the biggest problems in the past was much more open to taking ideas from throughout the organisations and saw this as a key leadership role. Of the senior staff interviewed from Company 2 all saw their role as facilitating the development of strategies that would build upon all the organisational strengths at all levels: *"If we are to ensure we do not repeat the loss of the last franchise it will have to be a real team effort – we can't face the loss again and so we all must take responsibility for preventing it"*[Company 2]. Consequently, the data showed that as a result of previous loss some companies were showing awareness of needing to evaluate more fully, but there was still no feeling of real challenge to current processes or of needing to identify any areas of ignorance.

How the organisation amasses and utilises its knowledge for the future

There were common themes that emerged from the data regarding how the organisations prepared for the future. Constantly scanning the environment was seen to be vital as was taking time to talk about the future. The need for a shared vision was mentioned in several cases: *"But preparing for the future I think is about one having a vision, having a plan, being ready for the shocks, being fiscal shocks or otherwise, that will required response and often that response is/has to be done very, very quickly"*[Company 4]; *"All staff to contribute ideas,*

and have a bit of a vision of where [Company 2's] *going"* [Company 2]; however, not everyone felt that visions were really transferred across their companies *"As I said we are reactive to what Auckland what us to do next. Another problem I have is that we have a situation that there is no real strategic planning from our point of view. May be a vision in the head on someone in Auckland, it is not shared to any extend what so ever"* [Company 9].

There were also links with earlier sections as ensuring that employees are on up to date courses and are maintaining industry and sector knowledge was seen as particularly important *"Its up to the individuals in here to update themselves with what they know. We get plenty of journals, magazines regarding what's happening in our industry and we have plenty of opportunities to encourage people to take on additional course etc, to be able to learn more about what they are doing and gain new skills. And we have to update ourselves and look at what's happening in the market place to be competitive, and have a competitive advantage in the market"* [Company 8]. However, there were serious differences identified between the companies that had been through a crisis and those who had not.

Company 2 tenders for work from the government which has to be renewed every three years. After what they thought was a successful three years they had prepared a bid expecting to get most of their business renewed. Unfortunately, they were not nearly as successful as they had hoped which resulted in closing offices and job losses. The Managing Director in particular was very clear that this experience had to be the basis for learning: *"we have had to learn from what happened last time [a bid was made] and make sure not doesn't happen again"; "The other thing too is, last contract we were all new to the organisation and* [Company 2 is a] *very family based organisation. When you come in, it's like you walk into this big family and they say, "come in, we'll take care of you. You do what you got to do, we trust you know what you are doing". But when you are in this type of industry, it was great to have that because we all felt very nurtured, but didn't know the outcome of that going to be, we didn't hit the wall at a 100 miles an hour at the beginning, and we suffered the consequences of that at the end. Where as if someone had said to us, "no well, look it's lovely, and you know it's all touchy feely, but get to work", and you can't stop, and that I think the biggest lesion we've learnt in this contract. And we did, we hit the ground running this time, and it's been reflected in our star ratings"*. All those interviewed mentioned the horrors of losing offices and staff, how it had felt and how they knew that the company was determined for this not happen again. It was apparent that, although such losses had always been a possibility, they had never been seen as a probability. As a result there was a much greater focus upon two things: firstly, not growing so fast so that the business was not supporting such great costs and, secondly, being much more prepared to buy in tender writing skills in order to be sure of success. This was particularly of note during two interviews where they had just heard they had not got some new business they were bidding for.

The other subset of companies that showed more awareness of a need to radically rethink the way they were working were the chemists: companies 3; 6 and 7. The new legislation was raised as a reason why there would need to major rethinks: *"At the moment we are coping*

with the possibility that Woolworths will open their own pharmacies. Under the new agreement that may come in, in June. The ownership of pharmacies will be open. With any business it is profit and loss; it competition; its your own survival. That's why, every two years I have had to put in new things, service new areas. Specifically to expand you have to put in something new. Now I am specialising in geriatrics. Becoming specialised and servicing the nursing homes. Which I think I can do it best if I had more time to do more. To get more business. I have a good reputation. I know how to prepare myself; how to present myself; what to say. I've learnt a lot about geriatrics, and I have more to learn. I'm now specialising in geriatric needs. ... I may have to take on a partner [another chemist / partner in the business] here in a few months time too much for a sole operator like myself" [Company 6]; *"We are going into weight control. Over weight is the source of evil when you get older. Predisposes you to diabetes, hypertension. Sedentary lifestyle. I think in the future pharmacists' role is going to be very much about lifestyle. Encouraging people to live right for the sake of their health. ...We will survive because we have this personal touch with local people. Lots of problems are metabolic people could help themselves through lifestyle we will have this sort of personal service, in concordance with GPs; lifestyle coaches"* [Company 3]; *"There is a certain amount of margin in my profitability because of the size of the business. I can lose profitability, if it's going to happen, it will make it tighter, it will make it harder, but then I'm still 4 or 5 percent better than the average pharmacist and the people at this pharmacy who will lose most are the people who rely on the profit for their income. ... There are going to be ways, there are going to be techniques to minimise loss. I might have to reduce staff, I might do that. But that will be the last resort"* [Company 7].

Thus, there were clear indications that the future would need changes and different strategies, However, such changes were all developed as reactions to a perceived threat which was clearly evident within their environment. No companies were showing any evidence of undertaking unlearning or transformational behaviours before such threats emerged. Although the majority of respondents thought that their organisations displayed learning behaviours that might lead to transformation, most thought that some aspects were missing, and analysis indicates that the notions of updating and renewing are seen from within the organisational cognitive frameworks, thereby restricting the likelihood of real change.

Implications

Analysis demonstrated that where there had been a fundamental crisis within an organisation, it had recognised the need to reframe the learning in place, identifying and changing the learning currently in place. However, where no crisis had occurred, the idea of needing to unlearn was not recognised as an important part of developing learning processes. All questions about evaluation were answered in terms of assessing whether things worked, not in terms of identifying whether there were patterns of behaviour that might need to be challenged. The notion of challenge itself was never raised.

In the introduction of this paper it was mooted that the mental models held by the organisation may prove to be too strong and that they will prevent the potential perception of differences. This will result in learning being suppressed and new knowledge not emerging or being used ineffectively. The research data implies that such problems are very likely to develop. As a result unlearning, which in the literature is generally linked to crises, might prove to be beneficial if configured more widely.

When comparing findings between companies that had not yet encountered problems, those that had, and case studies of failures (Mellahi et al., 2002; Chapman and Ferfolja, 2001; Davison and Blackman, 2004), it can be argued that organisations should be considering the potential role of unlearning far more as, unless the deeply rooted, instinctive behaviour patterns are, firstly, identified and then secondly, challenged in some way, it seems that it will be luck rather than judgement if they are successfully overcome. Many change programs will be potentially undermined by the fact that the desired behaviour is contrary to the current learnt patterns and the strength of the currently held mental models will make change problematic unless the potential for a lack of unlearning to prevent change is understood. Processes will need to be considered in order to promote and develop ongoing unlearning. In order to differentiate itself from current learning theories, managed unlearning will need to commence, not with a problem but with a decision to surface areas of ignorance and to identify potentially limiting learnt routines. This notion of on-going challenge could be linked to the ideas of Socratic Dialogue (Kessels, 2001) and Double Loop Doubting (Blackman and Henderson, 2004a), both of which concentrate upon questioning what is given an accepted as true. In both cases established knowledge is questioned in an ongoing and pragmatic way. Such challenge should enable organisations to identify areas of routinised learning that needs to be explored and considered in terms of its potential to act as a constriction for future development. At this present time it appears that even those organisations that consider themselves to be at the forefront as regards the development of learning and knowledge processes do not actively consider the need to understand where they may have learning blind spots or if they are being closed down by either ignorance or their existing pictures of the world.

This would have serious potential impact upon organisational change as resistance to change would emerge from the routinised learning practices but, because it will not prevent change implementation, but recognition of the need for change itself, the seriousness of its impact may not be recognised until crisis has developed. Unlearning routines may be a way to prevent organisational failure if such self-awareness and challenge can be developed in an ongoing manner.

It is, therefore, recommended that the notion of unlearning be researched in a context wider than that of crises alone. It needs to be considered in the light of how organisations can surface their learning routines in a way that will clarify whether they are enabling or constricting potential knowledge development and, consequently, their competitive advantage.

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Endnotes

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Institutionalising Learning in SMEs: Beyond Crossan's 4I Framework

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Abstract

The ability to learn from customers and suppliers is key to improvements in productivity and longer-term competitive advantage in smaller firms. However, SMEs lack the internal structures, routines and procedures by which larger organizations absorb knowledge. Therefore, we suggest that inter-organizational links are essential if owner-managers are serious about institutionalising new knowledge. To demonstrate how this process operates we re-conceptualise the 4I learning framework to incorporate inter- as well as intra-organizational linkages. The 5I framework suggests that SMEs must maintain a balance between exploration and exploitation if the firm is to remain competitive. We also extend the original model by suggesting the 'feedback' learning processes are shaped by the power of owner-managers. Two case studies provide clear illustrations of the way in which owner-managers can mediate the absorption of new knowledge from external organizations, but also the role that external organizations can play in encouraging organizational learning in small firms.

Introduction

Inter-organizational networks are an important source of new knowledge and are central to the innovation process (Drucker, 1985; Rothwell, 1992). Systematic incorporation of new knowledge requires development of a firm's absorptive capacity to encourage effective dissemination and exploitation (Zahra and George, 2002; Van Den Bosch, Van Wijk and Volberda, 2003). Moreover, Nesheim (2001) contends that empirical studies support the argument that a firm's strategic core is strengthened through transactions with suppliers (and other business networks) that go beyond traditional market-based interactions. Limited absorptive capacity means that small firms concentrate on knowledge exploitation rather than exploration (March, 1991). Exploitation is concerned with the effective application of current knowledge by focusing on the 'refinement, routinisation, production and elaboration of existing experience' (Holmqvist, 2003:99). Strategic renewal (Vera and Crossan, 2003) requires mature firms to break-out of their path dependencies (David, 1985) through the acquisition and incorporation of new knowledge. Although SMEs provide a significant contribution to employment and GDP (Tilley and Tonge, 2003) individually they generally lack the managerial, entrepreneurial and technical skills required to identify and absorb new knowledge (Yli-Renko *et al*, 2001; Penrose, 1959). As a consequence, SMEs are less productive and lag larger organizations in the adoption of modern management techniques and new technologies (Acs et al 1999; Mole et al, 2004). This learning failure means that most SMEs are increasingly ill-equipped to operate in a global economy.

Child (1997) argues that top-management's perception of market conditions has a significant influence on the recognition and exploitation of opportunities. In SMEs this is

even more important since the influence of the owner-manager or senior management team is pervasive (Stanworth and Curran, 1976). Organizational learning in SMEs cannot be isolated from the needs, goals and expectations of key individuals who are responsible for decision-making (Molander, 1986). Barriers to small firms becoming 'learning organizations' include lack of structures and systems to capture and disseminate learning, short-term horizons and resource limitations that restrict space for review and debate, the inability to attract talented management staff, and political processes and owner-manager attitudes that restricts the prerogative for action and prevents delegation and staff empowerment (Wyer *et al*, 2000). Limited managerial resources mean that smaller firms are dependent on knowledge from external sources. As a consequence, utilising feedback from customers and suppliers is a key learning source (Gibb, 1997). In their 'systematic literature review', Pittaway et al (2004) confirm that customers are important for suggesting incremental improvements to existing products and identifying new markets (see also Ragatz et al, 1997). Links with suppliers appear to be more important for helping promote radical innovation (Perez and Sanchez, 2002; Romijn and Albu, 2002).

Understanding the responsiveness of SMEs requires attention to problems associated with transferring individual knowledge to the collective level through appropriate systems (Liaio et al, 2003). Therefore, owner-managers must develop ways of interrelating and connecting knowledge since firms cannot evolve without the acquisition and development of additional resources (Chandler and Hanks, 1998; Tsoukas, 1996). This view is confirmed by writers such as Brusoni and Prencipe (2001:1033) who contend that 'specialization of knowledge production will make firms' external knowledge relations ever more important'. Nahapiet and Ghoshal (1998:243) also point out that knowledge capture requires communication structures that provide access to 'actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit'. However, for a variety of reasons, including the reluctance to delegate power and share knowledge, autocratic and defensive management behaviours persist in SMEs (Jones, 2003). Where this is the case, it is unlikely that owner-managers will be willing or able to develop systems of knowledge-sharing that leads to genuine organizational learning. Here then, if customers, suppliers and other interested stakeholders, such as development agencies, are to encourage genuine organizational learning necessary for strategic renewal, an understanding is required of how owner-managers can be encouraged or supported in institutionalizing processes that reflect and support organizational learning.

The paper begins with an overview of the organizational learning (OL) literature and this is followed by a brief outline of the 4I learning framework developed by Crossan, Lane and White (1999). Thereafter, we explore and develop criticisms of the original model to consider suggest how it might be developed in order to understand the peculiarities of OL in small firms. In particular, we consider the central role of the owner-manager and relationships of power both within the firms and in inter-organizational networks. Following a discussion of our methodology, we present data on two cases which illustrate the key elements of a revised

conceptual framework. We then discuss our findings in the context of both the OL literature and strategic renewal in SMEs and suggest both practice and policy implications.

Understanding Organizational Learning

According to Holmqvist (2003) two approaches dominate the OL literature. One concentrates on ways in which 'formal organizations' (firms, hospitals, universities etc) learn from experience. This focuses attention on learning within organizations and is 'the most common unit of analysis' (Holmqvist, 2003:101). The second approach examines learning through formal collaborations such as strategic alliances or joint ventures. Inter-organizational learning is based on experiential rules that are, in part, distinct from intra-organizational rules and, consequently, collaboration is seen as a 'unique learning entity'. Many influential authors suggest that the processes of inter- and intra-organizational learning are fundamentally different (March and Simon, 1958; Pfeffer and Salancik, 1978; Thompson, 1967). Other researchers acknowledge the importance of learning communities which cross organizational boundaries. In the R&D literature the term 'invisible college' demonstrates the importance scientists place on inter-organizational communications (Price and Beaver, 1966). More recently, theorists of situated learning pay attention to a range of social practices which are not constrained by organizational boundaries (Brown and Duguid, 1991; Lave and Wenger, 1991; Wenger, 1998). Collaboration may encourage organizations 'to increase their store of knowledge' and facilitate learning 'faster than acquisition through experience and more complete than acquisition through imitation' (Huber, 1991:97). This creates opportunities to challenge current practices, since a more democratic style of social organization within collaborations helps subvert existing norms. However, Holmqvist (2003:102) argues that, in general, learning partnerships are seen as 'very loosely coupled' because organizations differ in terms of experience and capabilities. Although he acknowledges that this is not the case in the institutional literature in which organizational fields contain largely homogenous organizations (DiMaggio and Powell, 1983; Scott, 1995). Nevertheless, Yli-Renko *et al* (2001) found that benefits of knowledge transfer were accelerated in 'loosely coupled' network relations because strong ties may reduce transaction costs but they limit access to wider reservoirs of learning. While March (1999) acknowledges that studies of organizations within a community 'complicates' theories of routine-based learning, we still lack a framework which demonstrates how learning entities relate to each other (Holmqvist, 2003; Grant and Baden-Fuller, 2004).

Links between inter and intra-organizational learning can be analysed by incorporating ideas related to the exploration and exploitation of knowledge (March, 1991). Exploitation is concerned with the effective application of current knowledge by focusing on the 'refinement, routinisation, production and elaboration of existing experience' (Homqvist, 2003:99). As pointed out by Leonard-Barton (1994) core capabilities can rapidly solidify into core rigidities without exposure to new knowledge. Hence, exploration focuses attention on such

organizational activities as experimenting, innovating and risk-taking. According to March (1991: 71), 'maintaining an appropriate balance between exploration and exploitation is a primary factor in system survival and prosperity'. Nevertheless, existing theories suggest that organizations are either engaged in processes of exploration or exploitation (Weick, 1979). A number of authors who have examined learning processes from a longitudinal perspective demonstrate that organizations 'sequentially go through periods of exploitation and exploration' (Engeström *et al*, 1999; Nonaka, 1994; Weick and Westerly, 1996). Studies of organizational life-cycles also demonstrate an inter-play between evolution and revolution during stages of growth (Greiner, 1972; 1998; Macpherson *et al*, 2004). As Holmqvist (2003:100) points out, '[t]his dynamic view on organizational exploitation and exploration seems, however, not to have gained sufficient attention in the literature'. Holmqvist (2003:107) proposes that intra and inter-organizational learning are *intertwined* through the processes of exploitation and exploration. As a result, the learning process involves 'four interrelated transformations' that occur within and between organizations: acting, opening up, experimenting and focusing.

- Acting occurs when the organization is in an ongoing process of exploitation;

- Opening-up comes about when the organization moves from a process of exploitation to exploration;

- Experimenting takes place when the organization is in an ongoing process of exploration; and

- Focusing occurs when the organization moves from a process of exploration to a process of exploitation.

The *trigger* for opening-up comes from a growing feeling that things have to be done differently perhaps as a result of some internal crisis or because external stimuli destablises the organization's steady state (Jönsson and Lundin, 1977; Tushman and Romanelli, 1985). As Holmqvist (2003) points out, 'opening-up' activities are well documented in the literature through a range of terms including; unlearning (Hedberg, 1981); diversification (Starbuck et al, 1978) and de-learning (Jönsson and Lundin, 1977). In most cases, opening involves the creation of alliances with organizations that have different skills, knowledge and competences. Because opening-up challenges existing routines (March et al, 2000) it is likely to be accompanied by some internal conflict as the organization goes through a period of 'critical self-reflection' (Engeström *et al*, 1999).

The 4I Learning Framework

Although the field of OL has grown rapidly in recent years it lacks consistency in terminology which inhibits the creation of cumulative knowledge. One of the most widely quoted attempts to give greater theoretical coherence is the 4I framework (Crossan *et al*, 1999). OL is

conceptualised as a process incorporating thought and action shaped by institutional mechanisms, which are the basis of every established organization. According to Crossan *et al* (1999:523) learning at the individual, group and organizational levels is linked by four social and psychological micro-processes. Intuiting and interpreting occur at the individual level; interpreting and integrating occur at the group level; integrating and institutionalising take place at the organizational level. The processes of learning are defined in the following manner (Crossan *et al*, 1999:525):

> *Intuiting* is the preconscious recognition of the pattern and/or possibilities inherent in a personal stream of experience. The process can affect the intuitive individual's behavior, but it only affects others as they attempt to (inter)act with that individual.

> *Interpreting* is the explaining of an insight, or idea to one's self or others. This process goes from the preverbal to the verbal and requires the development of language.

> *Integrating* is the process of developing shared understanding amongst individuals and the taking of coordinated action through mutual adjustment. Dialogue and joint action are crucial to the development of shared understanding. This process will initially be *ad hoc* and informal but if the action is recurring and significant it will be institutionalised.

> *Institutionalising* is the process of ensuring that routinised actions occur. Tasks are defined, action specified and organizational mechanisms established to ensure that certain actions occur. Institutionalising is the process of embedding individual and group learning into the organization's systems, structures, procedures and strategy.

The process of OL is illustrated in Figure 1 which also distinguishes between stocks and flows of learning. Learning stocks occur at each of the three levels and are created as a result of inputs and outputs to the learning process. 'Feed-forward' learning takes place through flows from individual to group to organization. The interpretation, integration and institutionalisation of learning prompts feedback flows through the three levels. This process certainly bears a strong similarity to the knowledge creation cycle (Nonaka and Takeuchi, 1995) and the tension between feed-forward and feedback is similar to the tension between exploration and exploitation (March, 1991).

Figure 1. *The 4I Organizational Learning Model (Crossan et al, 1999)*
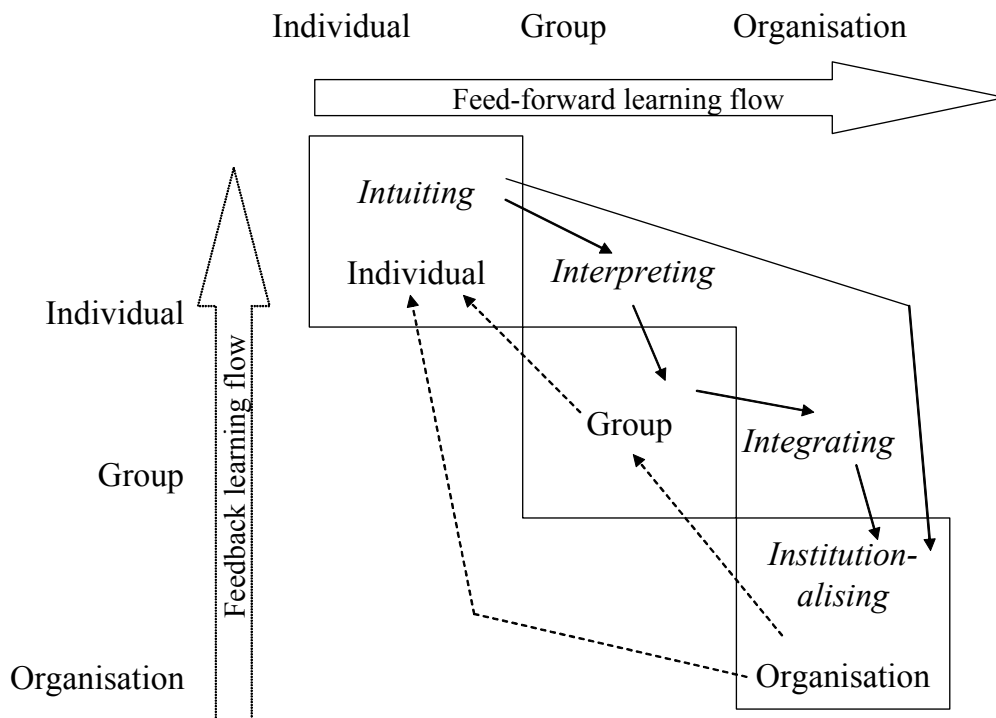
In response to encouragement from Crossan *et al* (1999) to 'refine' their model Zietsma, et al (2002) add two new concepts to the original framework. First, Zietsma et al (2002) regard intuiting as too passive and suggest that the term 'attending' captures a more active process of information seeking. Secondly, 'experimenting' is described as a parallel activity carried out by individuals and groups which adds substance to the process of interpreting (Zietsma *et al*, 2002:63). Data from a case study of a Canadian logging company provide support for the significance of these two activities during organizational learning.

> Most organizations have institutionalised scanning mechanisms. However feedforward learning is enabled only when individuals attend to data that is not part of the normal organizational attention pattern.... The experimentation process provides specific feedback on their intuitions and interpretation in controlled risk environments' (Zietsma *et al*, 2002: 71-2).

While attending and experimenting capture important dimensions absent in the original framework it appears that Zeitsma *et al* consider organizational learning takes place in a vacuum. This seems to be a particularly significant omission since they examine the way in which stakeholder pressures eventually prompted learning in *MacMillan Bloedel*. They also note the way in which prior learning created a 'legitimacy trap', essentially closing off the attention of senior management to an alternative discourse about acceptable logging practices. Thus, the dimensions of power and politics, both internal and external are ignored in the development of Crossan *et al's* framework.

Conflict can occur as a result of new ideas and new knowledge that create challenges to existing processes and procedures within the organization (Fiol, 1994). It is noteworthy that neither Crossan et al (1999) nor Nonaka and Takeuchi (1995) address this issue of conflict in their respective models. Engeström (2000) is particularly critical of knowledge creation as a cyclical and sympathetic process of conflict-free socializing. The notion of knowledge consensus suggests knowledge as a benign social dimension that is achieved through the dialectical conversion process. Engeström (2000:968) however, argues that expansive learning occurs more from 'conflictual *questioning* of the existing standard practice'. Gherardi and Nicolini (2002) also point to tension between consonance and cacophony in the establishment of meaning. They argue that explanations of learning overemphasize mutuality in understanding and ignore the discontinuity and conflict that co-exist within knowledge systems. For collective understandings to be constructed requires a challenge to the accepted assumptions within a community. It requires a break from the accepted order, creating disorder and conflict before new assumptions are accepted or rejected. As Hopkinson (2003:1965) observes:

> 'discourse may lose meaning, and even cause confusion, when imported to an organization. It may contradict the prior constructions on the basis of which organizational members act.'

While Brown and Duguid (1991) suggest that day-to-day practice provides access to alternative conceptions of activity, ultimately, organizational learning requires that communities legitimate innovatory activities developed through these relationships (Fox, 2000). Since OL involves a collective acceptance of experiences and rules it will either be facilitated or constrained by social relationships that exist in an organization (Bogenrieder, 2002) as well as by the relationships of power that are embedded in all social interactions (Contu and Willmott, 2003). This is particularly pertinent in SMEs, where, generally, owner-managers or management team are reluctant to relinquish power, delegate responsibility or distribute knowledge through formal organizational systems (Jones, 2003).

Crossan and her colleagues do use an early version of the 4I model to discuss inter-organizational learning and as the authors point out: 'learning involves *institutionalizing*: the processes of incorporating new knowledge and skills into the systems, structures and procedures of the organization' (Tiesessen et al, 1997:384). We differ from this view because such structures and procedures do not exist in the majority of small firms. For new knowledge to become embedded within the 'memory' of such firms requires an external organization to act as a substitute for those internal structures. Learning from other organizations can be formalised in strategic alliances or join ventures (Inkpen and Crossan, 1995; Kale et al, 2000) or may be informal *via* 'invisible colleges' or communities of practice (Price and Beaver, 1966; Brown and Duguid, 1991). The process of 'intertwining' illustrates the mechanisms by which learning takes places at the interstices between organizations and not simply within organizational boundaries. We deliberately use the term intertwining because it suggests an active engagement between the firm and its knowledge network (Holmqvist, 2003). In other

words, this re-conceptualisation illustrates that the learning process can benefit both parties.

Our extension to the work of Crossan *et al* (1999) outlines some of the more obvious mechanisms for mutually beneficial learning partnerships (Table 1). For smaller firms, links with customers and suppliers are the most easily accessible source of new learning. These links may be based on customer requests for improvements in products and services or supplier suggestions for cost reductions by streamlining their joint processes (such as EDI). Engagement with the regulatory environment, particularly concerning financial accounts or taxation, may also lead to learning by the adoption of activity-based costing for example. Rather than being based on one-off transactions, in most small firms, such relationships are likely to be part of on-going network relationships in which knowledge sharing benefits both parties (Taylor and Pandza, 2003). However, we also recognize that these relationships are unlikely to be conflict free. Rather, it is probable that inter-organizational networks will include asymmetries of power that may be deliberately used in order to encourage, or impose, the institutionalization of learning (Agrell *et al*, 2004; Rokkan and Haugland, 2002; Watson, 2004).

Table 1. *Organizational Learning and Renewal (Crossan et al, 1999)*

Level	Process	Inputs/outcomes	
Individual	Intuiting	Experiences Images Metaphors	
Group	Interpreting	Language Cognitive map Conversation/dialogue	Original Model
Organization	Integrating	Shared understanding Mutual adjustment Interactive systems	
	Institutionalising	Routines Diagnostic systems Rule & procedures	
Inter-organization	Intertwining	Customer requirements Supplier suggestions After-sales service Regulatory environment	Extension to original model

Inter-Organizational Learning

To be effective, learning at the individual and group levels must be transferred to the organizational level (Sundbo, 1998; Nonaka and Takeuchi, 1995). As Crossan *et al* (1999:529) point out 'the process of insitutionalization sets organizational learning apart from individual and *ad hoc* group learning'. In established organizations, learning is embedded in systems, structures and routines as well as in electronic format such as databases (Alavi and Tiwana, 2003). Hence, learning in large organizations can be largely independent of the agency of individual actors if not their actual roles. If a key employee leaves then such structures ensure that knowledge and learning capacity are retained. It is, however, important to acknowledge that there are restrictions on the ability of organizations to absorb new knowledge (Crossan *et al*, 1999: 533). Van Den Bosch *et al* (2003) argue the antecedents of absorptive capacity are based on the firm's internal mechanisms for absorbing knowledge: communication structures and the character and distribution of expertise. This draws attention to the way organizational structures directly influence absorptive capacity (Lane and Lubatkin, 1998). However, as Cohen and Levinthal (1990) originally argued, identifying absorptive capacity means examining structures of communication between 'the organization and its environment' as well as between subunits. Thus, Zahra and George (2002:185) re-conceptualise absorptive capacity as a set of organizational routines through which knowledge is acquired, assimilated, transformed and exploited.

We propose that there are substantial differences between absorptive capacity in large, well-established organizations and such activities in SMEs. It is acknowledged by Crossan *et al* (1999:529) that 'new' organizations lack established structures and routines which means learning is concentrated on individuals and groups. However, this situation does not only exist in new organizations but it is almost certainly the case in the majority of micro (up to 9 employees) and small firms operating in the 10-49 employee size-band. As is well-established in the small firm literature such organizations are dominated by the entrepreneur (owner-manger) who relies on direct authority and high levels of informality (Rothwell, 1989; Vossen, 1998). Furthermore, such firms are less able to attract high-quality employees and are less likely to engage in training than larger firms (Wyer *et al*, 2000; Jones, 2003). Hence, the organizational ability to absorb new knowledge is less evident in small, owner-managed firms. Therefore, we suggest that intertwining is particularly important for institutionalising learning in firms that lack the sophisticated structures of large organizations. For example, routines, diagnostic systems, rules and procedures are less evident in SMEs as owner-managers rely on flexibility and informal communication mechanisms. While such factors are key sources of competitive advantage in smaller firms it means that institutionalising learning is more difficult.

We suggest that links with other organizations including customers, suppliers and knowledge providers help institutionalise learning in SMEs by providing structures that are otherwise absent (Gibb, 1997; Pittaway et al, 2004). The processes of opening-up and experimenting demonstrate the importance of knowledge-sharing links between organizations

(Homqvist, 2003). Our extension of the 4I framework incorporates inter-organizational relationships *via* Holmqvist's concept of intertwining (Figure 2). The model demonstrates that both feed-forward and feedback learning flows are linked to other organizations. For example, the development of integrated supply chains means that small firms are increasingly encouraged to share learning (feed-forward) with customers and suppliers (Macpherson and Wilson, 2003). Although feed-forward is important for building competitive advantage we also focus on how external organizations promote the institutionalization of new knowledge in SMEs. Intertwining with suppliers, customers or knowledge providers promotes feedback learning flows within the recipient company. The institutionalization of external knowledge leads to a cycle of integrating, interpreting and intuiting as employees learn from operating new procedures. In addition to intertwining activities we also suggest that feedback processes are intrinsically linked to the owner-manager's power. For example, the degree to which the owner-manager is willing to share their knowledge with other managers and employees will directly influence the extent to which genuine organizational learning takes place (Child, 1997; Stanworth and Curran, 1976; Jones, 2003). Fully institutionalizing new knowledge promotes further learning as the associated activities are incorporated into existing practices promoting integrating, interpreting and ultimately intuiting.

It is also important to note that the degree of interaction, trust and inequalities of power embedded in relationships influence the nature and extent of organizational learning (Coopey and Burgoyne, 2000; Contu and Willmott, 2003). Institutional structures and organizational social architecture limit legitimate interactions since they define the norms, conventions and expectations of social relationships (Gertler, 2003). Politics and power cannot be ignored when analyzing organizational learning since they are always present (Coopey, 1995). In SMEs, this will be particularly important given the proprietary nature of owner-managers' internal power but also because of their relative lack of power within the wider network (Figure 5). Indeed, as Child and Heavens (2003:321) argue 'possibilities for conceiving and acting upon new insights are likely to be defined by those structures that are already in being and enjoy legitimacy'. There is potentially tension between the relative power of owner-managers to define work practices within their organization and the power of organizations within the network to encourage the institutionalization of learning in order to change and formalize work practices in smaller firms.

Figure 2. *The 5I Organizational Learning Model*
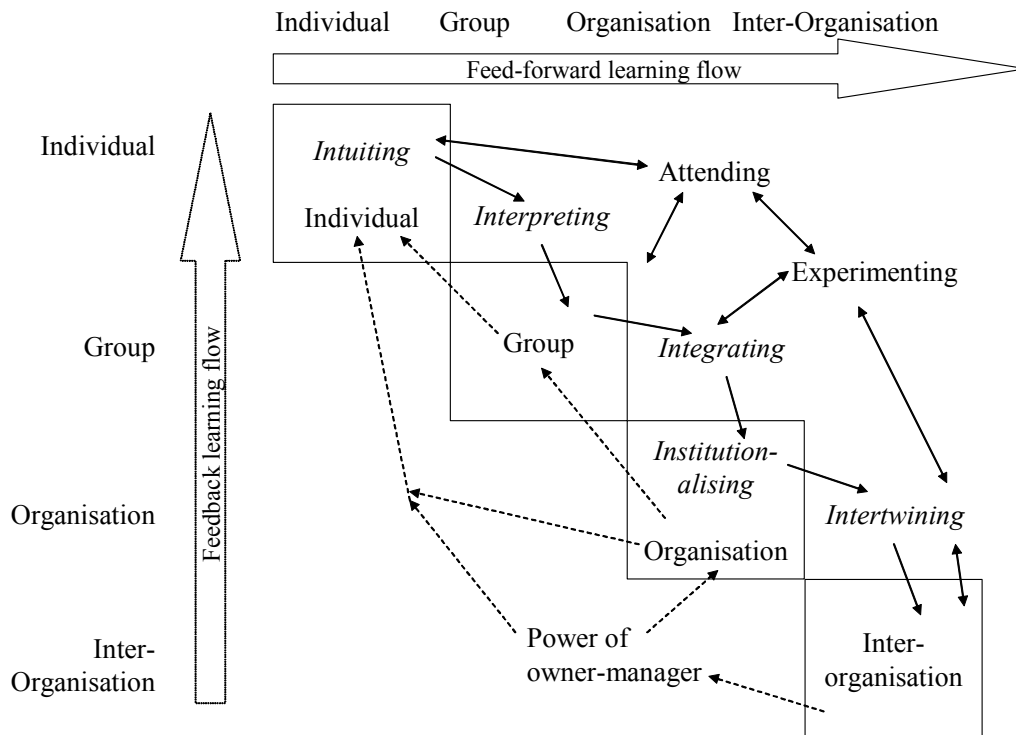
The Distinctive SME Learning Process

Our objective in this paper is to reconceptualise the 4I model by incorporating managerial power and external links into the internal learning processes. In doing so, we adopt a similar approach to Crossan *et al* (1999) who use Apple Computers to illustrate their model. Therefore, to express the processes of intertwining we draw on two cases undertaken as part of other research projects. The cases demonstrate the utility of our model rather than offer confirmatory empirical support. We suggest that this approach is appropriate because of the importance attached to a better understanding of how learning and organizational renewal can be promoted in smaller firms.

Research on BRW was carried out over a two-year period. Data incorporated five interviews including two audits of managerial systems and three interviews lasting between 90 minutes and two hours with the owner-manager. Interviews were taped and transcribed; information on the audits was collated and analysed to provide to provide a comprehensive overview of management systems within the organization. In addition, company documentation was made available for scrutiny to support the research. The second case examines activities associated with the introduction of new manufacturing methods into *MFD* a privately-owned manufacturing with approximately 200 employees. Data were acquired from a variety of sources including observation, regular discussions with the owner-manager, company documents and fifteen semi-structured interviews with all managers and supervisors

who were directly involved in the changes. We do not claim that these companies are in any way representative of small firms in general. In fact, one of the clear distinctions between SMEs and large firms is their heterogeneity compared with the 'isomorphism' of large organizations. For example, companies operating in particular sectors whether they are universities, banks or pharmaceutical companies share many common characteristics.

Another key distinction between large and small firms is the significance of the owner-manager. It is acknowledged that the entrepreneur is the major determinant on the way in which small businesses 'behave' (Bridge *et al,* 2003:187). That is, the characteristics of small business ventures generally closely reflect the founder's motivations (Chell *et al*, 1991; Glancey, 1998). This is confirmed by Sadler-Smith *et al* (2003:53) who found a statistical significant link between organizational growth and entrepreneurial style (Covin and Slevin, 1988). Therefore, our argument is that smaller firms are diverse because they are established in ways that reflects the approach of entrepreneur. Consequently, small, owner-managed firms are different because they reflect differences between individual entrepreneurs. Secondly, and this is central to our reconcepualisation of the 4I framework, small firms are not subject to the same institutional pressure which typify large organizations. To take the example of HR (human resource) practices which in large firms are similar because of regulatory requirements and the influence of bodies such as CIPD (Chartered Institute of Personnel Directors). Small firms have, until recently, been excluded from much employment legislation and such firms are typified by their 'informal' approaches to HR (Taylor, Shaw and Atkinson, 2003). Two contributory factors are the lack of personnel specialists in most small firms (Duberley and Walley, 1995) and the unwillingness of managers to engage in consultation with employees (Atkinson and Curtis, 2001). Taylor *et al* (2003) conclude that although the 1999 Employee Relations Act encouraged more formality in employee relations smaller firms are still typified by high levels of informality. The authors go on to suggest that the reluctance of owner-managers to acknowledge 'employee rights' reflects their unwillingness to accept external influences on independence and autonomy.

To summarise, the dominant role of the owner-manager and the lack of institutional pressures mean that smaller firms are much more diverse than their larger counterparts. Furthermore, because owner-managers are unwilling to delegate meaningful responsibility to employees SMEs lack the structures, procedures and organizational routines which typify large firms. This has two major implications for learning in SMEs. First, the majority of external contacts are based on the owner-manager and all new knowledge tends to be channelled through one individual. Secondly, there are no formal mechanisms by which knowledge can be shared and retained at an organizational level. Hence, our argument that external links are central to the promotion of effective learning within SMEs, since suppliers and customers provide the a means by which knowledge can be institutionalised.

Case 1 – BRW

BRW is a privately-owned precision machine engineering company with 70 employees which utilises CNC machines to produce components for larger manufacturers. Towards the end of the 1990s, MD Roger Wilson intuited a shift in the relationship between customer and suppliers. Lucas Aerospace, BRW's main customer at the time, set up a strategic sourcing initiative that removed decisions from local buyers. In order to win business, suppliers had to meet stringent performance criteria, and evidence-based performance improvements were required in all contracts. Although Wilson felt he was making savings and improving product quality, he could not provide evidence to his customer.

> They were looking for good business strategy you know. What are you doing to cut costs? How much scrap do you produce? I knew we'd made cost savings, but I couldn't produce evidence. My knowledge of what was going on in the company was all word of mouth. I knew we'd scrapped a job yesterday but by tomorrow that was all forgotten…. I knew I wasn't performing well in these audits.

It was clear to Wilson that if he was going to retain his major customer in the long-term he would need to provide competitive year-on-year improvements. It was also clear that his company's internal management systems were inadequate and lacked the professionalism that had become the industry norm. However, he did not have the expertise or knowledge in order to turn things around.

> It was very frightening because I didn't really know what to do. I knew I wasn't giving my customer what he wanted. I knew these strategic sourcing people weren't going to pick BRW and I also knew we were in danger of losing the work.

He was fortunate that Lucas Aerospace, concerned by the number of failed supply audits, set-up a supplier development programme, which was delivered by a Further Education College. Initially sceptical, he began to 'attend' to information provided by the college and Lucas Aerospace in an attempt to identify knowledge which might be useful within the company.

> Well there's this college and they're telling me that all big companies use these tools and techniques and I thought, they can't all be wrong, you know. It was a realization that these must work for them to be so popular and I started to cherry pick and listen to what could work in BRW.

This allowed the MD to gain experience in quality and continuous improvement techniques used in large firms. Continuous improvement was the key factor in winning work from Lucas, and Wilson was able make explicit what he was already doing and to improve his own systems by experimenting with systems discussed on the course. Initial improvement in internal systems was the result of a process that involved interpretation, experimentation and integration.

> I started doing graphs, putting them on the wall and showing the workforce exactly

what was going on… I started realizing, hang on a minute, we're producing a bit too much scrap here, there's too much waste involved. I'm throwing money down the drain…. You started tackling the problem. Plus I think the fact that we started to record things meant that every issue was being tackled, and your employees were involved more in discussions… it was discussions that solved the problem together.

Although the discussions allowed shared problem-solving, at this stage the processes were still informal. To support the change, he also created a quality function and appointed a quality manager in order to help institutionalize the new systems. However, the move to continuous improvement techniques was a radical departure from previous informal work practices. Staff were initially suspicious of his intentions. The MD and workforce were not experienced in formal production reviews and employees were initially reluctant to adopt new work practices.

At this stage, and in order to reinforce the need for change, the MD again enlisted the help of Lucas Aerospace. He took his workforce to an away-day presentation delivered by Lucas in order to set the change programme in a wider business context. He also got the workforce involved in practical activities by engaging a consultant to train them in continuous improvement techniques. In addition, the MD recruited a production manager with large firm and continuous improvement experience to provide more formalisation. Production systems were codified with set-up procedures and manufacturing methods for every job stored on computer. This information was used to optimize workflow and enable seamless handovers between shifts. Information from these formal manufacturing and quality systems was used as a management tool to control quality, costs and production problems. The successful institutionalization of quality and continuous improvement enabled BRW to demonstrate professional manufacturing management techniques to current and prospective customers, retain existing business, and win new business by demonstrating cost-conscious, high-quality manufacturing procedures. With the support of his customer, consultant and the college, Wilson was able to overcome resistance and institutionalize new attitudes and behaviours. They had effectively helped him to institutionalize both the systems and the behaviours expected within large commercial manufacturing.

Case 2 - MFD

MFD is a medium-sized (200 employees) privately-owned manufacturing company founded over 50 years ago to supply casting and machined components to the Ministry of Defence (MoD). The period of study coincided with the company making the transition from the batch production of engineering components to the mass production of electronic products. This move from batch to mass-product required an intensive period of organizational learning. Unfortunately, neither MD Mark Fletcher nor any of his managers had experience of mass production. Initially, conventional batch production methods continued to be utilised and there were a range of factors contributing to shop-floor

inefficiency including an ancient MRP (material requirement planning) system, which made it difficult to track material flows through the factory. Mass production exacerbated this problem and operator 'waiting time' increased as a result of material shortages. The work of white-collar staff was also inefficient as store-keepers and material controllers spent a considerable amount of time searching for missing components. Intuiting and interpreting occurred when Fletcher discussed his problems with representatives of *LaComm*, MFD's main customer, who had experience of mass production. A number of suggestions were made including use of flow-lines for assembly work and the incorporation of quality procedures into the job descriptions of operators (rather than being the responsibility of quality control). However, rather than simply implement these new approaches, Fletcher then engaged supervisors, stores personnel and the quality manager in discussions about the appropriateness of these activities within MFD. In other words, the intuiting phase which involved *LaComm* was followed by internal process of interpreting and integrating prior to implementation. Changes to shopfloor layout and associated investment in new equipment would not have occurred without pressure from the company's main customer.

> 'Mr Fletcher has spent a lot of money during the last 2 or 3 years. If he hadn't we'd be out of business because *LaComm* would go elsewhere even if it was only to second-source suppliers. We're tooled up for the electronics trade and we need to stay in it. We're buying dollops of equipment - a third of a million pounds a time' (Production Manager).

Institutionalising the changes proved more difficult as shop-floor employees constantly reverted to their conventional forms of work organization. Fletcher again utilised his links with *LaComm* to help overcome shop-floor resistance and institutionalise the changes. *LaComm* representatives provided direct assistance by explaining to supervisors and operators the importance of professionalizing their manufacturing activities. Fletcher also used *LaComm* as a 'lever' to minimise resistance amongst first-line supervisors and operators to changes in traditional working practices and encouraged the company to become more market focused.

> 'We've always manufactured to customer requirements but that is a reactionary position. Now we're proactive and draw customers in. That is a dramatic difference and the awakening of that reality was brought about by *LaComm* and required commitment from the chairman down' (Material Controller).

Fletcher also decided to take advantage of a Regional Development Agency (RDA) programme to improve manufacturing practices in small firms. The RDA project, which emphasised the importance of Kanban and shopfloor teams, in combination with the new layout, helped *MFD* shift towards the principles of lean manufacturing. The project involved a consultant from the RDA helping managers and supervisors understand how ideas associated with modern manufacturing practices could resolve their own production problems. The RDA consultant then helped Fletcher and his management team actually

introduce and embed these new working practices with shopfloor workers. Although the RDA's assistance was important everyone in the company knew they were reliant on *LaComm's* orders to sustain improvements in performance. Hence, the argument "*LaComm* say we must do this" was usually enough to overcome resistance to new working practices amongst managers, supervisors and shopfloor workers.

Discussion: Intertwining Knowledge in SMEs

'Opening-up' (Holmqvist, 2003) indicates that an organization shifts from the exploitation of existing knowledge to the exploration for new knowledge. Small firms, particularly those in stable sectors, generally emphasise knowledge exploitation rather than exploration (March, 1991). Exploitation is concerned with the effective application of current knowledge by focusing on the 'refinement, routinisation, production and elaboration of existing experience' (Holmqvist, 2003:99). Strategic renewal (Vera and Crossan, 2004) requires firms to break existing path dependencies as they shift from exploitation to exploration which focuses attention on the recognition and assimilation of new knowledge. Moving from exploitation to exploration is likely to prove difficult in most small firms and, as discussed below, may occur as a result of some internal crisis. While this issue is clearly important the main focus of this paper remains the mechanisms by which new knowledge is actually institutionalized within the firm. The stage when the organization moves from exploration to exploitation is described as 'focusing' by Holmqvist (2003). In other words, knowledge acquired externally must be firmly embedded within organizational procedures and routines if it is to be effectively exploited.

What we illustrate *via* the cases of BRW and MFD is that external organizations have a key role to play in helping smaller firms absorb and institutionalize new knowledge. Within both firms the owner-managers recognized the need to access knowledge from external sources to renew the strategic position of their respective companies. Both underestimated the difficulties associated with their absorptive capacity because of the lack of formal structures and procedures. *LaComm* and *Lucas Aerospace* provided Fletcher and Wilson with up-to-date knowledge about contemporary manufacturing practices. More importantly, both companies played an active role in ensuring new ways of working, particularly a commitment to quality and continuous improvement procedures, became institutionalized within MFD and BRW. The fact that both firms were well-established and had rudimentary managerial structures illustrates the scale of the problem for newer or less developed companies.

Our objective in this paper is to extend the 4I framework (Crossan et al, 1999, Zeitsam et al, 2002) by incorporating the role of owner-manager power and external links to organizational learning. That inter-organizational learning, both formal and informal, takes place is widely established in a range of literatures (Cohen and Levinthal, 1990; Inkpen and Crossan, 1995; Kale *et al*, 2000; Lane and Lubatkin, 1998). In fact, Holmqvist (2003) sets out what he describes as a 'dynamic model' in which intra- and inter-organizational learning are

intertwined rather than being discrete activities. Our approach differs in three ways; first we focus specifically on the unique problems of learning in SMEs. Secondly, we highlight the role played by external organizations in actually institutionalizing learning within the focus company. Again, we suggest that this is a distinct feature of SMEs which, without the influence of external partners, lack the systems, procedures and routines by which to embed knowledge. Such firms are typified by high levels of informality which provides a key source of advantage in competing against larger, better resourced but more bureaucratic organizations. The negative impact is that SMEs do not possess the structural mechanisms for knowledge-sharing which are taken for granted in large organizations. Thirdly, we focus on the asymmetries of power associated with owning and managing small firms: on the one-hand, proprietary rights provide owner-managers with unchallenged authority within the firm. On the other hand, owner-managers have little real influence in their external relationships with more powerful customers and suppliers (Agrell *et al*, 2004; Rokkan and Haugland, 2002; Watson, 2004).

Even when owner-managers overcome hurdles associated with the identification and acquisition of knowledge there are still formidable barriers within the firm. The assimilation, transformation and exploitation of that knowledge demands the creation of structures, systems and routines to broaden the scope of learning from an individual level (the owner-manager) to the organizational level (Liao et al, 2003). Hence, the importance of external actors (customers, suppliers and regulators) who help embed learning at the organizational level. Our revised model (Figure 2) indicates that external organizations have a role to play in the 'feed-forward' processes by which knowledge created as a result of individual 'intuiting' is interpreted, integrated, institutionalized and intertwined. In our two cases, we primarily focus on the feedback processes by which new knowledge becomes institutionalized as a result of pressure from customers or suppliers. This, we suggest, is the key to strategic renewal in SMEs as external knowledge must be effectively institutionalized if 'learning' is to shift from the level of the individual owner-manager to the organization as a whole. Although, as Green (2004) points out, institutional approaches to the diffusion of managerial practices emphasise the importance of those practices to the pursuit of rational goals (higher productivity or quality). In contrast, the 'rhetorical turn' allows diffusion to be decoupled from institutionalisation so that, for example, those with power can force new practices on others (Green, 2004: 665).

It is instructive here to analyse the significant asymmetries of power involved with OL activities taking place within these case organizations. First, it is unlikely that learning would have been achieved had the owner-managers of the two firms not 'intuited' and 'opened up' to the problems caused by a lack of institutional systems necessary to manage production effectively. Their roles were central to the move from exploitation to exploration. However, this 'opening up' was stimulated by recognition that major customers were dissatisfied and had the *power* to withdraw their orders. Moreover, the actual institutionalization drew on the credibility of the customer and other outside agencies to help to resolve conflict within the

organizations and thus allow learning to be fed-back and embedded in systems of production. Knowledge was distributed throughout the organizations and systems established so that learning will be retained even if current staff members leave.

That OL achieved in these firms was dependent on the dynamics of specific contexts exemplifies the gradual shift within the literature from cognitive approaches to 'situated learning theory' (Lave and Wenger, 1991). Situated learning approaches pay more attention to the broader organizational context including culture, 'mediating' artefacts and power relations. Lave and Wenger (1991:35) draw attention to the fact that learning is situated within everyday work activities and is 'an integral part of generative social practices in the lived-in world'. Contu and Willmott (2003) identify links between power, particularly in terms of control over resources, and the possibility of situated learning taking place. We suggest that this issue is particularly significant in SMEs where 'proprietary rights' give owner-managers much greater direct power than conventional managers who rely on 'bureaucratic authority'. As pointed out by Hardy and Clegg (1995) both Marx and Weber acknowledge that power is derived from the ownership and control of the means of production. Although, in his more sophisticated analysis Weber rejected the view that power was reducible to categories of ownership or non-ownership.

> 'Organizations could be differentiated in terms of people's ability to control the methods of production, as influenced by technical relations of production, and embedded in diverse occupational identities from which grew the subjective life-world of the organization' (Hardy and Clegg, 1995:623).

Hence, all organization members have some opportunity to exercise creativity, discretion and even to challenge 'structures of domination'. As Hardy and Clegg (1995:624) go on to say 'power in organizations necessarily concerns the hierarchical structure of offices and their relationship to each other'. A short, but highly influential, monograph by Steven Lukes is the most widely-quoted source of our understanding of power. Hardy and Leiba-O'Sullivan (1998) update the framework by adding a fourth dimension which takes account of poststructuralist perspectives on power (Table 2). The four dimensions of power can be defined as follows: the first dimension is pluralist, the second coercive, the third ideological and the fourth disciplinary. If we assume that A represents the owner-manager and B represents the employees then this framework provides the potential for categorising power relations in a range of SMEs. At the same time, it is a consistent theme of this paper that a defining feature of SMEs is that proprietary rights mean the exercise of power, and its influence over access to knowledge, is more overt than in larger organizations. It is also likely that the type of power exercised by owner-managers directly influences the nature of knowledge generated within new firms. However, in the process of intertwining, it is also the power held within other organizations that can be used to overcome, or suppress, dissenting voices that inevitably arise during the learning process as old systems of work organization are challenged. As Engeström (2000) argues, learning is not a conflict-free process of

socialization. Rather it is an iterative and contested process where historical experiences and current contexts create tensions (Tsoukas, 1996). Resolving tensions requires the ability both to define and legitimate new routines and activities. In the cases presented here, institutionalization of learning depends on the influence of the customer to define acceptable production standards and processes. It also required the owner-manager to accept this definition and to employ the customer in legitimating change, eventually institutionalizing learning through the adoption of new routines.

Table 2. *Dimensions of Power (Hardy and Lieba-O'Sullivan, 1998)*

	1st Dimension	2nd Dimension	3rd Dimension	4th Dimension
Power of A over B	Management of resource dependencies	Management of decision-making processes	Management of meaning	None - embedded in the system
Interaction of A and B	Overt conflict	Overt and covert conflict	Apparent cooperation	Local struggles
Reasons for B's failure to influence outcomes	B aware of issues but unable to use power effectively to influence outcomes	B aware of issues but unable to get to decision arena	B unaware of issues and has no will to resist	A and B prisoners of prevailing discourses of power although A derives greater advantage
Empowerment of B	Acquisition of resources and ability to mobilise	Access to decision arena	Consciousness raising and 'delegitimation' strategies to create will to resist	Empowerment not possible although local struggles may produce a more positive experience
Key authors	Thompson, 1956 Pettigrew, 1971 Pfeffer and Salancik, 1974 Pfeffer, 1981 Hickson et al, 1971	Crenson, 1971 Hunter, 1980	Clegg, 1975 Pettigrew, 1979 Ranson et al, 1980 Martin, 1982	Foucault Cooper and Burrell Hassard, Knights, Willmott *ad nauseum*

Conclusion: Practice and Policy Implications

In this paper we extend the original 4I framework by identifying the significance of external organizations and owner-manager power to learning in SMEs. As a means of demonstrating the utility of our model we introduce two case studies of learning in small, independent firms. To summarise, both firms renewed their activities by tapping into

knowledge and expertise from their main customers. This activity was clearly part of the feed-forward process (Crossan et al, 1999) as inter-organizational links helped resolve intractable problems in both DFM and BRW. Further, in both firms, pressure from their main customers helped institutionalize new knowledge by encouraging the adoption of more professional managerial practices. Because knowledge was embedded within organizational processes and systems (rather than in the head of owner-managers) learning was fed-back to groups and individuals *via* the micro-processes of integration, interpretation and intuiting.

Morgan and Morrison (1999) suggest that 'models' are important in both natural and social sciences because they mediate theory and empirical phenomena. To learn from conceptual models 'it is important to justify more clearly what theoretical and empirical aspects are selected and how they are addressed in the proposed model' (Van Den Bosch *et al*, 2003:295). In this paper we have sought to extend the 4I model by incorporating ideas related to inter-organizational learning. We have also drawn on literature associated with SMEs to demonstrate that organizational learning in small firms is very different from larger firms. In particular, effective organizational learning requires owner-managers to relinquish proprietary control to enable other actors to have more involvement in the acquisition, dissemination and application of that knowledge. We have used two cases as a way of illustrating the utility of our model and accept that the data do not provide empirical support in a manner that would be appropriate in the natural sciences. This mirrors the approach adopted by Crossan *et al* (1999) in their conceptualization of the 4I framework. The original model has subsequently been validated and extended by other authors including Crossan and Berdrow (2003) and Zietsma *et al* (2002). Organizational learning in SMEs has been largely ignored in favour of greater focus on 'entrepreneurial learning' by the academic community. We suggest that our conceptualization provides the opportunity for a more rigorous focus on the mechanisms by which small firms acquire new knowledge as a basis for organizational renewal. Not least of all because the need to compete in an increasingly globalised economy means that service firms as well as manufacturing firms can only remain competitive in the longer-term by becoming knowledge-based organizations.

While our main aim has been to improve the conceptual understanding of how SMEs renew their activities it is also suggested that this paper has implications for the practitioner community. What we know from the limited research on organizational learning in SMEs is that owner-managers are both the main means of accessing new knowledge and at the same time the barrier to dissemination of that knowledge within the firm (Cheouke and Armstrong, 1998). This paradox is related to the way in which owner-managers exercise their proprietary rights which means that they are reluctant to cede power to others within their company. Consequently, in SMEs owner-managers are usually responsible for the majority of external contacts (suppliers, customers, regulators, finance providers) and retain tight control over internal decision-making. Therefore, we conclude that to promote strategic renewal owner-managers must first of all 'open-up' their companies to external knowledge sources. Secondly, owner-managers must allow customers and/or suppliers to help create the internal

mechanisms by which real organizational learning can take place. Institutionalizing learning means establishing the systems, procedures and routines by which external knowledge can be disseminated to all employees within the firm.

We further suggest that the policy community can make use of the ideas expressed in our model to improve managerial practices within small firms. For example, measures such as the number of employees or turnover are acknowledged to be unsatisfactory ways of categorizing small firms (Tilley and Tonge, 2003). Entrepreneurial firms tend to be 'learning organizations' as owner-managers match internal resources to external opportunities (Bridge *et al,* 2003:187). However, 'lifestyle' businesses founded by entrepreneurs who simply want a reasonable income will be very different than fast-growing firms established by 'innovatory' entrepreneurs (Chell *et al*, 1991). That is, the characteristics of new business ventures will generally closely reflect the founder's motivations (Glancey, 1998). This is confirmed by Sadler-Smith *et al* (2003:53) who found a statistical significant link between high growth and entrepreneurial style (Covin and Slevin, 1988). In other words, it is possible to hypothesise that entrepreneurs who emphasise organizational learning will place more emphasis on innovation and growth. Thus, an alternative approach might adopt measures related to a firm's ability to absorb new knowledge. This could incorporate an understanding of how the elements or systems of absorptive capacity identified by Zahra and George (2002), acquisition, assimilation, transformation and exploitation, are addressed within the firm. It would be relatively straight-forward to 'measure' a firm's ability related to knowledge exploration (high, medium, low) and exploitation (high, medium, low). Even such a simple categorization would provide the policy community with a more effective template for intervention.

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Endnotes

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Retail internationalization and the role of knowledge sharing: A qualitative case study of IKEAs expansion into the Russian market

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Abstract

Research on the internationalisation process and retail internationalisation acknowledges the relevance of knowledge management and organizational learning, even though there is a lack of discussion about the specific constructs and approaches. The central role of knowledge sharing in the internationalisation process is rarely stressed. The aim of this paper therefore is to stress the importance of a more critical discussion about knowledge in theories about internatioanlisaiton and to develop a tentative framework for knowledge and knowledge sharing based upon previous literature about knowledge sharing and the internationalization process (Johanson & Vahlne, 1977, 1990). The theoretical approach is then used to discuss and analyse the case of IKEA's entry into the Russian market. The purpose of this research should be regarded as mainly explorative - in order to increase our understanding on the role of knowledge and knowledge sharing in theories on internationalization and on whether and how general internationalisation theories can be applied within a retailing context.

Introduction

The retail sector has become more and more international in its outlook and operations (McGoldrick, 2002). Furthermore, internationalization of retailers is often argued to be particularly challenging and complex, especially when compared to manufacturing. Retailers normally need to develop and manage a set of stores on the new market, and thus cannot use a traditional exporting strategy. This will involve the recruitment and education of staff, development of property, contacts with local and national institutional actors, etc. Consequently, the need to develop a strategy for how to share knowledge should be especially crucial for retailers. Still, there is a dearth of research on the role of knowledge and knowledge sharing as a retailer enters new markets. Researchers focusing specifically on retail internationalization (e.g. Dawson, 2000, 2003; Doherty, 1999) have expressed the importance of looking into theories about knowledge and learning. Dawson (2003) argues that whilst research has shown that knowledge sharing does occur, research has not focused upon how it occurs, and the latter is a precondition for fully understanding its impact on retail internationalization.

One of the most cited internationalization models was developed by Johanson and Vahlne (1977, 1990). It is often referred to as the internationalization process model, sometimes as the learning approach since knowledge is the centerpiece of the model (Fletcher, 2001). However, the model has been questioned for only emphasizing experiential knowledge, i.e. one out of several *types* of knowledge, and for not explaining the mechanisms for *how* to share knowledge (Blomstermo & Sharma, 2003; Forsgren, 2002; Petersen et al, 2003). Nevertheless, McGoldrick (2002) argues that the ideas about knowledge stemming from the internationalization process model would be interesting to develop for the retail sector. The

patterns for how retailers expand into new markets also seem to fit with the ideas of the internationalization process model (Alexander, 1997; McGoldrick, 2002; Vida & Fairhurst, 1998, Vida & Reardon, 2000). A first attempt to incorporate the ideas of the internationalization process model into retailing was made by Vida and Fairhurst (1998). Vida and Reardon (2000) further develop their approach by relating the internationalization process model to the stages model for internationalization (Cavusgil, 1980). Their study supports the relevance of such an approach even though more empirical data is needed.

While some retail researchers argue that it is possible to adopt general internationalization theories to retailing (Sternquist, 1997) or at least to apply them to a certain extent (Vida & Fairhurst, 1998; Vida & Reardon, 2000) some argue that it is less desirable to apply these since they were developed in relation to manufacturing firms (e.g. Alexander & Myers, 2000; Dawson, 1994). Organizational differences between manufacturing and retailing firms are thus argued to hinder the application of international business paradigms and by applying these models the specific requirements of retailing may be neglected. However, Dawson (2003) acknowledges that research outside the retail sector may have a great potential to provide new insights into knowledge creation and knowledge sharing in international retail firms, but that it has to be applied with care. This suggests that only by further studying the phenomenon empirically within a retail setting it is possible to evaluate the role of general theory as well as to increase our understanding of the nature of knowledge and knowledge sharing in the process of retail internationalization. All in all, there is little empirical data on knowledge and knowledge sharing in the process of retail internationalization and in-depth studies of international retail firms may be a first step towards a better understanding of this issue.

The aim of this paper is to develop a tentative framework for knowledge and knowledge sharing based upon previous literature about knowledge sharing and the internationalization process (Johanson & Vahlne, 1977, 1990). The theoretical approach is then used to discuss and analyze the case of IKEA's entry to the Russian market, in order to identify critical aspects and factors with a specific relevance to knowledge and knowledge sharing in international retailing. The purpose of the research should thus be regarded as mainly explorative - in order to increase our understanding on both how general theory can be applied within retailing and on the role of knowledge and knowledge sharing as a major retailer enters a new market.

The following section will further discuss the basic ideas and recent developments in theories on retail internationalization and the internationalization process model (Johanson & Vahlne, 1977, 1990). Furthermore, theories on knowledge and knowledge sharing in relation to theories on internationalization will be discussed. The empirical case of IKEA will then be presented, based on the constructs discussed in the theoretical part. Finally, some tentative conclusions and implications for future research will be presented.

Theories on knowledge and the internationalization process

Retailing is more complex and different from manufacturing in several aspects (Dawson, 2000; Elg, 2003; Helfferich et al, 1997; McGoldrick, 2002), e.g. its responsiveness to local culture, the dispersed nature of operations, the large number of products and services offered and the large extent of network activities. Retailing involves direct contact with the end-consumer, which requires effective research procedures and information systems in order to understand the consumer. Retailers also offer a complex mix of products and services in order to meet the consumers varying and changing needs and wants.

According to Alexander and Myers (2000) there is a danger in adopting general internationalization theories since the great amount of research about international retailing may be neglected and it may restrict the development of a more applicable framework. Dawson (1994) argues that it may be possible to borrow some concepts from (industrial) internationalization theory but that it is unlikely to apply it directly to the retail industry because the structure, the process and behavior are different from manufacturing firms. However, Dawson (2003) argues that questions about why, where and how retailers enter new markets have been in focus in research about retail internationalization but that there is still much to develop. The question about *how* should very much be linked to the question of how knowledge is shared when a retail organization expands and enters new markets. Furthermore, it is argued that retailing should not be viewed in isolation; *"Research outside the retail sector (Nonaka et al, 2002a,b) has the potential to provide new insights on international retailing in respect of this knowledge creating and transfer in multinational firms. These processes of knowledge management are likely to be important in influencing the extent of improvement in performance as the firm develops internationally."* (Dawson, 2003: 202).

There are thus a number of different views on whether it is possible to adopt or adapt general theories about internationalization or not to retailing. This stresses the need of additional empirical research on knowledge and knowledge sharing in the retail internationalization process.

The Johanson and Vahlne model is one of the most cited general internationalization frameworks. Based on earlier theories of the firm (Aharoni 1966; Cyert and March 1963; Penrose 1959) it assumes that a company does not have full access to information and that internationalization is a process of increasing experiential knowledge. It views the internationalization process of a firm as interplay between knowledge development and increasing foreign market commitment. The model has a potential to provide valuable insights into what kind of knowledge that is relevant for internationalization. It has been empirically tested in many different studies, but lately it has been criticized for being obsolete, to simplistic and for not really developing the ideas about learning. Several researchers have stressed the need for additional research and a more in depth understanding of the knowledge construct. Blomstermo and Sharma (2003) as well as Eriksson et al, (1997) argue that there is a need for more research on the nature of knowledge and how it is shared. Petersen et al (2003) argue that theories about knowledge as well as the economy and society have change

considerably since 1977 and that the knowledge concept used in the model therefore must be challenged. They also argue that we need more empirical insight into the kind of knowledge useful in the learning process and how knowledge is accumulated. It is possible that the failure in adopting general theories about internationalization to a retailing context may be a result from the confusion in relation to what is meant by knowledge and learning. In such case it is possible that this research could lead not only to a better understanding of retail internationalization but also the internationalization process model (Johanson & Vahlne, 1977, 1990).

In accordance with this, my paper investigates the types of knowledge that a retailer relies upon when entering a new market and if different types of knowledge are emphasized in different phases of the internationalization process. In Johanson & Vahlne's original internationalization process model (1977) *market knowledge* is used as to explain knowledge about the foreign market. It also makes the distinction that *objective market knowledge* is something that can be taught whereas *experiential market knowledge* is something that only can be learnt trough personal experience. This view can be linked to the discussion about explicit vs. tacit knowledge and the different methods for sharing these dimensions of knowledge (Polanyi, 1967; Nonaka, 1991). Furthermore, a distinction is made between general knowledge and market-specific knowledge. *General knowledge* is defined as certain marketing methods and common characteristics of certain types of customers. *Market-specific knowledge* is defined as knowledge about characteristics of the specific market and specific individual customer. Eriksson et al (1997:343) extend the knowledge concept by separating internationalization knowledge, institutional knowledge and business knowledge. *Internationalization knowledge* is defined as experiential knowledge about the firm's capabilities and resources to expand on new markets. Furthermore, experiential foreign market knowledge pertains *business knowledge*, i.e. knowledge about customers, the market and competitors, and *institutional knowledge*, i.e. knowledge of government, institutional framework, rules, norms and values.

Vida and Reardon (2000:3-6) adapt the knowledge concept derived from the internationalization process model to a retail context. In their study *international knowledge* refers to the strategic management team's information-seeking behavior. *Experiential knowledge* refers to the strategic management team's international competence and the firm's prior experience in the international resource seeking involvement. Except from the study by Vida and Reardon (2000) retail internationalization research does not discuss knowledge to a great extent. However, recently Dawson (2003) argued that knowledge might be categorized in many different ways in the retail internationalization process, focusing upon four types of knowledge; *Experiential knowledge* is personal knowledge gained through experience of entering a new market. *Routine knowledge* is knowledge about the organizational routines and firm-specific know-how. *Conceptual knowledge* is knowledge that result from the organization's concepts and brands. *Systematic knowledge* is codified knowledge, which can be found in operating manuals, which are very common for retailing. Following these types of

knowledge used for retailing it appears relevant to further investigate whether there are certain knowledge needs that are specific for retailers, and what the implications are with regards to retail internationalization. Furthermore, it appears relevant to investigate how knowledge is created and how this knowledge is shared in order to be able to discuss knowledge.

A problematic aspect is that many different definitions are used and thus certain confusion with regards to the knowledge construct. Having focused on the knowledge concept in literature about retail internationalization and internationalization I find it problematic that there are so many definitions used (sometimes describing the same kind of knowledge). I also find it problematic that sometimes there is a lack of definitions, meaning that it is not clear what is meant by knowledge and how knowledge is created. When discussing knowledge creation it is important to separate whether it originates within individuals or groups of social systems (Alavi & Tiwana, 2003) Furthermore, a key point is to separate data from information and information from knowledge in order to understand the learning aspects in theories about internationalization. It appears that internationalization research sometimes uses the term knowledge when actually referring to information or data, and does not discuss how information is shared within the organization or the impact of that information on the internationalization process. However, the knowledge management literature makes a distinction between data, information and knowledge (Davenport & Prusak, 1998; De Long & Fahey, 2000) in viewing data as facts, images or sounds that may influence a particular task, information as data appropriate for a particular use, and knowledge as a combination of instincts, ideas, rules and procedures that guide actions and decisions. This study focuses upon *knowledge* that will guide actions and decisions in the internationalization process rather than upon pure information or data.

As demonstrated above, knowledge is not an easy concept to define. Synthesizing the many definitions of knowledge used in the internationalization process model (Johanson & Vahlne, 1977, 1990), the extended versions of it, and the ones used in theories about retail internationalization (Dawson, 2003; Vida & Reardon, 2000) has lead to the following tentative types of knowledge, which are defined accordingly: i) **market knowledge** about the new market (knowledge about customers, competitors, suppliers, authorities etc), ii) **internationalization knowledge** - i.e. general knowledge stemming from the experience of entering or expanding on new markets, iii) **corporate knowledge** about corporate goals and strategies, organizational culture and organizational routines and know-how about the organization.

Research on the internationalization process and retail internationalization thus acknowledges to a certain extent the relevance of knowledge management and organizational learning, even though there is a lack of discussion about the specific constructs and approaches that would be most fruitful. I believe that it is important to stress that the lack of such discussion may have consequence when reading about knowledge and internationalization and that this may lead to many misinterpretations of presented research on this topic. However, the discussion about organizational learning and knowledge management

has been rather diverse. Instead of looking into synergies with the two theories researchers seem to have ended up in a discussion about definitions and demarcations (Salk & Simonin, 2003; Vera and Crossan, 2003). This is especially evident when reading specifically about knowledge sharing.

Furthermore, the central role of knowledge sharing in the internationalization process is rarely stressed in research on the internationalization process and retail internationalization. Knowledge sharing can be seen as the first and initial step towards learning during the internationalization process. It can be expected to become especially central when managing the complexity of retail internationalization. Knowledge sharing is based on the idea that tacit as well as explicit dimensions of knowledge, "is capable of being disseminated, transferred, diffused, shared and distributed within and between organizations, communities of practices and departments" (Kalling & Styhre, 2003:57). Furthermore, the characteristics of knowledge - being tacit, complex or ambiguous - affect knowledge sharing (Nonaka, 1991). It is clear that explicit knowledge is more easily sharable than tacit knowledge. Experience sharing, the fundamental source of tacit knowledge, is a key to be able to build mutual trust. Through a continuous dialogue tacit knowledge may be articulated to explicit knowledge. Further, the recipient's absorptive capacity, the sender's motivation and the distance between sender and receiver also influence the processes.

In their literature review Kalling and Styhre (2003) find that knowledge sharing theory rests upon theories emphasizing the nature of shared knowledge, the cognitive abilities of those who receives knowledge and the organizational and social context where transfer occurs. They further argue that knowledge sharing can be studied based upon i) the *different organizational levels* where it occurs, ii) the *tools and mechanisms* for knowledge sharing, and iii) *factors enabling and hindering* knowledge sharing. Empirical studies of the process of knowledge sharing have focused on what part of the organization that is involved in knowledge sharing, e.g. communities of practice, teams, departments and networks; tools and mechanisms for knowledge sharing such as intranet and knowledge brokers; and different conceptual frameworks focusing on establishing a theory about what enables or hinders knowledge sharing, e.g. cultural barriers, motivation and tacit knowledge. It is important to understand that there is a difference in perspectives within knowledge management and organizational learning and that researchers therefore tend to focus on different aspects of knowledge sharing. Drawing upon the aspects stressed by Kalling and Styhre (2003) and the insights concerning different types of knowledge discussed, the paper continues by analyzing the role of knowledge during the different phases of IKEA's entry to the Russian market.

IKEA'S entry to Russia

This research is based on a single case study design focusing upon IKEA's expansion into the Russian market. IKEA is a leading home furnishing company with 202 stores in 32 countries (http://www.ikea-group.ikea.com/corporate). Of these stores, 180 stores belong to

the IKEA Group with more than 84 000 employees. The remaining 22 stores are owned and run by franchisees outside the IKEA Group. Sales for the IKEA Group for the financial year 2004 (1 September 2003 – 31 August 2004) totaled 12.8 billion euro (15.5 billion USD). The first store outside Scandinavia opened in 1973 outside Zurich, Switzerland. In 1974 the first German IKEA store was opened. Germany is today IKEAs top selling country followed by the United Kingdom, the USA, France and Sweden. In 2005 the IKEA Group plans to open 17 new stores in nine different countries.

The company was founded by Ingvar Kamprad in 1943 and is today owned by a foundation, the Stichting INGKA Foundation. INGKA Holding B.V. is the ultimate parent company for all IKEA Group companies, including the industrial group Swedwood, which manufactures IKEA furniture, the sales companies that run the stores, as well as purchasing and supply functions, and IKEA of Sweden, which is responsible for the design and development of products in the IKEA range. The range consists of approximately 10 000 articles. INGKA Holding BV is wholly owned by Stichting INGKA Foundation.

IKEA opened its first store in Moscow in March 2000. At present four IKEA stores operate in Russia, two in Moscow, one in St Petersburg and one in Kazan. Besides the IKEA stores, the company have opened two Mega Mall shopping centers in Moscow. IKEAs current expansion plan in Russia is to open two new stores as well as two new mega malls a year in 13 different cities. IKEA Russia is organized someway differently from other IKEA countries. The Russian organization includes IKEA Retail, IKEA Trading, New product development, IKEA Property and IKEA Distribution. Furthermore, a special project organization responsible for the future expansion is part of the Russian organization.

IKEA may be regarded as a unique and critical case, which makes it especially suitable (Yin, 1984). IKEA is the biggest global furniture retail company, a foundation that enables IKEA to grow in its own pace. The fact that the expansion strategy is based on a standardized retail offer with an ability to adapt to different cultural settings and to use previous experiences and insights in order to support their entry to new markets, further makes it an interesting case to study. The research approach was to generate insights about the kind of knowledge found important for IKEA's entrance and expansion on the Russian market and how this knowledge is shared. The empirical data consists of 24 in-depth interviews with people from different parts of the Russian organization in Moscow. Interviewees were selected in order to provide a broad representation of the organization, encompassing country, marketing and store managers as well as employees responsible for certain product categories in the store. The interviews were of a semi-structured character, lasting between 90 and 120 minutes. They were not based on specific questions about knowledge sharing, but on a more open discussion about IKEA's entrance and expansion on the Russian market. As knowledge sharing appeared in the interviews, follow-up questions were asked in order to capture the meaning of knowledge sharing as a concept and how IKEA worked with these processes.

The empirical findings show that knowledge sharing is a recurrent theme when discussing key success factors to IKEAs expansion into the Russian market. However, the concept of

knowledge sharing is sometimes used differently and the views on how to share and motivate employees to share knowledge vary. Knowledge sharing was, however, often described as part of the IKEA culture. This will be discussed in more detail below, but first focus will be upon the types of knowledge that is highlighted and shared in different phases of the internationalization process. In the performed interviews it becomes evident that the knowledge needs vary in the different phases of the internationalization process.

The types of knowledge emphasized in the three phases of the internationalization process

During the phase of **selecting and preparing to enter** the Russian market, most respondents regarded information about Russian market and particularly Russian customers to have a limited role. The reason for selecting and entering the Russian market was very much related to Ingvar Kamprad's vision, and since a lot of people live in Moscow at least one store was considered most likely to succeed without any survey giving that type of information. Concerning a specific strategy for how to enter the market, IKEA's view is that it is better to first live and learn about the new market and then to set the strategies. It is argued that to set up a new business is very little theory and very much practice. Once the decision was made to enter the Russian market IKEA specialists were sent to Russia to do market research. However, according to the country manager the information about the Russian market was very limited and not very good. For example, one advice that was given was that the IKEA store must be situated near a Metro-station since there were hardly any cars in Moscow. Five years later traffic jams is one of Moscow's major problems. It was argued that instead of relying on information about the market it is better to acquire *market knowledge* through market presence and company specific experiences based on active learning. In the words of the distribution manager with many years of international IKEA experience, IKEA's view is that it is important to learn about the market in an active manner that enables the company to perceive it through the eyes of the local consumers.

Internationalization knowledge was thus viewed as more important than market information when preparing to enter. In order to get that experience the Russian country manager recruited people with substantial IKEA experiences from other market entries, including several very experienced senior managers who had previously worked on other markets around the world. This move can in itself be regarded as a consequence of previously acquired internationalization knowledge. When setting up the Chinese IKEA organization "young potentials" (persons recruited from the universities and believed to be future IKEA-leaders), were recruited. Based upon the view of representatives of the Russian organization this was a reason why the entry into China met some problems and why the growth was slower that expected. It is held that experience of earlier mistakes and the ambition to do something better next time is one of the characteristics that make IKEA Russia successful. The personal experiences from entering the Hungarian market also pushed the country manager to try to make it better and not make the same mistakes again, and for recruiting a

management team with substantial IKEA experience. As the country manager expresses it; "*If we are going to build a good IKEA then we can only do it with people who know what IKEA is. A very common IKEA-way to think is to be cost saving. We shall be cost saving, but that would be to save in the wrong end. Because if you try to build something with a few people that have IKEA experience and the reason for having foreigners here is for the simple reason that there are no Russians with IKEA experience. So it has nothing to do with passports but rather the IKEA experience. And these foreigners are the guarantee for us to make an IKEA with high quality.*"

It was, however, necessary to develop a specific type of *market knowledge* concerning the macro-environment in order to prepare the entrance. Information about laws and regulations obviously played a critical role in preparing and investigating the possibility to enter and finding an attractive store location. The property manager explains that this process was and still is very time-consuming since you need to understand the different laws and regulations, locate the people responsible for given the permission to rent and build etc. In order to develop this market knowledge long term personal contacts are considered important. Normally it is the property manager together with the country manager that takes the initial contacts. Here, it is not only important to have market knowledge, however, but also *internationalization knowledge* that prepares the company representatives, provides them with the patience required for such time-consuming processes as to get a lease for land in Russia and enables them to identify the critical local actors to whom relationships need to be developed.

In order to be able to manage **the first critical years** it was important that IKEA could start its operations immediately. When recruiting people to Russia the country manager was looking for enthusiastic people to go to Russia and to share their IKEA *corporate knowledge*. The "old entrepreneurs" within IKEA that have been responsible for earlier expansions were thus employed for two reasons, one being their *internationalization knowledge* discussed earlier. A second reason was to teach Russian employees how to manage according to the IKEA way rather than the traditional the Russian way. Sharing corporate knowledge was prioritized to market knowledge at this stage. After the senior management had been recruited a group of 34 young, well-educated Russians were recruited. IKEA was looking for young people with an open, and ambitious attitude. Recruiting and educating a core group of Russians enabled IKEA to bring local *market knowledge* into the organization. This group was sent to other IKEA markets in order to get *corporate knowledge* through training and through their own experiences. The country manager saw this as the core group and a real key success factor for IKEA in Russia. One of the group's first tasks was then to recruit 450 employees to the first IKEA store in Russia and members of this are likely to be take over the responsibility for the Russian organization when the expatriates leave.

A combination of *internationalization knowledge* and *corporate knowledge* was thus considered as a basis for the first critical years. However, traditional *market knowledge,* such as information about income, buying power, local preferences and perceptions, also became

more important at this stage in order for IKEA to adjust the marketing of their retail proposition to local conditions. This information was collected through different surveys conducted by IKEA as well as by externally bought information. It was further argued that by employing local people market knowledge was acquired. In accordance with the general, global IKEA strategy adaptations would only concern the product range to a very limited degree. Rather, IKEA adapted their strategies for promotion, communication and how to present the product range in the stores to local characteristics.

Developing the Russian distribution system was also a crucial task for the Russian IKEA organization. The very high import duties pressured the Russian organization to look for alternative ways for how to get goods to Russia. It was argued that by facing these problems the real IKEA spirit evolved, i.e. being an entrepreneur always looking for better solutions. Here, *market knowledge* about laws and regulations about tariffs and import duties was needed and establishing long-term personal contacts on the local market was a key factor in getting this market knowledge. In order to be able to manage this part of the Russian organization a distribution manager with great earlier experience was recruited to Russia. Again, *internationalization knowledge* was considered as very important in order to be able to manage the first critical years.

Trading is also an important part of the organization, since by producing more locally it is possible for IKEA to offer low prices to the Russian consumers. A special new product development organization has also been developed for Russia with the purpose to adapt products from the IKEA Range to the Russian market. *Corporate knowledge* was considered as very important since being able to develop new products for the Russian market it is crucial to have earlier experience of product development at IKEA. *Market knowledge* was also very important when trying to find good suppliers that can offer the lowest price and to understand the Russian preferences and how products can be adapted to the local market.

Knowledge required for further expansion will be required because of IKEAs rather intense expansion strategy. Less can be said about this phase since it is still in an early stage. A project team is, however, responsible for the expansion - for finding relevant cities of location, get permissions, build a store and recruit and educate new IKEA co-workers - but it is still the country manager that sets the frames for the expansion emphasizing based on his substantial previous internationalization knowledge. It was considered important to share IKEA corporate knowledge since local knowledge about how to run an IKEA store the IKEA way is rather low. *Market knowledge* combined with *internationalization knowledge* and *corporate knowledge* was thus still important for the further expansion. A first critical test of IKEA's expansion strategy is the Kazan store. This city is very different western conditions and even from Moscow and St Petersburg. It will put IKEA's learning processes and ability to position its retail proposition on a culturally different and difficult market to a test.

Knowledge sharing within IKEA

The following section follows the theoretical framework presented by Kalling and Styhre (2003) for how to share knowledge within an organization. Knowledge sharing in different phases of the expansion process was found to take place on **different organizational levels**. Knowledge sharing was described as one of the key success factors for IKEAs expansion on the Russian market. Furthermore, it was found that the knowledge needs, i.e. the knowledge types, varied between different parts of the Russian organization. One crucial part was the knowledge sharing within the Russian organization and between Retail, Trading, Distribution, Property and the Project organization. New product development is a good example because it significantly stressed the need to share knowledge from Trading and Sales. Involving the store level in knowledge sharing was, however, also stressed. This includes sharing within and between different levels in the store organization but also processes for knowledge sharing between the store and the country management level. At a more aggregated level, knowledge sharing between the corporate level at IKEA Russia and other IKEA markets was also stressed. As discussed earlier, knowledge sharing between expatriates and local employees is another critical dimension that should not be overlooked. A part of the expatriates' job is to share knowledge with locals while the latter are expected to bring market knowledge into the organization.

When discussing **tools and mechanisms for knowledge sharing** varying answers were given. Much emphasis was on communication between individuals and on training, but the tools and mechanisms were used slightly differently at different organizational levels. The use of intranet was for example mostly used at corporate level and to some extent by the management team in the store. The HR Manager argued that knowledge sharing is all about employing the right people, who share the IKEA corporate culture. Knowledge sharing was also integrated into the career path at IKEA, as employees are promoted and rewarded based on their ability to share knowledge. Employees are stimulated to seek positions within different parts of the organization in order to get a broad knowledge rather than a narrow and specialized one. According to the HR manager IT could be a supportive tool but was much less important for knowledge sharing than corporate culture. Corporate knowledge was shared trough training by experienced IKEA people and by manuals and intranet. Best practices for how to run IKEA business are shared by these tools. Best practices are collected by employees at corporate level in all IKEA countries and then distributed by Inter IKEA Systems. Emphasis was also put on personal tacit knowledge that needs to be shared by people and not by computers. Furthermore IT could not be used as the only tool for knowledge sharing since the majority of IKEAs employees, i.e. those working in the stores, do not have a personal computer. All employees had access to a computer, for example in the cafeteria, but very few used it. A computer was seen as a mechanical one-way communication, where it isn't possible to discuss and share experiences meaning that information is shared and not knowledge. It was argued that action learning is important, although documented information available on the intranet could be a supporting tool.

Teamwork was also emphasized to be an important tool for knowledge sharing. For teamwork to be successful an open communication was considered as crucial.

At store level knowledge was shared mostly through personal contacts between the department head and the store manager. Some methods for knowledge sharing were formalized and routinized, such as weekly sales tours throughout the store together including the store manager, the department heads and the co-workers at each department, and co-workers sharing their knowledge about customers to the department head. At the department level knowledge was also shared trough personal meetings and by documented information at the intranet. Store managers also shared information by actually visiting new stores to see the latest developments. As stressed before, formal training programs were also an important mechanism in order to maintain a high growth rate in Russia. The special programs provided by IKEA Service office in Moscow ran for two to six months. New co-workers were educated in one of the two Moscow stores and knowledge was shared between existing co-workers and newly employed staff. Each new co-worker gets an introduction program for one week to know a little bit the IKEA organization, the culture, the history and rules of how IKEA work together and co-workers are expected to behave but also to do an on-job training. After this training these people are sent to work in a new IKEA store. Because the cost for labor in Russia is very low IKEA can afford to have two persons at the same positions at the same time. The ambition is to share knowledge and to teach new co-workers how the job works.

Also when asking questions about **the factors enabling and hindering knowledge sharing** within IKEA Russia there was no consensus. The marketing manager argued that being an open organization is a key factor for IKEA's ability to motivate the employees to share knowledge. An example of being an open organization was that very few rooms where it is possible to close the door exist. Another example of being an open organization was that all information about new project, vacancies, sales etc is provided at wallpapers and corporate newsletters. In order to be able to have an open IKEA it was argued that employees must not be afraid of making mistakes but rather to take their own initiatives and be problem solving. Another factor often stressed was that the IKEA employee should have a broad knowledge about the organization and understand the IKEA process. The career policy and reward mechanisms thus also stand out as an important driver of knowledge sharing, encouraging employees to step aside and try and learn new tasks and not to just move upwards in a linear way. Sharing knowledge this way being a part of the IKEA corporate culture was difficult to explain to local Russian employees. The traditional Russian management style encourages staff to keep knowledge to themselves and to become a specialist in order to have a successful career. Russians were not used to IKEA's open culture and this was reason for recruiting young local employees. Another problem facing the Russian organization is that local co-workers were well educated but less capable of transferring this to practice. That is why action learning together with experienced IKEA people, with great corporate knowledge, was seen as very important step in helping the Russian co-workers to transform their abstract knowledge to practice and to become independent. The method for recruiting and educating

new co-workers in the store was considered as a good way to share knowledge, involving new employees being trained together by other, previously recruited, local employees.

The existing Russian organization included many expatriates. This can be seen both as a driver and a barrier of knowledge sharing. As discussed, the expatriates are expected to share their corporate knowledge with local employees. Their presence and dominance may, however, also become a barrier to the local employees' learning and knowledge sharing. There is a concern within the organization that unless corporate IKEA knowledge is shared with local employees and future managers IKEA Russia will really a Russian IKEA rather that a part of a global IKEA. *"When the expatriates leave it is necessary that it has grown under the tree because otherwise we will have a huge problem in Russia and we will loose a lot.[...] So that you really work with transferring your knowledge, to really share with others. You can't sit in a corner with all your knowledge and give orders without sharing – then there will be a vacuum when you leave."* (HR Manager)

Concluding discussion

This has been an explorative study on the role of knowledge and knowledge sharing in IKEA's expansion into the Russian market. One objective was to stress the importance of a more critical discussion about knowledge and learning in theories about internationalization. A second objective was to investigate whether an adapted and extended version of the internationalization process model (Johanson & Vahlne, 1977, 1990) is applicable to the retail industry or not as well as the relevance of the knowledge concept used in the model. No generalizations can be made based on this case study but it highlights certain critical aspects of knowledge sharing in a retail firm's foreign entry. From the interviews it is evident that knowledge sharing has an important role in the internationalization process. It is also evident that there are different knowledge needs in different phases of the internationalization process. In order to be able to apply the internationalization process model (Johanson & Vahlne, 1977, 1990) additional types of knowledge should be added to the model.

Furthermore, in order to be able to understand the role of knowledge sharing it is important to extend the model to include how knowledge is shared since if this is not shown it would not be possible to speak of knowledge but rather information. Some aspects appeared as especially significant in the case study. Concerning the different levels, the need for interaction has been especially stressed, including the interplay between corporate level and country markets, between different country markets, etc. Another aspect is that it is crucial that general corporate and internationalization knowledge is systematically shared with staff on the new market. The case also highlights the relevance of knowledge sharing with employees in the store, who interact with customers on the new market. This discussion also touches upon the tools and mechanisms for knowledge sharing. The empirical data stresses formal as well as informal mechanisms. For example, reward and promotion policies appear central in order to stimulate knowledge sharing, including to encourage employees to become

familiar with different parts of the retail organization rather than to specialize in order to make a rapid, linear, career. The relevance of systematic recruitment and training for new employees on all levels from country management to store staff was also stressed, including the importance of encouraging interactions between old, experienced employees and local staff members on the new markets. In addition, the case highlights the role of having systematic mechanisms for sharing knowledge between different country markets. The role of IT was also stressed, but in the case of IKEA it appears to be rather limited at least in the earlier phases of the entry to the Russian market. Concerning barriers and drivers of knowledge sharing, different kinds of cultural aspects appear to be very central. For example, differences in management culture between the new market and the retail organization may be a significant obstacle. Still, the IKEA case also shows that these barriers can be overcome by recruiting younger staff members and by letting experienced senior managers have leading roles at the earlier stages of entry. On the other hand, established staff members may become an obstacle for knowledge sharing if their roles become too dominant. A scenario could therefore be where the young local staff cannot see their carriers develop in the near future may also hinder knowledge sharing. An interesting aspect to further study could be on who the expatriates are and how the organization was structured. The case also stresses the general country culture and the educational level of new employees. In Russia, formal education was at a rather high level, whereas the ability to transfer this into practice was a problem, as well as the fact that new employees were sometimes reluctant to take on responsibilities without consulting senior managers. Respect for senior managers and hierarchy may become an obstacle for knowledge sharing because it may make new employees less willing to ask questions and to share their own ideas.

This has been a first, explorative step towards an increased understanding of the role of knowledge and knowledge sharing in retail internationalization. My ambition was to highlight that there is a need for a more critical discussion about the knowledge and learning aspects in theories internationalization. Obviously, the aspects stressed in this study need to be investigated in more detail. The case study implies that there are differences between markets when it comes to the type, role and character of knowledge and the processes for knowledge sharing. For future research, one possibility could therefore be to further develop these ideas by studying and comparing different markets that IKEA has entered. The fact that IKEA choose different strategies for organizing its business in different countries makes it interesting to look at IKEA as a research field and different country organizations as different cases. Another possibility is to analyze and compare the knowledge strategies of different types of retailers since it is likely that IKEA may be so specific being such a big retailer and a foundation allowing long-term strategies that other public retailers cannot have. The case study has also identified new areas of interest that should be explored, e.g. that knowledge sharing in international retailing may include suppliers as well as other external partners. Knowledge may be shared both within and between organizations. Forsgren (2002) argues that it is important to consider how knowledge is shared between organizations in order to

further develop the internationalization process model. However, focus for this paper has been on knowledge sharing within the organization and interorganizational knowledge sharing needs. As an initial attempt to understand the processes for knowledge sharing in relation to internationalization issues it may be reasonable to only focus in intra-organizational knowledge sharing. Eisenhardt and Santos (2003) argue that there are significant similarities between internal (within) and external (between) processes for knowledge sharing.

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Bringing together the emerging theories on dynamic capabilities and knowledge management

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Introduction

A major issue in the field of strategic management is around how best to manage organizations in dynamic and discontinuous environments. This has given rise to the dynamic capabilities approach of strategic management (Teece et al., 1997; Eisenhardt and Martin, 2000), which seeks to explain how some organizations appear to build sustainable competitive advantage in dynamic markets. A stream of recent literature has started to explore how to manage the organizational characteristics that determine the effectiveness of the emergence, evolution and utilization of dynamic capabilities. Dynamic capabilities are considered to evolve through pathways that can be described in terms of the evolution of knowledge within organizations, so they depend heavily on knowledge. It is thus critical for managers to find ways to identify and manage knowledge resources within rapidly changing environments. In order words, knowledge management has a role to play to establish and maintain unique dynamic capabilities that determine a firm's overall effectiveness

This suggests the need to explore the convergence of the dynamic capabilities approach with knowledge management. Despite their implicit links, the two areas of literature retain a relative distance. This paper is a preliminary attempt to improve the situation by providing a theoretical account of the linkages between the dynamic capability view of the firm and the emerging theory of knowledge management to highlight the actions managers can take which most affect dynamic capabilities. This is illustrated using vignettes from our ongoing field research into the Chemical industry.

Conceptualizing dynamic capabilities

The idea of dynamic capabilities emerges as an extension of the resource-based view, incorporating the evolution over time of the resources and capabilities that form the basis of competitive advantage. Although there is still a bit of haziness, analysis of past research reveals three main conceptualizations that have dominated the literature on dynamic capabilities. These conceptualizations are depicted in Table 1.

Table 1. *Conceptualizations of dynamic capabilities*

Definition	Sources	Illustrative Studies
Ability to adapt, integrate and reconfigure internal and external organizational skills, resources and functional competences to address changing environments (Teece, Pisano & Shuen, 1997)	Processes Current assets positions Evolution Paths	Benner & Tushman (2003) Bowman & Ambrosini (2003); Helfat & Peteraf (2003); Marsh & Stock (2003); Sher and Lee (2004);

Specific organizational processes that integrate, reconfigure, gain and release the firm's resources to match and even create market change (Einsenhardt & Martin, 2000)	Knowledge-based routines dependent on market dynamism
	Paths shaped by learning mechanism
	  -Variation
	  -Selection
	  -Retention
		Danneels (2002);
		Daniel & Wilson (2003);
		Zott (2003);

Systematic patterns of collective activity to generate and adapt the firm's operating routines in pursuit of improved effectiveness (Zollo & Winter, 2002)	Co-evolution of specific learning mechanism:
	  -Experience accumulation
	  -Knowledge articulation
	  -Knowledge codification
		Winter (2003);
		Ferdinand, Graca, Antonacopoulou & Easterby-Smith (2004);

From the analysis of the different conceptualizations arise some criticisms about what dynamic capabilities are. Defining dynamic capabilities as "abilities" (Teece et al., 1997), "specific processes" (Eisenhardt and Martin, 2000) or "systematic patterns" (Zollo and Winter, 2002) is considered to involve tautological concerns that create confusion as to whether these abilities, patterns and processes are capabilities of the firm (the collective manifestation of dynamic capabilities), or the outcomes of dynamic capabilities. A "capability" is the potential to do certain things, but not the things that are done (Dougherty et al., 2004). If they are "dynamic", they connote change and evolution (Winter, 2003). Thus, dynamic capabilities may be described as *the potential of a firm to build, integrate and reconfigure resources, routines and competences in order to address actual or anticipated changes in the competitive environment*. Their value for long-term competitive advantage lies in the resource configurations that they create, this is, in their outcomes, not in the dynamic capabilities themselves (Eisenhardt and Martin, 2000; Zott, 2003). These outcomes result from processes for both leveraging existing resource configurations (exploitation) and building new resource configurations (exploration) (Teece at al., 1997; Zollo and Winter, 2002). This is achieved by carefully building a collective context that allows the meta-capabilities of exploration and exploitation to simultaneously flourish, and thereby sustaining

business performance. Moreover, the way firms do this is idiosyncratic to the firm, so that dynamic capabilities may take different forms (manifestations) according to the characteristics of the firm in which they emerge. This variability gives firms a basis to pursue different types of competitive advantage (Zahra and George, 2002).

The idea of the outcomes, processes and context of successful dynamic capabilities is beginning to take form in the literature on dynamic capabilities. In this sense, Zott (2003) proposes three attributes of the outcomes of dynamic capabilities that foster the emergence of robust performance differences among firms with similar dynamic capabilities: timing, cost, and learning of resource deployment. Besides, dynamic capabilities evolve through path dependence processes that can be described in terms of knowledge (Zollo and Winter, 2002). In other words, the dynamics of the firm capabilities are rooted in the firm knowledge base and, specially, in the potential to transform knowledge into further knowledge (i.e. to learn).

In view of this, and the related work of Verona and Ravasi (2003) and Dougherty et al. (2004), we envisage three distinct but complementary processes which comprise a firm's dynamic capabilities: knowledge creation and absorption, knowledge integration and knowledge reconfiguration. These knowledge processes entail how the firm exploits its current knowledge and competences while simultaneously exploring fundamentally new ones. We also suggest that dynamic capabilities manifest themselves through different forms of collective action that emerge according to the contextual characteristics (rules, resources, elements, behaviour-attributes, etc.) that coordinate social interactions by shaping people's attentions, priorities, and expectations as they work. Verona and Ravasi (2003) and Dougherty et al. (2004) also provide pioneering attempts to exemplify contextual factors that facilitate dynamic capabilities by contributing to knowledge creation, integration and use. They argue that a context for dynamic capabilities involves a set of stimuli and pressures that motivate the collective orientation of employees towards the simultaneous pursuit of knowledge exploration and exploitation. Finally, although they do not explicitly mention dynamic capabilities, Gibson and Birkinshaw (2004) focus their framework on the social antecedents and consequences of the capability to simultaneously achieve alignment and adaptability.

In conclusion, it is claimed that dynamic capabilities are an interlocked "system" of knowledge that allows an organization to carry out its business processes (Grant, 1996). But unless what is known and done is created, integrated and reconfigured on an ongoing basis, the firm is in danger of losing its uniqueness and adaptability (Tsoukas and Mylonopoulus, 2004). How these knowledge-related processes build upon each other through different forms of collective action provides a basis for examining why certain firms are more efficient than others when deploying and using dynamic capabilities. It is the link between dynamic capabilities, knowledge, and knowledge-related processes that lays a solid foundation for incorporating knowledge management to better understand the interconnectivity between dynamic capabilities and knowledge forces as part of the characterization of dynamic capabilities.

The relationship between dynamic capabilities and knowledge management

Knowledge management: definition and approaches

As a result of the recognition of the importance of knowledge in contemporary organizations, knowledge management has emerged as a separate area of interest, to the extent that it has become recognized as a significant source of competitive advantage (Nonaka and Takeuchi, 1995). Knowledge management is a broad and ambiguous concept that has been described as "any process or practice of creating acquiring, capturing, sharing and using knowledge…to enhance learning and performance in organizations" (Scarbrough et al., 1999:1). Although definitions of the term "knowledge" vary considerably, for the purposes of this paper, knowledge should be understood as multi-faceted, comprising mental representations, cognitions and actions. The emphasis in knowledge management is thus on the improvement of the firm's competence based on the maximization of knowledge and practices of knowing.

Contemporary knowledge management tend to be driven predominantly by two distinct frameworks or paradigms, one focusing on information and communications technology, the other on people (Swan et al., 1999). From the information technology-centered approach, knowledge management is seen primarily as a problem of capturing, organizing and retrieving information and knowledge. Knowledge is thus seen as analytic and composed of facts that can be stored, retrieved, and disseminated, with little concern for the context in which it is originated and used. This approach ignores or implicitly treats as subordinate any role for human and social factors in knowledge management. Conversely, the people approach shows just how vital human issues, social relations, and organizational culture are for knowledge management success. For this approach, it becomes clear that knowledge work involves communication among loosely structured networks and communities of people, and that understanding involves identifying the social practices and relationships that are operative in a particular context (Thomas et al., 2001). Accordingly, research points to a variety of people related factors that affect the social context of knowledge management, and how these interact with technologies intended to support remote collaboration. In agreement, it is argued that one of the most important aspects of knowledge management systems is that it becomes what has been termed a "knowledge community": a safe and trusting place where people discover, use, and manipulate knowledge, and can interact with others who are doing likewise (Thomas et al., 2001; Brown and Duguid, 2000).

Beyond the basic dilemma of whether to rely on information technology-based or human-based initiatives to manage knowledge, the real problem faced by firms when managing knowledge is the search of hybrid models of management able to produce socially translucent systems that permit human issues to come into play the specific techniques and characteristics that are imperative to broadly share information (Moffett et al., 2002; Newell et al., 2002; Van den Brink, 2003). This provides a call for exemplary managers to leverage the synergy of combining information technologies, structural and organizational aspects, and the inventive

capacity of human beings, in alignment with the firm's strategic thrust. It also bridges into the next section, which focuses on the need to combine dynamic capabilities and knowledge management.

Why is knowledge management an important issue for dynamic capabilities?

The answer to the above question is because if dynamic capabilities are dependent on the collective potential to integrate, build and recombine complex knowledge to address change over time, knowledge management has a critical role to play. In short, the value added of managing knowledge comes only when it leads to the creation, integration and application of knowledge to improve, change or develop specific activities (Newell et al., 2002).

Mechanisms that underpin successful knowledge management affect the way organizations create, integrate and reconfigure knowledge to form a dynamic path to compete. The field of knowledge management has produced a number of cultural, technical, personal and organizational enablers of how knowledge is created shared and used (Gold et al., 2001; Gorelick and April, 2001; Lee and Choi, 2003; Van den Brink, 2003; Chuang, 2004). Although an explicit examination of knowledge management is usually omitted in the discussion of dynamic capabilities, we argue that firms exhibiting dynamic capabilities are expected to lever, manipulate and combine these knowledge management enablers (not necessarily as a conscious process) to create and renew an organizational context that influences choices, actions and interactions to concurrently explore and exploit knowledge and competences.

Several dynamic capability researchers have noted (not explicitly) how knowledge management initiatives can contribute to dynamic capabilities. For example, Leonard-Barton (1995) identifies four dimensions for building core capabilities: personal skills and knowledge, physical technical systems, managerial systems (such as rewards and education), and cultural values and norms. Lawson and Samson (2001) propose seven knowledge management elements –vision and strategy, leveraging the competence base, organizational intelligence, creativity management, organizational structures and systems, culture and climate, and management of technology- that make up innovation capability. Also Verona and Ravasi (2003) note that human and physical resources, structure and systems and culture should be combined to stimulate dynamic capabilities through which firms generate and sustain competitive advantage. And based on Ghoshal and Bartlett (1994), Gibson and Birkinshaw (2004) investigate a context in which several attributes create two dimensions – performance management and social support - that give rise to ambidextrous organizations able to simultaneously explore and explore. In all these studies, conditions labeled as personal, cultural, and even organizational traditionally fit around the internal social context of the firm, while information technologies are features of the technical context of the firm.

Although technological initiatives have received much attention, there is still a lack of agreement about their implications for knowledge management and business excellence.

Some studies support the view that modern information technologies are an effective mechanism for extensive knowledge sharing and retention, thereby removing barriers of time and location (Alavi and Leidner, 2001; Gold et al., 2001; Van den Brink, 2003; Sher and Lee, 2004). In contrast, more skeptic positions have begun to appear by considering that information technologies are unable to develop fully an understanding of complex situations (Bender and Fish, 2000), and lack the emotional richness and depth of live interaction (Swan et al, 1999). Accordingly, information technology should not be a high priority when managing knowledge and, thus, dynamic capabilities. The role of knowledge management must be to support the social mechanisms that motivate people to collectively integrate, build, and reconfigure what they know and do if dynamic capabilities are to be triggered (Birkinshaw and Gibson, 2004; Dougherty et al., 2004). In other words, firms must create and renew a social context that gives people the propensity to engage in both exploitation-oriented actions and exploration-oriented actions in their day-to-day work. This produces dynamic capabilities, which subsequently enhance adaptability and performance.

Depending on the heritage of a given business, and the values of its leaders, equally valid, but slightly different, organization context solutions can be created. The right situation is achieved by putting in place carefully selected conditions, involving shared values and beliefs, systems, styles, norms, moods and emotions, motivation, and roles and skills, which can be used to encourage certain types of feelings and behaviors, and repress others (Van den Brink, 2003). In particular, selected conditions must enable individuals and collectives in the organization to exhibit initiative, cooperation, multitasking abilities, and brokering skills (Birkinshaw and Gibson, 2004). The impact of information technologies stems from the fact that they interfere with the social context, providing people with an opportunity to shorten the length of transformation cycles (transformation of tangible inputs into products/services, and the transformation of intangible ideas into tangible outputs) (Biloslavo and Zornada, 2004). But, ultimately, it is the willingness of people to engage in actions that support dynamic capabilities that dictate information technology usage.

Anyway, the linkages between dynamic capabilities and knowledge management can be analyzed in three ways: first, in terms of the overlap between the two concepts; second, in terms of the elements that need to be added to one or the other in order to create an hybrid model; and third, in the way practices within one area might contribute to the other. In the first case, the degree of overlap depends on the type of definition chosen for each. So, the definitions of dynamic capabilities, which emphasize managerial and technical systems, can be linked to the more technical views of knowledge management; the human and cultural views of dynamic capabilities will have a natural affinity for the social views of knowledge management. But there are also elements that are rather unique to one or the other: within dynamic capabilities the discussion about learning and change is relatively unique; and within knowledge management the focus of the collection and storage of data and information is relatively distinct. If we are to extend the call for hybrid models to the linkages between dynamic capabilities we have the potential problem of deciding which of these elements to

combine, and we also need to consider to what extent the two domains can contribute to each other in practice. These are complex, and overlapping, issues which cannot be easily resolved theoretically, and we have therefore decided to explore them a little further by reference to a brief case study, which is presented in the next section.

A Case Study

ChemCo[1] is one of the global leaders in the development and supply of chemicals, and over the years, it has built a huge body of technical knowledge, which has been carefully guarded as the source of its competitive advantage. Like many multinationals, it has recently reorganized its structure from product divisions into market segments. The corporate-wide reorganization was accompanied by a strategic shift that placed greater emphasis on customers and on the provision of knowledge-based services and expertise; and this has subsequently led to a radical rethink of the role of knowledge across the company.

Over the last year we have tracked the development of a new business venture (NBV) within ChemCo, through reviews of documentation, interviews and observations of meetings. This is one of a number of innovative projects initiated by ChemCo in 2003, and which are actively supported by the highest levels of the company. The essence of the NBV, which is still evolving at the time of writing, is to use an established French organization as a platform from which to expand the business across Europe and the Middle East. The strategy is to expand outside France using partnership arrangements with local specialist firms, and the expansion is driven by a small team of regional sales managers who are responsible for the recruitment and development of partners in each region**.**

The local partners need to have sufficient technical expertise and business networks to sell ChemCo's products to their customers, and since they are given exclusive rights for each country their selection is critical. The training of partners is generally conducted through brief assignments working with the French business, and through visits to potential customers in their own countries accompanied by the regional manager or technical experts from France. For the NBV, this model provides a route for very rapid expansion into new territories for negligible capital outlay, which then gives them the potential to claim regional presence when dealing with other global companies. Also, as ChemCo does not need to put an infrastructure in place, it is easier then for the company to decide whether to invest or disinvest in the various markets. For the local partners the arrangement provides local credibility due to their association with a global brand; it gives potential access to multinationals with which ChemCo has links elsewhere; and it provides them with substantial technical expertise and systems support. Furthermore, no one else operates the way ChemCo does, but instead sell directly to end customers.

The case demonstrates dynamic capabilities in several respects. The new organization, which relies on partnerships with established local companies, means that competencies and knowledge can be moved very quickly from one country or setting to another, and as we have noted it allows for rapid growth with minimal reliance on existing capital or infrastructure. It

also allows for responsiveness to local circumstances because they use local partners rather than franchisees, which enables the partners, in consultation with the regional managers, to devise contracts with customers that take account of local circumstances. To a lesser degree, the French operation gains a potential dynamic capability because the wider international reach of the NBV provides greater flexibility and leverage in their dealings with the French operation of multinational customers.

In this case, there are several flows of knowledge, some which are 'managed', others not. In example, information on sales and profits is collected on a regular basis using the standard information system of ChemCo, however the details of local arrangements and contracts are only reported to the general manager of the NBV and (by arrangement) do not need to be reported on to the parent. The French operation plays a pivotal role in technical and product development, and this is disseminated to the sales managers and national partners through generic training and technical guidance. This is significant in relation to the strategy of the wider company because it implements a less protected and more 'leaky' view of the role of corporate knowledge.

Less formal knowledge flows take place from partners to their regional sales managers, who are thus able to enrich their understanding of local market constraints and opportunities. These insights and local variations are then shared between the sales team and other senior managers at their bi-monthly meetings. At the present time, however, there are unresolved debates in the senior group about whether, and how far, to systematize the information gathered from partners, and about the relative weight that should be put onto the emergent experience of the regional sales managers compared to the deeper experience of the managers in the established French business.

Several potential links between dynamic capabilities and knowledge management are highlighted here. The French operation acts as a centre for technical knowledge creation and dissemination, which aids the NBV's credibility, and this provides for national partners a competitive advantage in seeking new business. Meanwhile market information flows back (for the time being) by word of mouth, and is then disseminated among sales managers which widens their repertoire for dealing with new business opportunities. These two forms of knowledge act both as drivers and facilitators for the flexibility and adaptiveness of the regional sales operations. Since this is a continuing and proactive form of change to local systems and routines, it fits well with the idea of dynamic capability as defined by Zollo, Winter, and others. This is further helped by the political 'umbrella' of the general manager who sanctions local autonomy in the development and evolution of national contractual arrangements.

The debate about systematization of information gathering however highlights the point that further formalization of knowledge management may lead to a reduction in local autonomy and creativity. Hence it may be that informal knowledge management supports dynamic capabilities, but that formal knowledge management may hinder it. This still the issues of politics and debate that appear to be absent from both theoretical domains. But it is

evident that there are considerable ongoing debates about which sources of knowledge and experience are most relevant to future strategic directions for the NBV, and potentially, whose contributions will be most valued in the future. Obviously, people are the most important part of the NBV and, in example, the role of the sales management team is being critical to accelerate the achievement of the NBV targets. The team contains diversity of experience, an entrepreneurial spirit, and a clear set of priorities (shared vision) to select focal elements to fit the targets of the business. Similarly, it is clear that a key facilitator of the NBV's dynamic growth is the political protection that the general manager is able to provide from the procedures and systems of the wider company. These aspects seem common to both knowledge management and dynamic capabilities, and would warrant further exploration.

Conclusions

This working paper is aimed to provide an integrative approach to the research into dynamic capabilities and knowledge management in organizations. We first provided a description of dynamic capabilities as a potential capacity manifest through different processes, where multiple forms of knowledge, multiple actors and organizational task interact. We then gave a brief review of knowledge management approaches, observing the need of combining information technologies, structural and systemic aspects, and the inventive capacity of human beings. We argued that, given the knowledge-based nature of dynamic capabilities, they cannot be managed in the same way as the tangible assets of the firm, but knowledge management also has a role to play. Specifically, although information technology has its intended use in the context of knowledge management, the critical element is the "passion" of individuals to engage in activities that collectively integrate, build, and reconfigure what they know and thereby support dynamic capabilities. It is a responsibility both of managers and employees to understand the relation between knowledge and dynamic capabilities as embedded in the social context and relations of the firm. The integrative framework presented here should encourage and future studies to take into account both connected theoretical frameworks, with the aim of avoiding confusions between them, and deeply analyzing these connections in practice.

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Endnotes

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[1]   This is a pseudonym!

Floating Over Troubled Waters: Knowledge Differentiation and Integration in Offshore Platform Design

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Abstract

This paper is concerned with knowledge differentiation and integration in the context of a large, distributed project. We contrast a firm-centred with a community of practitioners approach to the nature and locus of engineering knowledge by examining a project concerned with the development of an offshore platform for ultra-deep sea oil exploration, Octabuoy. The development of Octabuoy took place within a relationship between two geographically separate units which until recently belonged to two separate firms. The project's organisation mirrored the architecture of the platform and relied on the definition of clear technical and organisational interfaces between the two units. As the project got under way, the initial assumptions concerning the architecture of Octabuoy and project organisation proved unworkable. Our explanation of the reasons why this happened sheds further light on how technological practice is embedded in a series of connections involving firms, communities of practitioners and other institutions and evolves both through competition and cooperation.

Acknowledgements:

Introduction

This paper is concerned with knowledge differentiation and integration in the context of a large, distributed project. Our point of departure is that technological knowledge is expressed through functional artefacts oriented towards particular uses. These artefacts represent a mix and match of a variety of forms of technological knowledge implying the cooperation and coordination of multiple specialisms.

Two contrasting approaches as far as the loci of technological knowledge are concerned, stand out. A Chandlerian approach privileges the firm as the site of development of idiosyncratic capabilities, appropriation and development of technologies. An alternative approach regards technological knowledge associated with well-winnowed traditions of practice and clearly defined communities of practitioners, involving both individuals and organisations (Constant 1980, 1984). In this approach, firms are structures that aggregate highly differentiated subsystems, associated with different traditions of practice, through a variety of integrative devices (Lawrence and Lorsch, 1967).

Large, distributed projects provide an interesting setting to study tensions between knowledge differentiation and integration. On one hand, projects require mechanisms for simplifying interactions amongst specialists maintain linkages to existing structures and avoid

disruption to proven routines. On the other hand, the inherent uncertainties involved in combining different bodies of technological practice in the construction of a large artefact, encourages more interactive interfaces, provisional boundaries amongst different knowledge specialisms and the progressive amendment of plans in light of experience.

The paper focuses on a project concerned with the development of an offshore platform for ultra-deep sea oil exploration, Octabuoy. The development of this platform involved a distributed effort involving multiple specialisms located in Milan, Oslo and St. Petersburg. The project relied on a pre-defined division of labour that embodied particular assumptions about the nature of the platform and ways of integrating dispersed and heterogeneous knowledge. As the project progressed, initial assumptions regarding the division of labour and the architecture of the platform proved less robust than anticipated. We argue that these initial assumptions neglected the embeddedness of specialisms in different technological trajectories and communities of practitioners (Constant, 1980) and the extent to which these communities are themselves permeated by a logic of cooperation and competition.

The paper is structured as follows: in the first section we examine the nature and locus of technological knowledge focusing on the role of firms and communities of practitioners. In the second section, we focus on the methodology and results from our empirical case study. In the third section, we provide a discussion of the case before presenting some general conclusions in the final section.

The Nature and Locus of Technological Knowledge

Since Layton's (1974) seminal contribution, technology has been seen as embodying its own form of knowledge distinct from scientific knowledge. Layton viewed technology as a spectrum with the domain of ideas at one end, and the world of techniques and artefacts at the other, with engineering design somewhere in the middle. Rather than being hierarchically subordinate to science, technology is seen as autonomous form of knowledge interacting with science in a complex ways.

The locus of technological knowledge has however remained indeterminate. On one hand, the Chandlerian approach privileges the firm as site of development of idiosyncratic capabilities, appropriation and development of technologies. For Chandler (1990), firms are the important unit of analysis because they either develop new technologies internally or select and appropriate technologies from the market. Firms have pushed existing technologies to the limit through experimenting with new products, processes and managerial structures whilst on the other hand they have tried to ride on the coattails of Schumpeter's waves of creative destruction (Hounshell, 1995).

For Constant (1980, 1984), well-defined communities of practitioners dominate technological practice and these communities are the locus of technological knowledge. Such communities may be composed of either individuals adherent to the tradition or organisations. Every high technology sector is dominated by a few firms who together form a highly visible

community of practitioners, which map on to organisational functions or divisions. Individual practitioners will also split into well-defined communities. For example, engineers will commonly share professional education and background but their insertion into organisational lives is likely to lead to a complex pattern of learning-by-doing and specialisation that will further decompose the community of practitioners into smaller subgroups. The proposed isomorphism between individual and firm level communities suggests that broad traditions of technological practice are appropriated within each firm and develop into local and increasingly divergent traditions.

Brown and Duguid (2001) provide a useful bridge between these two positions by critiquing the notion of the firm as a culturally uniform entity. Their starting point is the paradox that firms often find it hard to transfer knowledge inside as much as they find it difficult to avoid leakiness of knowledge to outsiders. Brown and Duguid's reply to this paradox is that practice creates epistemic barriers among the different communities that make up a complex organisation.

Brown and Duguid (2001) focus on how work context provides a platform for the construction of shared identities and collective outlooks on work. Within these communities, knowledge can easily be shared since common perspectives and identities facilitate learning and the construction of common interpretations. This perspective embraces the possibility that organisations include many different identities and helps explain how different practices often create loosely coupled or balkanised organisations, where knowledge sticks to specific locations or segments of the organisation. In summary, Brown and Duguid see disciplinary networks of practice cutting horizontally across vertically integrated organisations and extending far beyond the boundaries of the latter. Organisations embrace communities with fundamentally different practices, presiding over a particular division of labour, and hence, of practice and knowledge. Internal divisions within organisations help explain knowledge stickiness while external connections help explain leakiness.

In an earlier but sadly neglected contribution, Constant (1987) develops the idea of technological practice as encompassing multiple, nested levels within a modular architecture.[2] If technological systems are modular they can be changed or improved with great efficacy. Sub-problems can be isolated and changed independently and whether a change is incremental or revolutionary depends on the hierarchical level. Complex, hierarchical levels imply multiple traditions of practice and multiple communities of practitioners. Each level can be seen as the purview of a different community of practitioners. Yet some traditions or communities may overlap at higher or lower levels of aggregation – e.g. gas turbine practitioners are both a distinct community, part of a broader aeronautical community, but they also design gas turbines for offshore oil production platforms.

More controversially, Constant (1987) proposes that individual members of a given community of practitioners should be seen as vectors for a specific replication code, carriers of a set of programmes that reproduce the relevant traditions of practice. The recipe for overcoming the problem of technological discontinuities is simple enough: "Slice open an

organisation, insert the new vector and its programming and presto!, the organisation starts replicating turbojets rather than piston engines, turbosuperchargers or steam turbines" (Constant 1987, p. 228).

It is this dual aspect of technological knowledge expressed in large-scale formal organisations and in the career commitment of practitioners that creates Hughes's (1994) technological momentum, the propensity of technologies to develop along predefined trajectories unless or until they are deflected by external forces or plagued by internal problems. In summary, Constant (1987, p. 240) sees communities of practitioners as the locus of technological knowledge, organisation as the locus of technological function (with a modular conception of function used to portray the way knowledge and function are integrated in complex organisations), and socio-technical systems as the broader structural contexts for both (see figure 1)
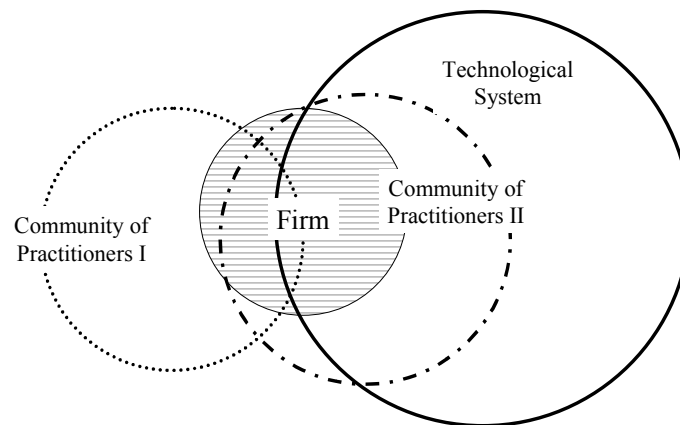
Adapted from Constant (1987, p. 238)

Figure 1

The notion of formal organisation as decomposable systems paints an extreme picture of a highly differentiated but loosely integrated system (Lawrence and Lorsch, 1967; Thompson, 1967). This picture stands in stark contrast to those who essentially view organisation in the broad sense, as a nonmodular response to the need for interaction amongst the modules (Langlois, 2002). Thus formal organisation is necessary to provide a stable pattern of connections between multiple communities of practitioners and to aggregate various forms of technological knowledge towards the design and production of functional artefacts. As Loasby (1998, p. 149) noted: "Divided capabilities typically need to be used in clusters or in closely related sequences, if the improvements in each subskill which follows this division are to be guided in compatible directions and effectively used".

Vincenti's (1990) seminal contribution regards technological knowledge-generating activities as resting both in informal communities and formal institutions. Informal

communities of practitioners are taken to be the central agency for the long-term accumulation and transmission of knowledge about specific problem domains. For Vincenti, communities of practitioners are essential to learning processes involved in technological progress, through a combination of competition and cooperation. Competition provides variety of alternatives to tackle difficult problems whilst cooperation provides mutual support and aid. Cooperation plays a key role in fostering the development of new knowledge through exchanges of knowledge and experience. Useful knowledge gets diffused through word-of-mouth, teaching and publications. Vincenti (1990, p. 239) concludes that engineering knowledge is the product of communities of practitioners bound together by allegiances to practice and having a sense of collective identity fostered by complex interactions based on shared problems and commitments.

Formal institutions represent the other leg on which the development of engineering knowledge rests. They provide the structure and support systems within which communities of practitioners function. Vincenti includes within this category manufacturing firms and their suppliers as well as government research organisations, University departments, regulators and professional societies. Some of these institutions are primarily engaged in knowledge generation and transmission; others have a more prominent role in influencing the directions of knowledge development while others still cut across these categories.

Formal organizations, as Vaughan (1999, p. 914) remarks, can complicate and manipulate the knowledge production process. Organizations can have their "dark side" – that is the capacity to generate uncertainty, disordered knowledge and unanticipated outcomes. Organizations represent meso level structures, intermediate between macro level contingences and micro level practices, which may amplify the uncertainty generated by external contingences.

Constant (1999, 2002) and Nightingale (2004) add a further dimension to this debate about the relationships between existing knowledge infrastructures and firms. For Constant (1999, p. 336): "In contrast to science, technology comprises a huge, variegated population of successful experiments (or failed Popperian refutations), a population that grows each time something works, which, oddly enough, stuff does most of the time". Thus technological practice is essentially recursive practice, relying on the reuse of established results or prior learning – in the form of algorithms, information, data, and so on. Furthermore, this recursive knowledge is both the essence of engineering practice and taken to be spatiotemporal, universal knowledge rather than local and idiosyncratic knowledge.[3]

Constant (2002) and Nightingale (2004) emphasise the role of infrastructures in producing stability and predictability in technological evolution. Nightingale (2004, p. 1272) follows Vincenti (1990) in arguing that the production of technology is guided by socially distributed traditions working on the assumption that progress is to be achieved by extrapolating previously successful paradigmatic solutions – "similar problems will have similar solutions". Nightingale (2004, p. 1273) argues that technological capabilities should not be conceived as purely firm-specific and can be characterised in terms of:

"(a) the skills, physical technologies and socially distributed explanations (collectively termed infrastructure) that (b) create the predictable conditions where explanations and the world match, thereby; (c) enabling explanations to reduce the number of experimental dead ends needed to construct a desired behaviour, which can; (d) produce economies of scale, scope and speed in R&D".

In summary, technological knowledge and evolution can be seen as residing in complex networks of practices or thick ecological webs that transcend the boundaries of firms (Constant, 2002). This is neither to deny the role of firms in technological systems nor to reduce it to one of assemblages of modules of specialist communities of practices. Rather the argument here is that technological practice must be understood within a broad ecology within each firms play a key but not unique role.

In the next section, we will present a case of the construction of a large and innovative offshore platform in the context of a collaborative project between two firms which had merged shortly prior to the start of the project. These two firms were active players in the field of offshore platforms but with different experiences as far the technological and geographical scope of their operations were concerned. The next sections chronicle how these two organisations attempted to combine their technological knowledge in the design of a novel platform, Octabuoy.

The Octabuoy case

Our fieldwork was conducted in Milan and Oslo, where Saipem Engineering (SEI) and Moss Maritime (Moss) were located, and consisted of a combination of semi-structured interviews, participant observation, and the collection of secondary data. Our empirical investigation began by visiting SEI in Milan who had recently acquired Moss. SEI is a contractor firm providing field services to the oil industry. It belongs to the ENI group, the Italian energy company operating in the oil, natural gas, electricity generation and petrochemicals industries.

Moss is an engineering company providing services to the oil and aerospace industries. Before the takeover by SEI it belonged to the Kvarner Group, an international oil service company specialised in offshore technologies. In Norway we conducted a week of field research, interviewing engineers and project managers. Our meetings with practitioners focused on the technical and organisational aspects related to the exchange of knowledge between Milan and Oslo, related to shipbuilding and offshore platform design. We also had access to a range of confidential documents related to the design of this oil platform. These documents included personal communications, e-mails, drawings, calculations and a valuable set of technical details. We were then able to search other documents in the public domain, which have proved useful to evaluate the mix of public and proprietary knowledge involved in the processes of knowledge exchange between SEI and Moss.

Our choice of informants as well as data collection centred on a specific research project, directed at integrating human and technological resources in SEI and Moss. This project was

concerned with the design of an innovative platform for extracting oil in ultra deepwaters (more than 1,000 meters) where the harsh natural conditions of the oceans generate strong vertical and horizontal motions on the platform. The key part of this design, a semi-submersible hull based on four conical columns (figure 1), was designed in collaboration between Moss and the Krylov Institute in St. Petersburg many years ago.[4]

A type of oil platform called "Spar"[5] was widely used by the industry to produce oil in harsh environments. Octabuoy's design departed from this well-established tradition of Spars, promising better motion characteristics in harsh conditions such as in the North Sea.

Figure 2 *A computer-generated drawing of Octabuoy*

After the acquisition of Moss by SEI, Octabuoy's design was carried out in three geographically separate organisational contexts – Milan, Oslo, and St. Petersburg – each of which had a specific function corresponding to a particular module.

The teams were well balanced, each one operating with seven engineers specialised in different sub-disciplines (naval, process, subsea, structural and mechanical engineering). Our data and information stem from a technical proposal commissioned by the Norwegian oil company Norsk Hydro. This proposal concerned a design of a platform for the Ormen Lange offshore field in Norway, some 140 km west of Kristiansund. During the project, which lasted approximately three months, two work sessions (one at the project start-up and one a week before delivery) lasting approximately two days each were held among practitioners working in SEI and Moss. These sessions were cross-organsational since they gathered all the engineers and project managers working on the project. In addition, nine in-house meetings were held at Moss Maritime whereas at SEI engineers had ten meetings to discuss Octabuoy.

Scientists at the Krylov Institute were involved occasionally when new versions of the platform were tested to evaluate their motion characteristics.

Modular Structures and Segmented Capabilities

Moss and SEI agreed on a project organisation characterised by a clear-cut division of labour, technologies and teams in distinct geographical locations. Within the oil industry, this division of labour represents the conventional way to design complex technologies:

> "When we have to work on operational projects, it is clear that a certain plant [system] has different macrosystems, so the Saipem Group has divided the design of these macrosystems among the various divisions. In this specific case, as Moss is the proprietor of the hull design, it has worked on the hull, whereas we [SEI] take care of the other parts of the plant. Thus in every new project we form a project team which is normally subdivided among several divisions, although it is strongly integrated…[…] Each division carries on the design of a single part, and through phone calls, e-mail exchanges and periodic meetings the different activities are joined together […] This is a typical approach employed in every engineering activity within the offshore industry" [SEI project manager]

The dominant design of oil platforms defined how SEI and Moss understood the processes of coordination and knowledge transfer across units. Thus the modular architecture of the platform induced a modular division of tasks. To the layman, an offshore oil platform appears as a massive monolith rising out of the sea. Closer inspection however, reveals it to be a complex assemblage of subsystems supporting and influencing each other.[6]

The design of each module was matched by a corresponding set of capabilities. The hull could be designed independently from the risers. Octabuoy was regarded as a modular system, as the hull could be mixed and matched with a variety of risers (figure 3). This assumption also made possible the physical separation of teams. The modular project organisation left team members in their existing work locations, minimising the need for travelling, meetings or complex coordination routines.
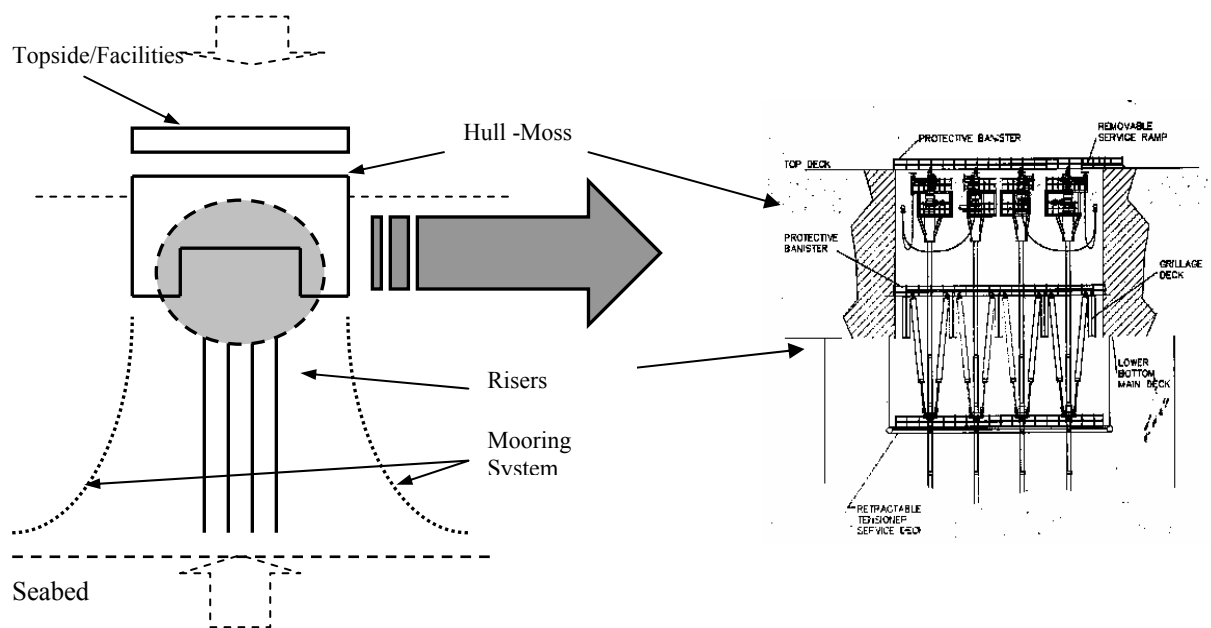
Figure 3

The drawing on the left hand side shows the principal elements composing Octabuoy. The shadowed area highlights the zone of interaction between the hull and risers. The picture on the right side focuses more in depth on the technical details of the technological integration between the hull and the risers. This is the "technical zone" around which Moss and SEI negotiated their integration.

Threats to Modularity in Design and Organisation

The construction of Octabuoy followed a traditional sequential process. Moss, after designing the risers, communicated to SEI interface specifications and data that allowed the next stage of riser design to proceed. This sequential process was repeated two times until an unexpected technological problem emerged that threatened the design and organisational bases of the project. Calculations related to risers and the hull turned out to require an iterative process, in which the hull's predicted motion depended on the risers' behaviour which itself depended on the hull's motion. The design of Octabuoy turned into a perpetual, closed loop. The interfaces were less stable than anticipated, raising serious questions about the architectural knowledge that led SEI and Moss to modularise the technological and organisational aspects of the project:

"This model would be suitable in shallow waters, where the motions of the platform are not much influenced by the presence of the risers and the mooring lines. In deep-waters however, the platform motions are actually influenced by the presence of the risers and the mooring lines, because of the direct damping from the risers" [Moss Engineer].

As floating production systems extend into deeper waters, the effects of mooring and risers become increasingly significant when predicting the response of the floating structure (hydrodynamics resistance or damping). The modularisation of Octabuoy was appropriate for shallow waters but severe environmental conditions could disrupt the model of integration based upon well-defined technological interfaces.

The inadequacy of the initial division of labour became even more apparent when separate analysis in Milan and Oslo were carried out drawing on two different approaches and software packages for the analysis of the whole platform. SEI drew on the so-called "Frequency Domain Approach" and used a design package named FlexCom. Moss used the "Coupled Domain Approach" and an alternative package called DeepC. DeepC is a software package for vessel motion analysis based on nonlinear theory which calculates a direct integration of the equations of motions in the time domain.[7] FlexCom is a software package for vessel motions too but unlike DeepC, it is based on a linear theory and assumes that both the waves causing motions and the resulting platform response are of small amplitude and therefore their interactions do not significantly alter the overall motion of the platform.

Thus SEI's and Moss' technological practices diverged on two aspects. First, they were using different computational methods – the coupled and uncoupled method. Secondly, they were designing Octabuoy by drawing on different theories of platforms motion responses – linear and non-linear approaches. The use of alternative computational methods had important implications for Octabuoy design – i.e. the sizing of interfaces, the structure's weight and cost.[8]

To reach an acceptable compromise between procedures and results, Moss and SEI tried an alternative approach. A new model called "integrated analysis" was designed for developing Octabuoy. The term "integrated analysis" indicates that the analysis of *all* components had to be carried out in parallel, in Milan and Oslo. Through this new structure, engineers conducted the analysis of the hull, risers and mooring system and independently designed the whole of Octabuoy – its weight, motions, dimensions and operability.

The new model also had a specific learning objective. The project's management sought to understand whether the results and practices generated in Oslo and Milan could be made compatible. Flicking back and forth between provisional results, engineers in both settings used their own package and approach to benchmark results against those produced in the other setting. Using numerical inputs, practitioners tried to assess which parameters could be tuned to homogenise outcomes.

Despite these attempts to generate uniformity of results, the difference between the outputs produced in Oslo and Milan remained large (between 6 and 8 per cent) ruling out the possibility of reaching a consensus. To solve these discrepancies, either SEI or Moss needed to change their approach. The Norwegian Classification Society (DNV), the institution that is formally entitled to approve new platforms in the North Sea, played a major role in this decision. After analysing the discrepancy of results, DNV advised that:

"...for deepwater applications, which are over than 2,500 meters deep, it would be advisable to apply a more sophisticated approach because the coupling effect between risers and platform becomes much larger and that also includes coupling with the ankle lines to the mooring line to the sea floor" [Moss engineer].

DNV suggested the use of the coupled-domain approach with the nonlinear DeepC programme, which was produced and marketed by DNV itself. This decision concerned only Moss, who continued to carry out their calculations by drawing upon the coupled-domain approach regardless of SEI's final decision. As one of our respondents put it:

"I don't know what Saipem has decided to do. We have informed Saipem that this is the way we want to do it in the future and they have taken that as information. I don't know what they plan to do with it [Moss Engineers].

Thus, despite several attempts to coordinate their efforts SEI and Moss could not decide on an integrated approach to their design problem. The project's management concluded that one single interface could not be defined in complete isolation, as its effects would have larger systemic effects on the entire structure. In contrast with the initial assumptions, it was not possible to uncouple the detailed design from the overall design. The members of the Octabuoy Project decided to follow DNV's recommendations and use non-linear theory with coupled domain approach which ruled out modularisation as the way to partition tasks and integrate knowledge across teams.

Considering the characteristics of Octabuoy, designed to operate in ultra deepwaters, the technological tradition in which Moss had developed appeared more appropriate for the task. Moss grew out of the first and one of the most important deepwater "laboratories" in the world – the North Sea. DNV had built a prominent position in the North Sea, and given the importance of this province in the global oil market, it extended its influence to remote provinces such as the Gulf of Mexico and Angola.

However, acknowledging the role played by DNV in solving the controversy around which type of theory and computational approach to use to design Octabuoy would only offer a partial explanation of why SEI and Moss drifted away from each other. As it turned out, Moss and SEI were embedded within different traditions of engineering practice.

The Locus of Octabuoy's Technologies

Octabuoy's technologies were embedded within an established community of practitioners committed to developing Spar-type platforms. This "Spar community" configured design requirements, technological practices, contractors' selection procedures, computational methods, and so on. Within the Octabuoy project benchmarking against the Spar design was consistently done. Octabuoy engineers sought to demonstrate that under specific circumstances the Spar design would be affected by stability problems caused by the coupling effects amongst excitation forces. This stability problem was already known within the Spar

community, and discussions around it influenced the processes of integration chosen by SEI and Moss.

Among the important decisions confronting constructors of oil platforms is the choice of shape for the hull which ensures the structures' stability in different environmental conditions[9].

The need for a stable platform from to conduct experiments and activities at sea had been well established in oceanography since the 1960s. Phillip Rudnick, Fred H. Fisher and Fred N. Spiess of the Marine Physical Laboratory at the University of California, San Diego developed a research platform FLIP, to measure fine-scale fluctuations in phase and amplitude of sound waves. Their work drew on hydrodynamics and considered two types of excitation forces affecting the stability of buoy structures: the vertical motion (heave) and the horizontal motion (surge). If the behaviour of FLIP was confined within a specific natural frequency region (5 to 18 sec), then the energy embedded in the structure would cause amplifying effects influencing the platforms' stability. In order to lower amplifying effects derived from the vertical motion, Rudnick (1964) suggested design criteria which would require both a sufficient length of FLIP (300ft) and a reduced cross-section at the waterline. Rudnick was not only concerned with the heave motion. The horizontal motion or surge was recognised as a severe problem but no means for reducing it were proposed at the time[10].

In the mid 1970s Shell, Exxon and IHC[11] successfully transposed the FLIP concept into the oil industry. Two researchers at IHC, J.A. van Santen and K. de Werk, developed a solution to the stability problem through a new theoretical approach. Vertical response caused by waves at critical frequency (5 to 18 sec) needed to be relatively low. For Spar structures this stability would permit both installation of risers and stable drilling operations. van Santen and de Werk incorporated a more advanced theoretical understanding on the relationships between fluid motions and structural responses to excitation forces representing it as a nonlinear phenomenon. This new understanding did not change Rudnick's criteria to reduce the structure's motion. For example, the (in)famous BRENT Spar was designed with a sufficient draft (175 m) and a reduced cross-section at the waterline.

The non-linear approach used to improve structures' stability gained momentum when Glanville et al (1991) at Deep Oil Technology used it to design a new Spar commissioned by Chevron-Texaco and built to operate in the Gulf of Mexico. Despite the fact that the proposed Spar was larger than the BRENT and FLIP designs, it retained the stability assumptions implicit in the slender buoy concept. Deep Oil Technology acknowledged the influence of subtle interactions between vertical and horizontal motions, and suggested two different procedures for calculating platform motions in deepwaters: the "frequency domain" and the "time domain approach". As we have highlighted earlier, the first one was used by SEI whereas the second one was preferred by Moss. Using the "frequency domain approach" Glanville and colleagues assumed that both the waves causing motion and the resulting platform response were of small amplitude. The "coupled-domain approach", on the other hand, was best suited for ultra deepwaters and structure's responses which may be

characterised by nonlinear functions. Simulation results at Deep Oil Technology confirmed that the motion responses were excited by nonlinear affects (Glanville et al 1991, p. 6). In addition, Glanville et al's approach required the simultaneous computation of motions generated by all technological interfaces – hull, mooring lines, and risers.

Drawing on non-linear theory and the coupling approach, Deep Oil technology developed the "Truss Spar" which unlike the classic version it included a damping device – helical strakes – to inhibit vibrations causing fatigue in risers. In 1987 Ed Horton, founder and chairman of Deep Oil Technology, patented the Neptune Spar with a circular cross-section sitting vertically in the water and supported by buoyancy chambers ("hard tanks") at the top and stabilised by a structure ("midsection") hanging from the buoyancy chambers. The design of the Neptune Spar was based on helical strakes and used the coupled domain approach. Model tests were conducted to compare how Neptune, BRENT, and other existing platforms (e.g. Tension Leg Platforms) performed within the critical frequency period – between 5 and 18 seconds.

The reports mentioned above contained some proprietary data that began to circulate in the public domain. Spar platforms, however, continued to be designed by a handful of US contractors. Between 1976, the year in which the Brent Spar was installed in the North Sea, and 1993, only three exemplars of Spar were constructed outside the Gulf of Mexico (Converse and Bridges, 1996). In the 1990s the success of this type of technology attracted the interest of Exxon and Chevron, who were willing to expand their deepwater activities in the Gulf of Mexico. From 1993 until the end of the decade, US contractors designed most of the existing Spars (Genesis, Diana, Boomvang, Nansen, Horn Mountain, Gunnison, Holstein, and Mad Dog). In summary, Spar became the dominant design to extract oil in deepwaters and was fundamentally the product of US contractors working in the Gulf of Mexico.

In Norway, the seminal work of Haslum and Faltinsen from the Norwegian University of Science and Technology (NTNU) at Trondheim significantly contributed to the development of new understandings of buoy structure stability. There was a great deal of continuity between the stability problem examined at NTNU and on the other side of the Atlantic at Deep Oil Technology, Spar International and McDermott, a key US-based contractor. Both Norwegians and Americans acknowledged that different excitation forces in the critical period between 5 and 18 seconds induced the coupling between high vertical vibrations in the buoy structure. However Haslum and Faltinsen (1999) conceptualised the nonlinear motions through the so-called "Mathieu effect" or parametric resonance, showing how the Spar solution was highly vulnerable within this critical period - large amplitude pitch motions coupled to extreme amplitude heave motion arose when Spar platforms are exposed to long period swell.

Haslum and Faltinsen used the same computational methods as Glanville et al (1991) to demonstrate that there was a good agreement between the two methods except under the critical wave period between 5 and 15 seconds. Due to the non-linear Mathieu effect, for waves at 16.5 seconds the time domain approach showed motions approximately 20 times

larger than the unstable effects calculated by the frequency domain approach. Haslum and Faltinsen (1999) asserted that the linear damping assumption was not a good approximation when large structure's responses occur (i.e. deepwaters contexts). In their calculations they used the SESAM software, a computational tool marketed by DNV and based on nonlinear assumptions.

Halsum and Faltinsen's work caused a basic shift in platform designs. As a result of this, Spar design changed. J. Halkyard, A. Zan, I. Datta at CSO Aker Engineering (ex Deep Oil Technology) together with Australian researches illustrated the qualities and performances of a new version of Spar with cylindrical disks or plates applied to the keel. The new Spar was called Cell Spar. It was still based on a slender buoy structure but unlike the previous generation it was designed with a thin disk attached to the keel. Like Halsum and Faltinsen, researchers at CSO Aker used SESAM software. However, CSO Aker treated the nonlinear motion mainly in terms of viscous effects on the spar's hull with little or not attempts to relate this to the Mathieu effect.

Octabuoy engineers, on the other hand, made explicit reference to the Mathieu effect. Halsum and Faltinsen's theory was used by Moss to challenge this well-established tradition of Spar. Octabuoy was designed to reduce the parametric vibrations which could only be clarified by drawing on Mathieu's equation. The relational proximity between Moss and NTNU was facilitated by their spatial proximity. Octabuoy project manager carried out his doctoral research at the NTNU under the supervision of Professor Faltinsen, who helped him get familiarised with the vortex-induced vibration through Mathieu's equation. Moss, DNV and NTNU shared both nonlinear theory and SESAM. However, Halsum and Faltinsen (1999) did not refer to any solution having a semi-submersible hull formed by four conical columns, which constitute the basic design principle of Octabuoy. On the contrary, they seemed to back the classic Spar design based on slender buoy hull and helical strakes. Moreover, Halsum and Faltinsen did not explicitly require the computation of motions generated by all interfaces. In sum, the non-linear theory became the conventional approach used by US and Norwegian contractors to design ultra-deepwaters platforms.

On the other hand, the coupling between interfaces was an issue of contention within this community. Colby et al (2000) at DNV strongly advocated that the effects of mooring and riser become increasingly significant when predicting the structures' response. In contrast, CSO Aker did not include motions derived from all interfaces. In line with the uncoupled approach used at SEI, the hull motion was seen as unaffected by the behaviour of risers and mooring line. In line with DNV and Moss engineers, and in contrast with SEI, they pointed out that with excessive wave amplitude damping from the spar hull and its appendages would be crucial to suppress the vertical oscillation. In short, the more specialised community connected to deepwater platforms was characterised by a degree of controversy on the basic engineering design principles.

Analysis and Discussion

Our analysis of the case begins by reviewing the implications of the modularisation as an approach to knowledge integration at an intra-organisational level. It will be followed by a review of the role played by communities of practitioners in knowledge transfer across functional teams in complex projects.

We have seen how Octabuoy's project management conceptualised knowledge integration by establishing an isomorphic relationship between Octabuoy's architecture and the project organisation. The task and knowledge structures were seen as modular and decomposable, mirroring the modular architecture of Octabuoy. This approach was in line with conventional engineering practices used in the industry. Thus modularity as a way of organising enabled dispersed project teams to channel their interactions through the presumed stable technical interfaces defined for Octabuoy.

The interaction between Moss and SEI teams was based upon agreement on a restricted set of data related to these technological interfaces. This agreement at the start of the project took place through a process of standardisation – i.e. the critical points for each interface were defined as parameters and formulae, greatly reducing the need for communication during the project. How critical an element of the interface was depended on its relationships with other interfaces. For example, risers could not be sized without the hull's R.A.O.[12] for the excitation motions. This number generally defines the shape of the complementary interface. On the other hand, the design of the risers drew upon a set of critical points regarding their interfaces – e.g. the bending and torsional forces on the risers, their structural characteristics, length and position of the touch down point of the well in the sea bed.

The study of Octabuoy suggests an image of knowledge integration which is in contrast to that of uniformity of practices, knowledge sharing, and social cohesion. The project's organisation had the effect of strengthening the autonomy of individual teams, increasing practitioners' specialisation, and reducing the need for managerial authority in promoting knowledge sharing. In summary, modularity is a form of organisational design which *intentionally* minimises the degree of interdependence across units. The coordination and transfer of knowledge between SEI and Moss were, to use Sanchez and Mahoney's (1996) terms, "embedded" within the modular structure of Octabuoy. The events that followed showed how this understanding failed to predict complex technical interdependencies that rendered Octabuoy's modularisation useless. Octabuoy proved to be a non-decomposable structure, since all its subsystems needed to be designed simultaneously and holistically, using the same approach and design tools.

It might be argued that the differences in technological background between the two units as well as adherence to conventional industry practices, contributed to the ill-fated decision to modularise Octabuoy and organise project teams accordingly. The capabilities required to accomplish this task, also conceptualised as single modules, appeared bound up with a larger structure of technological knowledge extending far beyond SEI and Moss.

In line with Vincenti's (1990) multilayered view of engineering knowledge, we sketched the nature of deepwater practices and discourses which were brought into play in the design of ultra deepwaters platforms. In particular, we highlighted two layers that differentiated SEI's and Moss' design practices: a theoretical and a computational layer.

In this context, it is easier to appreciate why Moss and SEI could not communicate effectively and why the design process of Octabuoy turned into a stalemate. Moss' practices were situated within the nonlinear excitation forces debate taking place in the community of practitioners concerned with technological solutions for deepwater platforms. Nonlinear theory became part of the structure of knowledge used across the industry to evaluate new solutions. The work of Haslum and Faltinsen at NTNU contributed significantly to the development of the nonlinear approach to the study of platform motions. Some implications of their work were then adopted by the Spar community to modify existing hulls designs and conceptualise new damping devices to improve the stability of buoy structures.

Practitioners in the ultra deepwater tradition were glued together by multiple layers of knowledge. They shared: 1) a well-defined technological problem, the stability of buoy structure in the critical frequency period (between 5 and 18 seconds); 2) the physical characteristics of new floating concepts – deck equipment, main dimension of the hull, types of mooring system, and types and dimensions of risers; 3) the performances of the overall structure after model testing; 4) mechanical concepts underlying platform performances; 5) design configurations – cylindrical Spar, truss Spar, and cell Spar; 6) design approaches – the coupled and uncoupled domain approaches; and 7) new theories to explain the behaviour of these platforms under severe environmental conditions, namely the Mathieu effect. These items generated a common language through which new concepts and understandings could be brought into the public domain to be tested.

As signalled by Constant (1984, 1987) and Vincenti (1990), communities of practitioners are often internally fragmented. Within the community of deepwater practitioners, parallel technological developments took place simultaneously and at times with a degree of controversy. For example, not all practitioners agreed that the stability of buoy structures was affected by the coupling of hull, mooring system and risers. DNV and Moss, used the coupled approach as the normal computational approach, which was at times adopted by researchers familiar with the alternative uncoupled domain approach.

The key argument here is that this controversy shaped the design of Octabuoy and the interaction between SEI and Moss. Initially engineers from SEI and Moss endeavoured to work out the problems affecting Octabuoy's design by drawing on approaches and practices from past experience. Engineering decisions were oriented toward making existing design solutions work as opposed to coming up with novel and untested designs. Radical changes are costly since too many elements must be scrapped – e.g., theoretical approaches, software, relationships with suppliers.

The modularisation of tasks according to expertise (hull and risers) and geographical criteria (Milan and Oslo) had the effect of strengthening the autonomy of individual teams,

and standardising their interactions according to well-defined technical interfaces. More importantly perhaps, our case demonstrates how routine practices may be implanted within traditions in ways that can go largely undetected or understood, even by those closely involved in those practices. It is novel projects such as Octabuoy that expose the long roots of practice in particular technological infrastructures and challenge existing understandings and knowledge structures.

Conclusions

The Octabuoy case throws up a number of interesting issues concerning the nature and locus of engineering practice. As far as the nature of engineering knowledge is concerned, this case demonstrates the variegated and complex nature of this knowledge. For Vincenti (1990), the term engineering knowledge has usually been associated with knowledge used by engineers whereas scientific knowledge is customarily perceived as the knowledge generated by scientists. This conception perpetuates the misconceived notion that science produces knowledge while technology uses existing knowledge.

This conception ignores the variety of knowledge generating activities associated with different types of engineering practice associated with design, production and operations. Vincenti (1990, p. 237) argues that all engineering knowledge contributes in one form or another to the implementation of how things *ought to be*, usefulness and validity being the key criteria for assessing engineering knowledge. The implementation of how things ought to be requires both procedural knowledge (know-how) as well as descriptive knowledge (know-that), some coming from science but much of it generated through engineering practice itself.

The second major conclusion we offer relates to the locus of engineering practice. At the start of this paper, we contrasted a Chandlerian view privileging the firm as the developer and user of technologies versus the community of practitioners as the locus of technological knowledge. Vincenti (1990) and Brown and Duguid (2001) provide an intermediate position by arguing for the importance of both firms and communities in developing and using technological knowledge. The Octabuoy case demonstrates how the knowledge required to design this platform drew on a well-winnowed tradition of engineering practice associated with the design of Spar platforms as well as basic scientific research connected with the behaviour of these platforms in what Halsum and Faltinsen (1999) called "hostile areas". It was the need to mix and match these different sources of knowledge that exposed the fissures between the technological knowledge bases of SEI and Moss and overturned the initial assumptions concerning the modularisation of Octabuoy. Even though SEI and Moss were experienced practitioners at designing and building Spar platforms, the Octabuoy project demonstrated how their practices were linked to past experience in particular territories (Gulf of Mexico for SEI and Norway for Moss) and shaped by particular relationships (e.g. Moss's long standing links to DNV).

The Octabuoy example demonstrates how technological evolution in this field is bound up within a distributed set of firms, communities of practitioners and other institutions such as Universities, research institutes and regulatory bodies. As we highlighted earlier, the origins of offshore platforms for oil exploration lie in the pioneering work undertaken at the University of California, San Diego. The developments of oil exploration in the Gulf of Mexico by some of the oil majors in cooperation with major contractors formed a community of organisations that developed successive generations of platform culminating in one dominant design, the Spar platform. The move from the relatively shallow waters of the Gulf of Mexico into the deeper and hostile waters of the North Sea, created another pocket of capabilities residing in a variety of organisations, from firms with roots in shipbuilding such as Moss, to regulatory bodies such as DNV and Universities such as the Faculty of Marine Technology at NTNU and other institutions such as the Krylov Institute. Ultimately, the final solution for the design of Octabuoy and the prevalence of Moss' approach owed more to its connections with these external sources of knowledge than any intrinsic superiority of its technological capabilities vis-à-vis SEI.

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Endnotes

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2 The increasingly fashionable notions of decomposable systems (Simon, 1962) and modularity are discussed at length in Garud et al (2002).

3 "Practice is the reification in locality of a whole hierarchy of foundational knowledge, belief in which is, in Bayesian terms, rational" (Constant 1999, p. 354).

4 The Krylov Institute was founded in 1894 and has been the primary research institute in Russia concerned with the design and construction of naval ships, commercial vessels and offshore structures.

5 Spar platforms consist of a large cylinder supporting a typical fixed rig platform. The cylinder does not extend all the way to the seafloor, but instead is tethered to the bottom by a series of cables and lines. The large cylinder serves to stabilise the platform in the water, and allows for movement to absorb the force of potential storms.

6 These subsystems are the top side, where drilling and housing facilities are located, the hull, which supports both the top side and the drilling rigs, the risers, which form the system of line and pipes that connects the hull and top side to the sea bed and finally the mooring system, which is the system used for "station-keeping" to assist re-entry for drilling completion as well as minimise the risers bending angle at the seafloor during drilling.

7 For fixed offshore structures, wind-generated waves are often the main contributor of structural vibrations. For floating structures in deeper waters, ocean waves are random and prediction of the structural displacement should be based on stochastic analyses. Nonlinearity arises mainly from drag-related forces resulting from the interaction between the ocean wave motion and the structure members.

8 As an example, consider the fatigue life of the risers - defined as the number of cycles of stress that can be sustained by a technological artefact prior to failure for a stated test condition The coupled domain approach used at Moss takes into account interactions amongst all the interfaces. As a result, the weights and size of each component would be significantly reduced as the damping effects of the mooring lines would reduce the overall stress on the risers. When this coupling is not taken into account, the risers would have additional and unnecessary weight which will eventually increase the size and costs of the structure. Using the uncoupled approach SEI generated conservative results which overestimated the fatigue life for each interface. To obtain the same estimated life of the risers produced by Moss, using the coupled-domain approach, SEI needed to apply extra margins to the modules thereby increasing the weight and cost of the structure.

9 Stability represents the ability of a platform to return to equilibrium float conditions after a transitory disturbance occurred – for example, disturbance may arise from a storm or strong sea conditions.

10 However, this problem did not seem worrying. "Fortunately, the motion is least at the lower end of the buoy. It is also fortunate that vertical stability is usually the more important property for an oceanographic platform" (Rudnick, 1964, p. 1271).

11 In 1965 a number of Dutch shipyards established under the name N.V. Industrieele HandelsCombinatie Holland (freely translated as the Industrial Trading Combination Holland), a new company to compete in traditional marine technology fields as well as enter the then emerging oil and gas market.

12 Response Amplitude Operators.

Passionate Knowers and Passion in Knowing? An Attempt to Introduce Market Orientation

Jessica Eriksson[1], Sofia Isberg[2]

Commitment, belonging and passion for work is argued to support learning as well as the performance of a unit (cf. Bartel & Saavedra, 2000; Wenger, 2000). In practice-based approaches to learning the view adopted is that we learn because we understand each other; an understanding embedded in the situation and expressed through shared language, tools and social rules (Blackler, 1995; Cook & Brown, 1999; Gherardi, 2001; Kalman, 1999; Wenger, 2000). The results of learning are then expressed through processes of interaction termed knowing.

It is often argued that learning is enhanced in tightly knit groups sharing a practice, so called communities of practice (Brown & Duguid, 1998; Wenger, 2000). In a corporate context, a community of practice can be a unit or a department within a firm such as a product development department made up of technicians or a sales or production department. In these communities there are socially constructed views of what constitutes knowledge and thus of what constitutes appropriate processes of knowing in particular situations (Orlikowski, 2002). Hence, the socialization into communities of practice also becomes an issue of identity creation and adoption of world-views (Brown & Duguid, 2001).

Changes in practice not in line with the existing identity of a community may threaten the identity, and evoke emotional responses such as resistance. To date, Teigland (2003) argues, few studies have been conducted accounting for the life cycle of communities. Similarly, while change, social interaction and knowing is closely related to emotions, emotional expressions are rarely explicitly considered in the literature on organizational performance or on knowing (Sturdy, 2003). In addition, emotional expressions have an individual component that needs to be acknowledged since communities are made up of people, or practitioners. Practitioners are 'knowers', who have different emotions for their daily work and engage in their work in varying degrees (cf. Blackler, 1995). Whether passion for work spreads among workers in a community may depend on what, more precisely, these knowers are passionate about and whether these passionate knowers have similar reactions towards changes in practices. How does passion for work affect knowing during change? Is passion for work always "contagious" and if so, what is it that is spread or shared? In particular, how are changes attempting to increase learning and achieve knowing received?

This paper considers the role of passionate employees, or knowers, following changes in work practice. More specifically, we will focus on attempted changes in, or additions to, work practices aiming at improving processes of knowing within and between organizational communities. In the following, we sketch our theoretical frame of reference, focusing on knowing, change and homogeneity/heterogeneity in communities of practice and emotional expressions. Thereafter we discuss methodological issues before presenting and analyzing our case.

Knowing, Change and Emotions

The knowing perspective removes focus from knowledge transfers, and instead focuses on how learning arises when people share practice. Focusing on knowing repositions knowledge as something people do rather than as a resource (see e.g. Blackler, 1995; Cook & Brown, 1999; Kalman, 1999; Orlikowski, 2002). Changing the noun knowledge into the verb positions knowing as unfolding in activity, constantly ongoing (Cook & Brown, 1999; Gherardi, 2001). Knowing is situated, and continuously constructed and reconstructed by the people, or knowers, involved (Blackler, 1995, Gherardi & Nicolini, 2002).

The situated character of knowing is closely connected to the existence of homogeneous groups sharing a practice. When people work together over time, shared practice will emerge and create communities of practice (cf. Brown & Duguid, 1998). One can look upon organizations as consisting of several homogenous such entities or communities of practices, and in the literature, these communities tend to coincide with departmental borders within firms and/or occupational borders (Teigland 2003). Most individuals are however members of several communities of practice, at work as well as outside work (Wenger, 2000).

Communities of practice are considered to facilitate learning, but the similarities and the established tradition of interaction in a community may hamper dynamics (Wenger, 2000). Wenger (2000) argues that it is important to continuously support learning through reflection and new input, for example through learning between communities. Translators or knowledge brokers are often described as the solution for such learning (see e.g. Brown & Duguid, 1998). Based on an insider status in two different communities, translators facilitate knowing through translating the interests or knowledge of one community of practice to another. It is frequently argued that different (boundary) objects or artifacts facilitate knowing or knowledge sharing within and between communities (Brown & Duguid, 2001; Bechky, 2003) such as maps, computer programs or drawings.

There is also heterogeneity regarding identity, practice and knowing *within* communities (Wenger, 2000). Even when sharing a practice, knowers will be more or less central and established within the community. For example, Fox (2000) gives an example of different groups within communities, such as masters, young masters and apprentices with different roles and varying degrees of legitimacy. These different groups all have their stakes in maintaining the stability of the community and influencing the development of the community. The identification processes reinforcing the community (Brown & Duguid, 2001; cf. Mael & Ashfort, 1992) may therefore relate to different parts of a community for different people.

Changes in practice can be perceived as threatening for a collective as well as for individuals (cf. Blackler, 1995), which a vast literature on change and resistance to change also has shown (see e.g. Huff, Huff & Barr, 2000). When change is imposed on an industry, a community or a group, the core beliefs and norms of that group are often questioned, removing or loosening the guidelines for action inherent in the group (see e.g. Eriksson, 2004; Greenwood & Hinings, 1996; Newman 2000). Emotional expressions arise following such

change, and are an important part in explaining the meaning constructed in relation to different change initiatives.

Social constructionist approaches to emotions[3] are often criticized, as research on emotions largely build on the individual mind (Sturdy, 2003). An example of the latter is Lazarus's emotion theory, which implies that people go through an emotional evaluation process following change. First there is an (often unconscious) evaluation of the consequences of the change for the individual and his/her goals etcetera. If the change is perceived as beneficial, pleasant feelings are evoked, and oppositely, if the evaluation points to negative consequences, unpleasant feelings are evoked (Lazarus, 1991). We argue that in a social constructionist view, the emotional expressions are still individual, but they gain importance in their role in constructing shared meaning (see also Sturdy, 2003). Emotions arise based on current identities and thus shape the responses to change in an ongoing process (cf. Huy, 2002).

As a consequence, emotions are also an indication of whether the norms, boundaries and identities specific to a community of practice, a particular group, etcetera, are challenged or reinforced (compare Baldwin & Bengtsson, 2004). Accordingly emotions are closely tied to issues of power (Sturdy, 2003), and change initiatives may cause fear for a loss of prestige or control as well as a sense of pride if new responsibilities are assigned to a group. The emotions evoked can easily spread across the group as different moods have been shown to have contagious effects in work groups (Bartel & Saavedra, 2000). Emotions are therefore an important aspect in understanding whether a change initiative is successful, in particular if the change attempts to introduce practices that require knowing to be successful.

Knowing – a story of passion, identity and power

Learning about and from customers is important for many, if not all, companies in order to be able to offer attractive products and services. Knowing processes are initiated by generating information from different sources such as customers, competitors, laws and regulations. However, since all companies have access to similar information, the information per se is not a competitive advantage; the key is how to disseminate, understand and utilize information. The ability to use information and put it into action, knowing, separates truly market-oriented companies from less developed ones (Maltz & Kohli, 1996). Consequently knowing processes are of special interest in this particular story.

Context

In a study focusing on market information processing, the empirical arena was a local office of a large Swedish insurance company. Several activities were identified where the issue of passion turned out to be of crucial importance for the members' experience and understanding of the activity, and thus for the outcome of the same. The story we are about to

present includes actors such as a passionate manager and several practitioners representing three different communities; claims adjusters, sales staff working with incoming customer calls (a unit called "customer service") and sales staff actively targeting and visiting customers. In focus is the implementation of a tool for disseminating market information. In a survey among the employees, several practitioners have given the current market information processes low grades, a result which leads the local manager to initiate this new activity. The activity is also triggered by the development in IT-technology and the widespread use of the Intranet.

Methodology

Emotions are difficult to study (see Sturdy, 2003), but our stand is that people express emotions and provide important information about work processes through their reflections about their work. This paper is therefore based on people's stories on how they feel about their work, about their daily practice and of new practices being introduced. The study was conducted over a period of 12 months. The length of time spent in the organization improved access and trust in the researcher. Semi-structured interviews were the primary method for data collection, but information has also been gathered through their Intranet and through participation in meetings. The respondents were managers and practitioners, and their answers were often reflective, long and spontaneous, resulting in stories filled with details and reflections, expressing different emotions. Further, some individuals have been interviewed on several occasions, allowing for an understanding of the processual characteristics of the changes imposed. The length of time spent in the organization and the observations also contributed to an understanding of the social structures in the company, allowing for an analysis of power and control aspects.

The passionate manager

The management group of the local office decided to respond to the practitioners' criticism of, as they experienced it, the undeveloped market information processing. One of the managers, a man responsible for developing customer relations, was assigned the responsibility for initiating a change. The manager saw coordinated knowing processes as a necessity for the company to survive and he stressed the changing environment both as a driving force for the development and as a motivator for ongoing learning for the sake of competition. He said: *"We need to learn and cooperate. All the information we have that we do not know that we have…put together it will help us understand the customers and give us directions for the future."*

In his daily work he tried to understand customers' needs and wants and he was eager to learn from the market and to share market information with others. He also expected others to feel the same.

A new practice was therefore initiated. In customer meetings there are opportunities to learn, by asking and listening to what the customers say, about competitors, about needs and wants concerning the offerings etc. Front line personnel, who have daily contacts with customers, were encouraged to gather information and to disseminate it to others through the Intranet and a local website. The practice was introduced on the website by the manager with the phrase *"You are the key person when it comes to sharing valuable information of the market…"* and all members of the organization are invited to the local Intranet site labeled *"Local market information"*. The technical instrument that would enhance dissemination of information was introduced, and then came the question of how to use it.

The manager really believed in the new practice but he was also a little worried about the response it would get from the practitioners, the front line personnel. His worries were mainly connected to the front line personnel's present working conditions and how adding a new practice would affect their daily work. Their main goal was to handle as many customers as possible and to make sure that no customer had to wait longer than necessary for help. *"I can see a barrier here"*, he said. *"The same person who works under these productivity demands shall perform an extra task which in turn affects the possibilities to serve the customers."*

The practitioners

The new practice received mixed responses. One sales woman, from the unit "customer service" said: *"We are a part of the surrounding world and I need to know what our competitors do. How could I otherwise persuade my customers that our offerings are better?"*

A loss adjuster got frustrated and started talking about information overload and the more or less "silly" fact that people send e-mails or communicate via the Intranet instead of talking to each other.

Several others talked about the demands for productivity and efficiency as a hindrance for sharing information. A manager from "customer service" said: *"In our group we are evaluated by our accessibility for the customer. That means answering the phone. We are also evaluated by our sales figures. We have to take care of the customers first. If there is time left, then maybe we could contribute to this"*.

A sales man expressed his feelings: *"Everything that has to do with reports, writing stuff, meetings, affects our possibilities to sell more insurances. If you are not forced to participate in this activity, you will prioritize selling. If you should take time to report something like this, information from the market, then it has to be something that can be so useful that it can lead to more sales in the future."*

And then… passion in knowing?

Following the introduction, the passionate manager was one of the most frequent users of the new tool. He reported on competitors' actions and made price comparisons. Some people followed, but the real interest for disseminating information in this forum was never really

widespread. The practice did not engage as many members of the organization as the manager had hoped.

Six months after the introduction, the site "Local market information" was gone.

Analyzing the failure, one of the other managers, representing the claims adjusters, said: *"This must not be a practice just for the sake of it. One has to have a straight policy behind this and we did not have that. The practice has to be given a meaning to engage people. Perhaps we need to talk more about the surrounding world, what it is and what we need to know .We never really defined the expression market. If we should do this again, maybe we should start by gathering people and discuss the market and define what obligations that comes with the activity."*

Others meant that the Intranet was an unnatural forum for disseminating market information. They meant that information about customers and competitors were orally communicated during the daily work. One of the reasons behind the introduction of the practice was to make information more widespread and not limited to different communities and units. This "problem" remains and disseminating information outside the working group is referred to as a "cost", and a loss of time.

The manager, who introduced the practice, returned to the issue of productivity demands as a hindrance for a new practice, when evaluating the failure. *"They (the front line personnel) all try to make their daily work easier, focusing on their special tasks. By adding a practice without changing the other demands, they felt that they had too much to focus on. I believe that we should have a tape recorder in all coffee rooms, in these informal meetings people share a lot of information."*

One member of the organization concluded: *"It (the process of disseminating information) drowned in all the great noise out there in everyday life and it did not receive any oxygen. Perhaps it was a dream image of how we want it to be."*

In table 1 the presentation of the case is summed up and supplemented with additional data about the meaning assigned to the practices and the emotional expressions following change.

Table 1. *Meaning and emotional expressions – a comparison between manager and group.*

	Company level	**Group level**
Knowers/ Practioners	Primarily manager with responsibility for developing customer relationships	Three departments of front- line staff, sales men (customer service and outreaching activities) and claims adjusters
Meaning attributed to current front-line practice	Serve customers as efficiently as possible – contributes to customer satisfaction and profit.	Serve customers as efficiently as possible. Serving customers = helping. Efficiency = what is evaluated by the managers.
Emotional expressions towards current practice	Contentment towards staff's daily work, appreciation towards staff's knowledge, but also a feeling that there are unexploited resources	(Professional) pride, stress,
Context and rationale for new flow of information	Increase market orientation to gain competitive advantage	Varying opinions; - Shared knowledge can improve customer contact - Meaningless administration
Meaning attributed to the new tool	A functional and simple tool for sharing experience	A static tool, additional work not contributing to current work
Emotional expressions towards the tool	Enthusiasm, anxiety	Unfamiliarity, frustration, ridicule, uneasiness, pressure, interest/lack of interest, threat, curiosity

Discussion

The actors in this story have similar goals – to serve the customers in the best possible way, and the manager and the front-line staff all want to learn more and share knowledge. Still, the initiative to do so fails and processes of knowing do not arise. In table 1, we could see the differences in the meaning the parties actors attribute to the initiative. We analyze the problems with the new tool and its failure to achieve knowing related to market information in relation to three themes, all centering on the importance of meaning. First, the issue of identity in relation to practice is focused. Thereafter we address the role of control and power. Finally, we connect these two themes in a discussion of what is required for achieving knowing in relation to a new practice and how emotional expressions influence knowing.

Meaning and identity

The norms and beliefs of a particular group are important influences on what feelings that are evoked (cf. Baldwin & Bengtsson, 2004). Something that reinforces the identity of a

group or a community is more likely to be perceived as meaningful, evoke positive emotions and be embraced by the group.

The meaning of everyday working life for the front-line staff is to be there for the customers, serving and supporting them, which also is at the core of the different communities' identities. This meaning is supported by the management who, for example, measures productivity by the number of telephone calls every individual sales man in the customer service department handles on a daily basis. The working life and identity of the group is thus focused on today's customers and their needs and wants - in the particular moment when the customer and the member of the organization meet. It could be described as reacting to the customer's voice, a way of acting that makes the everyday work possible to handle. The new task affects customer focus and that means an extra workload, which evokes negative emotions.

If information sharing is to be performed well it will take time from the primary task – to care for customers, which is what the staff is evaluated by and takes pride in. The new tool in our story thus conflicts with the current identities and emphasizes negative aspects of the work situation such as time pressure. Collective identification processes (Mael & Ashfort, 1992) therefore work against the new tool. The idea of the front-line staff as a knowledgeable source of information is clouded by the design of the tool, which is not perceived as providing status to the communities. Rather it can be used as an alibi for *not* sharing information since the page is evidence that others are participating; "things are being handled and why should I then have to do it as well"? The current practices in the communities does not include knowledge sharing and as a consequence, the tool does not find support neither in the current practice and routines nor in the norms and beliefs connected to the identity of the communities.

The meaning of the Intranet page is clear for the management - the passionate manager gives the introduced practice the meaning "competitive advantage". He views the meaning as not primarily connected to his own actions since he does not meet customers on a daily basis, but for the organization as a whole. He puts satisfied customers in a different more long- term perspective, than the front-line staff that is evaluated by daily sales/calls. But the front-line staff struggles with making sense of the concept. The passion that many of front- line staff feels is focused on the present time, but the passion experienced by the manager is more aimed at the future.

Still, some individuals can see meaning with information sharing as such, but not with the design of the tool. The beliefs about how to best serve the customers differ among the front-line staff, some consider updated information about the market as a sales point, and others put more faith in the current approach. This heterogeneity that stretches across the three communities provides a potential for change (Wenger, 2000) if the problems with the design of the tool could be overcome. The heterogeneity of beliefs concerning the tool is rooted in individual differences and aspirations as well as in potential subgroups; some have a more pronounced interest in market information and an ability to see the relevance of information

on different levels (cf. Fox, 2000). If enough people are persuaded to work with market information, this could stimulate others in their respective communities as well. Positive examples are important in order for knowing to evolve and involve all three communities

Power and control

As we have seen, the employees find it difficult to identify with the new activity, but what practical opportunities are there for implementing the tool? The tool and the initiative are a result of the management's view that the front-line staff is very knowledgeable, but paradoxically, the one-way communication of the tool emphasizes the front-end staff as a large mass of anonymous individuals far from the corporate centre. In particular, for the claims adjusters and the staff at the customer service unit, the productivity measurements show the lack of control the employee has over his/her everyday work and the amount of control exercised by the firm. The practices are tightly scripted and cannot be departed from. The units thus cannot function as the innovative communities of practice described in the literature (cf. Wenger, 2000) because there is no room for creative and innovative ideas. The tool is designed by the management and has a certain meaning and a certain definition of desirable knowledge inscribed. Further, the design of the tool largely prevents the employees from inscribing a new meaning to the tool. The tool has a stabilizing definition of knowing inscribed and can be perceived as a way of exercising power rather than encouraging employees to act and reflect more freely.

Earlier we mentioned that objects such as technological tools often are described as facilitating sharing of knowledge or knowing. But as Bechky (2003) relates, objects do not always help to transcend boundaries between communities, or, as in our case within and between communities made up of organizational departments. The technology could be a point of departure but, as we have seen, it is actually counterproductive. The design of the Intranet home page does not encourage participation. Only reading information on an Intranet site does not have the same meaning as actively producing and discussing information - to use it in practice. Instead, the front-line staff prefers discussions, a more dynamic way of communicating. They want to talk about their experiences and be listened to. The dynamic component of a conversation can further be considered as less demanding than writing down information due to the interactive responses that triggers the story. Information placed on the Intranet remains information, but information put to use, analyzed in meetings and during coffee breaks is closer to knowing.

To truly share information and support the use of that information in knowing is to acknowledge that knowing is about more than information. Who is really to know what and for what purpose? Acting upon such a realization would upset power relations within the organization. This would entail a reprioritization of resources such as time and staff that currently controls the staff and prevents more reflexive practices. In addition, knowing is not only about receiving information, it is about actively sharing knowledge (Kalling & Sthyre,

2003). This includes the management that need to engage in the discussions and create an understanding for their perspectives and their need for market information.

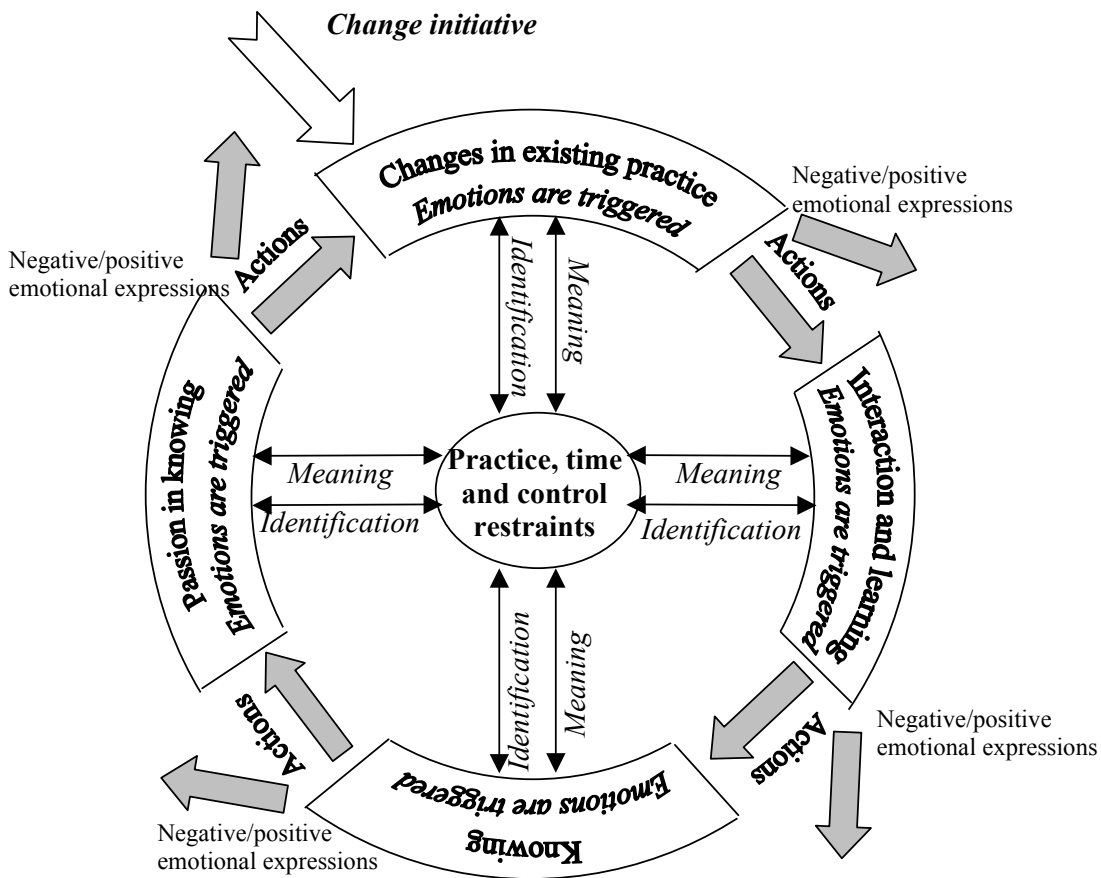*Passionate knowers and passion in knowing*

In figure 1, we illustrate a tentative process leading to knowing. When a change initiative is introduced, changes in practice are required. Strong emotional expressions are more likely to arise when something out of the ordinary happens, like the new practice in the story. Negative emotions are detrimental for learning, but if we find meaning in an activity, positive emotions are evoked (cf. Lazarus, 1991). Positive emotions support actions that are in line with the change initiative, whereas negative emotions support defecting actions.

In a first stage, it is important for the employees to find meaningfulness in the tool and to identify with why the tool is necessary. As we have illustrated, the manager is very passionate about sharing market information, but problems regarding identity, meaningfulness and control and time issues in the current practice arise. The lack of identification, the problems with finding the tool meaningful and the problems with control evoke negative feelings. This hinders the initial initiative to move on to a second stage of learning since mere information is not enough. To be competitive the organization has to process the information.

Blackler (1995) states that knowing is pragmatic and locally situated and we can see this pattern also in our story. Knowing in the working situation is in this case mainly concerned with "getting the work done" in the particular situation. Mutual understanding within the community makes knowing possible, but lack of understanding of other communities' work situations is an aggravation for knowing between different units. The knowledge of the customer is thus local, situated in different smaller communities as a result of the working conditions. As learning fails, the third stage of knowing is also hindered. The communities continue to find it difficult to identify with the tool and to find meaning in it, and negative rather than positive emotions influence the actions.

Knowledge is something people do, together, in social interactions, in knowing processes (Orlikowski, 2002), but in our story, shared information about customers is far from a social activity. Interest in learning and engaging in knowing needs to be stimulated - think for example of a child learning to walk or a new employee at the office. We feel and experience emotions in interactions; we are affected by other people, the situation, the language used and the meaning or lack of meaning we see in knowing. Knowing is constructed and reconstructed by people, which means that knowing involves emotions (passion) (Blackler, 1995). The tool does not encourage people to talk, meet, interact and learn, rather the contrary. If our learning efforts are encouraged and stimulated by those around us, we will feel positive, wanting to learn more and more. Commitment, energy and most of all meaning can eventually turn into passion. Passion is in turn a driving force for continuing knowing. As long as we see meaning and response of our efforts we continue the process.

Table 1. *From change initiative to passion in knowing.*

Conclusions

In our story, both the manager and many among the staff can be considered as passionate knowers; the front-line staff has a passion for serving the clients and has much knowledge about the customers. These knowers learn how to handle their daily assignments and how to meet the customers. Unfortunately, if they share information, they do so in the small working unit that they belong to. When the organizational goal is to satisfy customers in a long-term perspective, information need to be spread throughout the organization.

Passion in knowing could give the organization in this story competitive advantage, but not the information per se, not passionate knowers (they can contribute to and support knowing, but individuals cannot develop the process on their own). If there is widespread passion in knowing, if knowing is stimulated and organized for (possibilities for people to meet, share experiences and interact), then there is a chance that knowing will continue. Tools designed to disseminate information and support knowing must however be perceived as meaningful for

the people within the communities. Meaningfulness is however closely connected to the actual work situation and requires opportunities for reflection and social interaction.

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[3] Research on emotions includes many different definitions and careful distinctions. We have adopted a broad view of emotions as including several related concepts such as mood, following Huy's (2002) study of middle managers. A further theoretical distinction is not of theoretical interest for this paper.

Organizational independence of single employees as a means to control knowledge

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Abstract

This paper focuses on means for organizations to become or remain independent of their employees' subjective knowledge, which I discuss from the employee's point of view. Three popular management ideas – organizational learning, the learning organization and knowledge management – are analysed. The main conclusion is that the more current and less academic ideas of the learning organization and knowledge management contain the same tools as the idea of 'old' organizational learning for getting in control over knowledge, but that these two ideas in addition contain other control means. The idea of 'new' organizational learning seems, however, to be less fit for controlling subjective knowledge, since it implies that knowledge is not storable. Some alternative scenarios for this idea are finally outlined.

Introduction

We are said to live in a 'knowledge society'. If this is true, it would, among other things, mean that individuals and their subjective knowledge are becoming more important, at the expense of machines and other so called 'resources'. Droege and Hoobler recently (2003: 50) described one of the problems in the 'knowledge economy', in terms of that employees' knowledge 'is rarely shared, swapped, traced, and fertilized to ensure that it remains, at least in part, with the firm when employees leave'.

There are, though, ways for organizations to become more or less independent of any single individual and her or his subjective knowledge. The aim of this paper is to draw attention to such means, which sometimes are obvious but often are quite subtle, in the following management ideas: organizational learning, the learning organization and knowledge management. Literature on these ideas have been analysed in order to highlight and 'unveil' means for organizations to become independent of the individuals' subjective knowledge.

Most of the management literature in general seems to view struggles of becoming independent of subjective knowledge as risk reduction, if it is acknowledged at all. From such a functionalistic perspective, independence struggles are thus a necessity that organizations – and in particular the employers – would not cope without. For instance, Bonora and Revang (1993) discussed strategies for reducing firms' dependence on subjective knowledge, by building knowledge into the organization and by building exit barriers. Clegg argued that

If management can reduce their dependency on individuals as the bearers of knowledge and skills by rendering these skills into computer-based artifacts, it is possible to manipulate and combine these with other factors of production in ways that are impossible if these skills remain a human possession. (Clegg, 2000: 87-88)

Stovel and Bontis (2002: 310) argued that 'senior managers must implement knowledge management strategies to ensure that monies they have spent on the training and operation of departments are not wasted when voluntary turnover occurs within the firm'.

I will instead view the means for organizations to become independent of subjective knowledge from a more critical perspective, thus following in the footsteps of pioneers such as Braverman (1974), and view them as concrete tools for gaining control over knowledge.

Analyses of learning and knowledge in an organizational context from a critical perspective, seem to be an urgent topic, as far as at least some other scholars in the area are concerned. Burgoyne (1999) acknowledged the importance of the question whether the organization is in control of knowledge in the organization or not. Moreover, Easterby-Smith et al. claimed that

The time is ripe to start addressing learning and knowing in the light of the inherent conflicts between shareholders' goals, economic pressure, institutionalised professional interests and political agendas. (Easterby-Smith et al., 2000: 793)

From such a critical perspective, current and more hidden means for controlling knowledge are hardly signs of a new trend, but rather extensions of earlier ways of controlling knowledge, such as slavery, where the labour was (and at some places in the world still is) owned, and Taylorism, where the employees are alienated from knowledge about the whole product/service and only are allowed to learn and master narrow, specialised work tasks, which also could be expressed in terms of control by deskilling the employees (Braverman, 1974). In this paper, though, the conflict in scope is that between the organization and the individuals. I will, though, assume that the employers are more interested in organizational independence than what the employees are.

Popular management ideas are often ambiguous, and therefore not easily defined. Extensive considerations about what the three ideas actually mean would, however, not help in this case – these would rather guarantee that I miss the point. Some general definitions are needed, though, in order to make it possible to follow the argumentation. Therefore, I will within this paper with 'organizational learning' mean the embedding of what the organization's individuals have learnt as agents for the organization, into different kinds of SOP:s (Standard Operating Procedures) which in their turn direct the individuals actions (and further learning) (cf. Argyris and Schön, 1978). The idea of the 'learning organization' will be defined as a flexible organization, with a relatively flat structure and empowered employees, which implies that the individuals have learnt from one another so that everyone can perform each other's work tasks, and that the employees continuously learn from their customers which (changed) needs the customers have and learn in order to being able to satisfy these needs (cf. the 'learning structure' perspective of the learning organization, in Örtenblad, 2002). 'Knowledge management' will be defined as the spread of the knowledge that is created at one place or within one group in the organization to as many individuals in the organization as possible, and the process of informing everyone in the organization about who knows what (cf. Ives, Torrey and Gordon, 1998).

The next part of the paper highlights what probably is the most common way for organizations of becoming independent of and controlling subjective knowledge, that is described in the studied literature, namely to store it outside single individuals. Thereafter, I present other

and probably less apparent means of becoming independent and in control, that the analyses of the three ideas have shown. In the third part of the paper, I present (a part of) an idea that does not seem to involve any knowledge control means whatsoever. The final part of the paper is devoted to a discussion and comparison between the three studied management ideas, and how they differ in terms of the means for organizational independence of subjective knowledge that they provide.

Independence and control by storing knowledge outside single individuals

One way for organizations to remain or become independent of single individuals and their subjective knowledge, and thereby in control of knowledge, is the storing of knowledge outside single individuals, in what often is called the 'organizational memory' (Argyris and Schön, 1978; Cyert and March, 1963; Hedberg, 1981). This consists of routines, standard operating procedures (SOP:s), manuals, shared mental models, etc. Argote and McGrath (1993: 366) claim that the effects of turnover on knowledge depreciation are smaller when knowledge is stored in the organization than if it is stored in individuals. Lam (2000: 492) claimed that '[t]he abstraction of individuals' experience and knowledge into encoded knowledge also facilitates centralisation and control in organizations' (see also Grant 1991: 128). When it comes to the three management ideas that I have studied, the storing of knowledge in the organizational memory seems, in fact, to be the cornerstone of the idea of organizational learning:

[I]n order for organizational learning to occur, learning agents' discoveries, inventions, and evaluations must be embedded in organizational memory. They must be encoded in the individual images and the shared maps of organizational theory-in-use from which individual members will subsequently act. If this encoding does not occur, individuals will have learned but the organization will not have done so. (Argyris and Schön, 1978: 19; see also Kim, 1993: 37)

According to Levitt and March (1988: 320), '[r]outines are independent of the individual actors who execute them and are capable of surviving considerable turnover in individual actors'.

Knowledge storing in the organizational memory is also important in the idea of the learning organization. For instance, Marquardt and Reynolds (1994: 25-26) described that the meaning and memory subsystem of the learning organization stores what they called 'organizational knowledge'. It is also apparent in the literature on knowledge management, in which Templeton and Snyder (1999: 706) argued that 'knowledge embedding is an important and desired outcome of knowledge management in organizations'.

One can, of course, argue that if every member of an organization would leave the organization, the knowledge would also disappear due to the fact that documents, routines, etc. have to be interpreted by people who are familiar with the culture of the organization, in order to understand the knowledge (cf. Kim, 1993; Scarbrough, 1998). This would mean that the or-

ganization can learn independently of any specific individual, but not independently of all of the individuals (Kim, 1993). However, it is a relatively rare phenomenon that all employees leave at the same time. Accordingly, one way for organizations to make sure that they are in control over the subjective knowledge, is to store it in the organizational memory, outside any single individual.

However, some have argued that it is impossible to store knowledge outside single individuals (e.g. Alvesson and Kärreman, 2001: 999), and that knowledge is always context-dependent (cf. the socio-cultural perspective of organizational learning, see below). More recent management ideas seem, though, to have taken this criticism into account, and they involve other ways for organizations of becoming and staying independent of single individuals and their subjective knowledge, which do not imply that knowledge is stored outside the individuals. Instead, knowledge remains – as it seems – possessed by the individuals and, as we shall see next, many of the means connected to these ideas are different from the means that is dominating the literature on organizational learning.

More refined means for independence and control

Although even the ideas of the learning organization and knowledge management involve knowledge storing outside single individuals, which was shown above, these ideas seem, to a large extent, to accept that knowledge remains subjective and therefore is tightly intertwined with the individuals. Consequently, these ideas instead involve techniques for making organizations independent of subjective knowledge that deal with the controlling of these individuals and their knowledge. Such means, found in the literature on the learning organization and knowledge management – but also on organizational learning – can be categorised into some various types: 'mind control', 'knowledge redundancy', 'complete transparency and accessibility', and 'contextual knowledge'. These types will be presented in more depth below.

Mind control

Mind control, that is, the controlling of the individuals so that they learn the right things – i.e. what the organization in which they are members needs – is probably the second most common means for knowledge control in the studied literature. It is quite common in the literature on organizational learning and is often closely connected to the storing of knowledge outside single individuals. Before any knowledge can be stored in the organizational memory, the individuals have to learn this particular knowledge, which later will be embedded in routines, rules, etc. Argyris and Schön (1978) expressed this in terms of that the individuals learn as agents for the organization, and claimed that 'organizational learning occurs when individuals within an organization experience a problematic situation and inquire into it on the organization's behalf' (Argyris and Schön, 1996: 16). It is presumed here that the individuals pay attention to and learn stuff that is of importance for the organization. This is accom-

plished through 'shared mental models' (Filion and Rudolph, 1999). Accordingly, 'mind control' is an important element of the idea of organizational learning. By controlling what the individuals learn, the knowledge that they learn will be well adapted to the organization's needs, and the risk that the individuals learn stuff that they do not want to share, when it is time to embed it, is minimized.

'Mind control' also seems to be occurring in the idea of the learning organization. Jones and Hendry (1994), for instance, have argued that the individuals are supposed to focus on things in the environment that are of interest to the organization. A 'shared vision', which has been described e.g. by Senge (1990) as an important ingredient of the learning organization, can also be understood as 'mind control', in that it is assumed to accomplish that everyone works in a common direction towards a common goal (cf. Filion and Rudolph, 1999). The individuals' learning will probably be directed by such a shared vision.

Knowledge redundancy

'Knowledge redundancy' means that more than one individual has the same knowledge, so that the organization is made less dependent on employees who possess unique knowledge. In some cases, the organization makes sure that at least some other individuals have the same knowledge, and in some cases it seems to be the objective that as many in the organization as possible share the specific knowledge. This means is apparent in both the idea of the learning organization and in the idea of knowledge management.

The learning organization is often described in terms of self-organizing and quite independent teams. The individuals in the teams are supposed to learn from each other in order to create flexibility, in that every team member has acquired the knowledge necessary for performing the tasks of the other team members, if there is much to do and the other members are occupied (see e.g. Garratt, 1990; McGill and Slocum, 1993; Senge, 1990; Swieringa and Wierdsma, 1992; Watkins and Marsick, 1993). Not only the single teams are supposed to possess such a redundant capacity (cf. Morgan, 1997), but also the whole organization – the teams are supposed to fill in for each other. This makes the organization less dependent upon any single individual and less vulnerable to turnover (cf. Bonora and Revang, 1993: 200). Another, similar way for the organization to become independent of single individuals, which also is present in the learning organization literature, is work rotation (see e.g. Kiechel, 1990: 76; Watkins and Marsick, 1993: 25-26). The same can be accomplished by personnel rotation programs, which is also mentioned in the learning organization literature (e.g. Garvin, 1993: 87).

The focus on knowledge sharing in the idea of knowledge management (see e.g. Civi, 2000: 173; Hermans, 1999: 161) is another way of ensuring that more than one individual has the particular knowledge. Sometimes this knowledge is described to be in need of facilitating measures, such as a harmonious climate:

> …because knowledge needs to be shared to be created and exploited, it is important for
> leaders to ensure that there is an atmosphere in which an organization's members feel

safe sharing their knowledge. It is also important for leaders to cultivate commitment among organization members to motivate the sharing and creation of knowledge based on the knowledge vision. (Nonaka et al., 2001: 37)

This facilitating culture – which might seem to be good and harmless – further increases the employers' control over knowledge, in that it facilitates the spread of knowledge to everyone and therefore makes any single individual less important for the organization, while people are supposed to feel 'safe', as Nonaka et al. express it (see the citation above).

Complete transparency and accessibility

Knowledge management is not only about the sharing of knowledge to others, i.e. that everyone learns everything. It is also about informing others – or ideally everyone – in the organization that a specific employee has knowledge in a particular area, so that it becomes widely available for others who might need it. Ives, Torrey and Gordon (1998: 272), for instance, describe knowledge management as 'the effort to make the knowledge of an organization available to those within the organization who need it, where they need it, when they need it, and in the form in which they need it'. In this case the knowledge seems still to be stuck in a few individuals – and not spread to everyone as was the case with the means of 'knowledge redundancy' that was outlined above – but there is supposed to be an awareness among everyone about the knowledge that exists in the organization, i.e. who knows what. Thereby, one can more easily make an inventory of all the knowledge in the organization, and replacements – for instance in form of substitutes – can be planned for in detail in the case of turnover. In fact, a group of commentators have described the aim of knowledge management as making 'the knowledge inside people's heads (i.e. cognitive knowledge) widely available to reduce the threat of valuable knowledge assets literally "walking out of the door"' (Swan et al., 1999: 265).

A similar way for organizations of obtaining relative independence of subjective knowledge is apparent in the learning organization literature. Several authors have described the importance of a holistic way of thinking in the learning organization (e.g. Senge, 1990; Watkins and Marsick, 1993). In essence, everyone should be aware of what the other members of the organization are doing and whether they are in need of any help, so that they can be helped out when necessary. This makes the organization less dependent on single individuals, in that everyone knows what is going on in other parts of the organization and thus can help to recreate the whole, although not being able to perform others' work tasks themselves.

Contextual knowledge

A quite common theme in the learning organization literature is 'learning at work' or 'on-the-job learning' (e.g. Jones and Hendry, 1992; Jones and Hendry, 1994; Watkins and Marsick, 1993). The intention in this theme is that the employees learn more valuable knowledge when learning during their everyday work, instead of learning general (decontextualised)

knowledge at formal courses. Thus, this theme is based upon the premise that there is such a thing as general knowledge, and consequently that there is a division between context-specific and non-contextual (or general) knowledge.

By letting the employees learn on-the-job instead of on courses off work, knowledge is made less general and more specific to the context in which the learning takes place. Therefore, it might be more difficult for the individual employee to transfer this knowledge to another organizational context. Thus, the organization remains to some extent in control over knowledge (and hence over the individuals) since it can not easily be used elsewhere (cf. Lam, 2000: 504; Scarbrough, 1995: 1012). This reasoning is based on the assumption that organizations are more vulnerable to personnel turnover when knowledge is organization specific, and that individuals gain from learning general knowledge that they can use elsewhere (cf. Lam, 2000).

An idea without any independence or control means

There is, though, a perspective to organizational learning that does not seem to involve any tools for making organizations independent of subjective knowledge – the so-called 'new' or 'socio-cultural' perspective of organizational learning. Instead of emphasising cognitive learning by individuals or cognitive learning of the organization as if it was an individual, as organizational learning researchers traditionally have done (Cook and Yanow, 1993), the new perspective sees organizational learning as collective learning. For instance, Cook and Yanow (1993) describe learning by the collective, and several other authors have described the learning in and by communities of practice (e.g. Brown and Duguid, 1991; Lave and Wenger, 1991; Richter, 1998; Wenger, 1991). According to Gherardi et al. (1998: 274), another main difference between old and new organizational learning has to do with contextual dependence. They claim that all knowledge is context-dependent in the socio-cultural perspective of organizational learning – learning is situated (Lave and Wenger, 1991). According to the socio-cultural perspective of organizational learning, there is no such thing as 'knowledge', in terms of a noun. Instead, knowledge is as much a process as learning is, and should therefore rather be called 'knowing' (see Blackler, 1995). According to Orlikowski (2002), 'knowing' can not be transferred or moved. In Cook and Brown's (1999) terms, knowing is action, and can not be possessed. Thus, knowledge as knowing is a process and a verb, not a noun and not something that can be stored or transferred.

Consequently, as I have understood this perspective of organizational learning, it happens in a group while performing its task, and it might not ever happen again in the exact same way, since things are never the same twice. Although a symphony orchestra has learnt to play a symphony in a specific way, no two performances are exactly the same, and it would not be possible to recreate a performance – not even with the same orchestra (i.e. the same collective). As Cook and Yanow (1993) explain, no two symphony orchestras play the same symphony in the same way. Therefore, a musician that leaves one orchestra for another must learn

to play the symphony in the same manner as the new orchestra plays it, as well as the orchestra has to learn to play the symphony anew, with its new member. Knowledge that has been developed (or should I say happened) in one context does not make sense in any other context, and can therefore not be spread to or used in these contexts (cf. Swan et al., 1999: 270).

Accordingly, the employees can not take 'knowing' with them, to other organizations, and hence the organization does not have to fear turnover. But since 'knowing' can not be stored, and in this sense not even exists in the individuals (Fisher and White, 2000, though, argue that knowledge in this perspective exists in the relationships between individuals), this perspective of organizational learning provides no means for organizations to stay or become independent of the individuals. In order to remain in control of knowledge, the organization would have to find other ways of controlling the collectives and communities of practice where this 'knowing' happens. Accordingly, it is – by definition – impossible to be in control of knowledge in this perspective, since there is no such thing as knowledge, although it might be possible, but difficult, to control the process of knowing. Knowing is something people do, not something they have or possess.

Discussion and conclusions

There are many different ways of explaining the continuous stream of 'new' management ideas. One way to explain the appearance of the ideas of the learning organization and knowledge management, is that these two ideas are better adapted to the knowledge society than the idea of organizational learning – especially the older, traditional perspective, in which knowledge is assumed to be routinized and stored outside single individuals. As it seems, knowledge is more often possessed by the individuals in the ideas of the learning organization and knowledge management, which makes them more suitable for a society in which knowledge is needed at every level, promptly.

Another explanation, though, might be that the ideas of the learning organization and knowledge management appear to be more democratic, in that knowledge is understood to exist in the individuals. Indeed, especially the idea of the learning organization is often connected to democracy and empowerment, as e.g. Snell and Chak (1998) and Coopey (1998) have argued, and according to Fenwick (1998) the literature on the learning organization promises a humanistic workplace. Even knowledge management is often depicted in beautiful words such as 'knowledge sharing'.

However, this seems to be a somewhat shallow picture of these ideas, according to the analysis of independence means in the literature about these ideas. The independence means are often subtle, but yet apparent. Moreover, it is precisely the idea of the learning organization – which certainly is the most associated with democracy of the three ideas – that contains the most means for organizations to make themselves independent of single employees and their subjective knowledge, and hence being in control over this knowledge. These means, though, are often quite subtle, and they probably must be part of an idea that signals democ-

racy, yet provides many means for controlling knowledge.

But what about the socio-cultural perspective of organizational learning? It has, as far as I know, not yet become very popular among practitioners. This idea (or sub-idea) differs from the other ideas, in that it – as it seems – involves no means for knowledge storing, and thus no tools for controlling subjective knowledge. One scenario is therefore that this idea will never get popular among employers (and consequently neither in management literature). Another possible scenario is that – if new organizational learning becomes a more widely spread perspective than it hitherto has been – employers instead of controlling the knowledge, will increase their control over the employees. This could be achieved by offering them partnerships, or the employers could become even more careful regarding who they employ, in order to employ people with good prerequisites for creating 'knowing' together, in communities of practice. Thus, even if the socio-cultural perspective of organizational learning implies less means for controlling knowledge, it might result in less democratic organizations. A third scenario is that this perspective of organizational learning will develop in the direction towards harmonizing with management, i.e. involving means by which it is possible to store knowledge, or in other ways control it, and therefore increase its chances of becoming a really popular management idea. In this way the idea would be 'colonized' by functionalists. One sign of this is that the term 'communities-of-practice' today is used as a management term, implying that knowledge can be stored (see e.g. Saint-Onge and Wallace, 2003). Alternatively, but less likely, an increased popularity of this idea will result in increased equality between organizations and individuals, especially regarding who is in control of knowledge.

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External Knowledge Management Strategies and Firm Performance

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Prior research suggests that firms benefit by acquiring and exploiting external knowledge. In this paper, we argue that the strategy aimed merely at appropriating the external knowledge does not yield performance advantages due to the difficulties involved in acquisition and exploitation of knowledge. In contrast, the strategy aimed at knowledge creation through participation enables acquisition and exploitation of external knowledge. Consequently, the participation strategy yields both short-term and long-term performance. We subject our arguments to empirical testing using survey data obtained from 88 Canadian firms and find support for our arguments.

Keywords: *External Knowledge Management, Organizational Learning, Performance*

Knowledge has increasingly been viewed as a source of competitive advantage (Grant, 1996; Spender, 1996). Not surprisingly, organizations have turned their attention to knowledge management (KM). According to one estimate, global corporate spending on knowledge management services will increase from US$4.2 billion in 2003 to US$8.9 billion by 2006 (IDCGroup, 2002). In order to benefit from knowledge management, firms need to realize that knowledge is a strategic imperative and develop strategies to manage knowledge (Bierly & Chakrabarti, 1996; Zack, 1999). Although much research has focused on strategic knowledge management, very little attention has been paid to the strategic management of external knowledge, which is important for firm success (Bierly & Chakrabarti, 1996; Zack, 1999). To address this gap, we build a model of external knowledge management and performance by drawing from existing research in knowledge management and strategy.

We identify two different types of external knowledge management strategies and examine their performance implications. In order to better understand the relationship between external knowledge management strategies and performance, we categorize performance into short-term and long-term performance. We test our model using survey data from 88 Canadian firms. This paper presents our model and its empirical testing.

This paper is organized as follows: First, we present the relevant literature with a view to providing the theoretical background and the constructs of research interest. Second, we develop two external knowledge management strategies and present hypotheses about their relationship with performance. Third, we present the methodology used for data collection and the results of the statistical analysis. Finally, we discuss the implications of our study.

Knowledge, Knowledge Management Strategies and Performance

Although the term 'performance' has been used by various disciplines in various ways there is no agreement on what it is (Kanter & Brinkerhoff, 1981). Likewise, the terms 'knowledge strategy', 'knowledge management strategy' and 'strategic knowledge management' are increasingly used in the literature but in various ways (Zack, 2002).

Therefore, it is useful to clarify both these expressions before developing external knowledge management strategies and hypothesizing their relationship with performance.

Long-term and Short-term Performance

Organizational performance is 'a topic with voluminous literature spanning several disciplines but with little agreement on basic definitions and approaches' (Kanter & Brinkerhoff, 1981:321). Although profit-oriented organizations are said to have immediate tests of their performance in the form of profits and market measures, models that recognize the complexity of the performance construct differentiate 'at least three different kinds of performance: (i) task effectiveness or goal attainment, including output, results, efficiency, etc; (ii) appropriate organizational structure and process, including organizational characteristics, member satisfaction, motivation, communication links, internal conflict resolution, absence of strain between subgroups, etc; and (c) environmental adaptation, including flexibility in the face of change, resource acquisition, longer-term adaptation and survival' (Kanter & Brinkerhoff, 1981:322).

Although used frequently in management research, financial measures may not be a complete reflection of performance because they are subject to influence by managers, accountants and accounting methods (Kaplan, 1984). Further, each of these measures only captures a part of the performance. For example, return on sales (ROS) captures cost effectiveness but does not offer any information about the rate of return on capital invested (Kaplan, 1984). Moreover, accounting and economic measures do not examine the role of knowledge, technology, and innovation, elements that are critical to the survival of modern organizations (Kaplan, 1984). Therefore, financial measures that indicate short-term performance of an organization must be supplemented with 'long-term performance measures such as product innovation, product leadership, employee skills and morale, or customer loyalty' (Kaplan, 1984:407). Accordingly, Kaplan and Norton suggest that performance measures should include both financial measures of performance as well as the drivers of financial performance such as internal business processes, innovation, learning and customer value (Kaplan & Norton, 1992).

In line with Kanter and Brinkerhoff (1981) and Kaplan (1984), we define short-term performance as: '*goal attainment, reflected in the current financial performance of a firm relative to competition*'. We define long-term performance as: '*organizational processes such as innovation, employee satisfaction, leadership, etc. that ensure long-term success and survival of a firm*'.

External Knowledge Management Strategies

Managing external knowledge is important because new knowledge is created in interaction with other firms (Powell, Koput & SmithDoerr, 1996; Tsoukas, 1996). Many researchers have acknowledged the limited utility of the knowledge residing in the firm

boundaries and the need to integrate it with the knowledge existing outside the firm boundaries (Anand, Manz & Glick, 1998; Bierly & Chakrabarti, 1996). Some researchers suggest that a firm's ability to interact with others firms and acquire knowledge is a distinctive competence that can yield competitive advantage (Leonardbarton, 1995; Lorenzoni & Lipparini, 1999; Takeishi, 2001). Despite the acknowledgement that knowledge resides inside the organization as well as outside, the body of research encompassing external knowledge is limited (Matusik, 2002).

We refer to the knowledge that resides within the firm boundaries as 'internal knowledge' and the knowledge that resides outside the firm boundaries as 'external knowledge'. The knowledge that is external to a firm is held by outside agencies, such as suppliers, customers, competitors, industry associations, and research communities (Powell *et al.*, 1996; Takeishi, 2001). Firms face two types of difficulties in acquiring and exploiting the knowledge that resides outside the firm boundaries. First, knowledge has both explicit and tacit dimensions (Nonaka, 1994; Polanyi, 1966). Explicit knowledge is easier to acquire whereas tacit knowledge is sticky and is difficult to acquire (Simonin, 1999; Szulanski, 1996). Second, knowledge resides in both public and private domains. The knowledge that lies in the public domain is accessible to a firm that intends to acquire it whereas the knowledge in the private domain is not accessible. Such inaccessible knowledge includes management practices, informal rules, and projects under exploration. Much of such knowledge would be in the tacit form and will be revealed only in the organizational context and action (Cook & Brown, 1999; Orlikowski, 2002).

Firms need to approach external knowledge management in a strategic manner given the difficulties involved in accessing external knowledge and acquiring it. A strategy, however, is not necessarily explicitly stated. More often, strategy is reflected in the actions of the firm (Mintzberg, Ahlstrand & Lampel, 1998) and can be clarified based on firm actions (Bierly & Chakrabarti, 1996). Accordingly, we define external knowledge management strategy as '*a theme that guides and defines a firm's efforts to acquire and apply external knowledge to facilitate organizational operations*'. In this definition, the phrase 'acquiring' is used to reflect both identifying knowledge and creating knowledge. The phrase 'applying' is used to reflect activities such as storing, accessing, and transferring knowledge that may be necessary before knowledge can be applied to fulfill organizational requirements.

In sum, much research attention has been focused on knowledge management and researchers established the importance of external knowledge. Yet, very little is known about what strategies are helpful to manage external knowledge and improve firm performance. In the following section, we develop two strategies for managing external knowledge and hypothesize their influence on performance.

Hypotheses Development

Firms can adopt two broad strategies for acquiring external knowledge: (a) appropriation strategy and (b) participation strategy. We define appropriation strategy as '*an emphasis on identifying and acquiring external knowledge from public domains through arms-length scanning and monitoring*'. Further, we define participation strategy as '*an emphasis on identifying and acquiring external knowledge through active interaction with agencies such as suppliers, customers, competitors and research institutions*'.

Firms following an appropriation strategy scan the environment closely, gather information, and acquire it from the external sources. Firms that follow a participation strategy actively engage with their suppliers, customers, competitors, and research institutions to create knowledge. As these two strategies differ in their content and approach, the type of knowledge that firms can gain too differs. Consequently, these strategies differentially influence performance.

Appropriation Strategy and Performance

Prior research has established the importance of a firm's location and the role of external forces in helping a firm acquire external knowledge. Firms that have access to knowledge from a vast labor pool, research institutions and government support acquire knowledge from them (DeCarolis & Deeds, 1999). Firms that adopt the appropriation strategy access knowledge through interactions with those outside the firm (Almeida & Kogut, 1999; Saxenian, 1990). Firms can acquire knowledge of its competitors by hiring former employees of competitors (Almeida & Kogut, 1999). Similarly, they can acquire knowledge by attending conferences, by scanning the research published in the journals and by reviewing the patents within an industry (Appleyard, 1996). These activities provide access to the external knowledge that resides in the public domain but do not, however, provide access to the knowledge in the private domain. Further, the knowledge in the private domain is largely tacit (Polanyi, 1966) and is difficult to acquire.

Firms that adopt the appropriation strategy do not engage in the creation of knowledge. They simply scan the environment for new knowledge and try to gather it. These activities help a firm to gain an understanding of the developments in their industry but do not help in internalizing those developments. Also, such scanning from a distance keeps the firm from accessing the tacit parts of that knowledge. More importantly, the firm can never gain access to the knowledge in the private domain. For example, distant scanning can get a firm access to patent information but not to the failed experiments that shaped the final innovation. Similarly, a firm can learn that its competitor has implemented a new system to improve productivity but cannot learn about the troubles that it went through in implementing a new system. Knowledge of this nature is important and does not get published but gets disseminated through networks of informal social relationships that professionals form (Appleyard, 1996).

The appropriation strategy does not provide a firm access to the knowledge that resides in the private domain. Further, the appropriation strategy does not get access to tacit knowledge, much of which resides in the private domain. In the absence of tacit knowledge, the knowledge a firm receives and uses in its operations is incomplete. Similarly, in the absence of access to the knowledge in the private domain, the knowledge that a firm receives is poor. Consequently, a firm cannot exploit such knowledge. Even if it does, such exploitation does not yield any performance benefits to the firm because of the incompleteness of knowledge. Therefore, we hypothesize:

H1   *Appropriation strategy will not be positively associated with either short-term or long-term performance.*

Participation Strategy and Performance

Participation strategy emphasizes an active interaction between a firm and external forces such as suppliers, competitors, customers, and research institutions. It envisages active participation in the research programs of universities and other firms. Further, it entails participation in industry-benchmarking exercises. Such participation leads to creation of new knowledge in the industry.

As discussed previously, knowledge is both explicit and tacit and also remains in both private and public domains. Knowledge that is tacit and private can only be acquired through communication, social interaction, and relationships (Lorenzoni & Lipparini, 1999; Takeishi, 2001; Yli-Renko, Autio & Sapienza, 2001). Therefore, firms access knowledge through their relationships with other companies (Lane & Lubatkin, 1998; Zollo, Reuer & Singh, 2002), suppliers (Lorenzoni & Lipparini, 1999; Takeishi, 2001), universities and research institutions (Lee, Lee & Pennings, 2001; Powell *et al.*, 1996), industry associations/ networks (HanssenBauer & Snow, 1996; Lee *et al.*, 2001), and customers (Yli-Renko *et al.*, 2001). Moreover, firms form consortiums and networks to learn from each other and create new knowledge. For example, firms across various industries in Norway formed a network to learn from each other and develop a common knowledge base to deal with hyper-competition (HanssenBauer & Snow, 1996).

Participation strategy entails active involvement of the firm in the knowledge creation activities occurring in the industry. As a result of the participation, firm's relationships with others are strengthened. Such strong relationships help firms to acquire and internalize knowledge and adopt innovations (Abrahamson & Fombrum, 1994). Such external knowledge helps an organization to create new knowledge (Bierly & Chakrabarti, 1996; Danneels, 2002; Mowery, Oxley & Silverman, 1996). Additionally, it helps organizations to better utilize their internal knowledge. For example, Lee et al., (2001) found that the performance benefits from internal knowledge capabilities are higher in the presence of external linkages and the knowledge gained from them (Lee *et al.*, 2001).

Internal knowledge may not always be useful because it tends to pay too much attention to short-term and local conditions. This phenomenon has been referred to as the learning trap (Levinthal & March, 1993). Empirical evidence points that the innovations of older firms are not as successful as their younger competitors' innovations because the older firms create their innovations largely based on their past innovations. In other words, the innovations of older firms tend to be incremental in nature and make little impact (Sorensen & Stuart, 2000). Firms that learn from the experience of others avoid such learning traps (Baum & Ingram, 1998; Ingram & Baum, 1997) and also save on the costs of creating new knowledge (Schulz, 2001).

In sum, participation strategy provides access to the tacit and private external knowledge. Such knowledge will help a firm to develop its own capability, avoid learning traps, and avoid the costs of creating new knowledge. Accordingly, these firms derive performance benefits. Therefore, we hypothesize:

H2   Participation strategy will be positively associated with both short-term and long-term performance.

Methods

Our model hypothesizes variation in external knowledge management strategies and their effect on firm performance. Therefore, we conducted a survey in a large sample study of 500 large Canadian firms, which enabled us to capture the variance needed to examine the differences in the external knowledge management strategies and performance. We have used a key informant approach and requested '*the senior-most executive responsible for knowledge management (or learning) in the organization*' to respond to our survey instrument on behalf of his/her organization. Although we acknowledge that multiple respondents could provide a better approximation of the organization, we realize that using the key informant approach is the only feasible method to obtain responses for organizational level data (Huber & Power, 1985; Parkhe, 1993).

Measure Development

Initial items to measure various constructs have been developed based on prior research and were designed to use 1 - 7 Likert-type scales where 1 indicates 'strongly disagree' and 7 indicates 'strongly agree'. In order to validate the items, they were subjected to two exercises. In the first exercise, the items along with construct definitions were provided to 18 doctoral students with experience in management research. Using students is appropriate because this is a cognitive task that requires intellectual ability rather than work experience (Hinkin, 1995). The students were asked to screen the items for the following criteria: (a) generality – the item could apply to most firms independent of the technology, product, industry, size, or country;

(b) discriminability – uniqueness of each item; (c) readability – ease of understanding, and (d) nonreundancy – one item could not be substituted for another. Items were finalized following this exercise (O'Reilly, Chatman & Caldwell, 1991).

In the second exercise, the finalized items were given to five researchers and five practitioners familiar with the field of knowledge management and survey method. These researchers and practitioners were drawn from Asia, Europe and North America. They were provided with the definitions of the constructs and asked to assign each item to the construct that it measures. In this exercise, it is possible that the placement of items may influence their assignment in some manner. In order to avoid that, all the items were randomly listed so that the order of items was different for each judge. The assignments made by the participants of the exercise were used to compute two measures proposed by Anderson & Gerbing (1991) to establish substantive validity of each measurement item, i.e. 'the extent to which that measure is judged to be reflective of , or theoretically linked to, some construct of interest' (Anderson & Gerbing, 1991:731).

The two measures that reflect the substantive validity of items are: (a) Substantive Validity Coefficient (SVC) defined as (number of judges who assigned the item to its intended construct – highest number of judges who assigned the item to any other construct in the set) / (Total number of judges) (Anderson & Gerbing, 1991), and (b) Proportion of Substantive Agreement (PSA), measured as (the number of judges who assigned item to its intended construct) / (Total number of judges). An item with higher PSA reflects the construct better than an item with lower PSA. Further, items with SVC of 0.5 and above reflect the construct in a statistically significant manner (Anderson & Gerbing, 1991). Accordingly, only those items with and SVC and PSA of over 0.5 were retained in the study. A list of the final items used in the survey is placed in *Appendix A*.

Measures

Short-term performance measure was adapted from Spanos and Lioukas (2001). This is a perceptual measure of performance that asks respondents to rate their company's financial performance vis-à-vis competition over the last one year. In agreement with Kaplan (1984), Spanos and Lioukas (2001) argue that 'objective' measures of performance are unreliable and incomparable across industries. Further, they also provide ample research evidence to assert that 'subjective assessments of business performance obtained from senior managers correlate strongly, albeit not perfectly with objective measures' (Spanos & Lioukas, 2001:933).

Long-term Performance is a six-item measure that we have developed to capture both organizational processes and adaptation capabilities (Kanter & Brinkerhoff, 1981). Some of the items have been borrowed from prior research (Bontis, Crossan & Hulland, 2002) while others have been developed based on the theoretical exposition on long-term performance (Kanter & Brinkerhoff, 1981; Kaplan, 1984; Kaplan & Norton, 1992).

Appropriation Strategy measure is a four-item measure that we have developed to capture whether a firm closely follows the media for new developments, whether it has systems to acquire new knowledge from outside and store them, and whether it scans the environment for new knowledge.

Participation Strategy measure is a five-item measure that we have developed to capture whether a firm closely interacts with its customers, participates in industry benchmarking exercises and collaborative research studies, and whether it shares its experiences with suppliers and other business partners.

Control Variables In line with previous empirical research, we control for firm size (measured using sales revenue and asset size in the previous year) and previous performance (measured as net income in the previous year).

Survey Design and Administration

The items finalized through validation exercises were put together in the form a survey instrument, which was pre-tested on five persons. One of these persons was a Chief Information Officer of a large corporation. Of the remaining four, two were MBA students while two were PhD students in business administration. These four students had corporate experience ranging from 5 years to 10 years and had occupied middle and senior management positions in large companies. The pre-test was aimed at finding out the following: (i) whether the language was clear and understandable, (ii) whether the survey posed any difficulties in understanding and completing, (iii) whether any of the questions were offensive and unfriendly, and (iv) the time required to complete the survey. The final survey questionnaire was developed taking into account the suggestions and comments made by the participants in the pre-test.

In order to generate a better response rate, the survey was conducted using mail survey and internet survey methods, following the Tailored Design Method (Dillman, 2000). Following a systematic and rigorous follow-up that included two mailings, three phone calls, and two emails to each of the companies, a total of 92 responses were received for a response rate of 18.4%. Accounting for undeliverable surveys and the companies that could not be contacted over telephone (58), the response rate was 20.8%. Although not high, this response rate is in line with the survey research using organizational level data (Frost, Birkinshaw & Ensign, 2002; Kotabe, Martin & Domoto, 2003; Subramaniam & Venkatraman, 2001). The sample size that we used in the analysis was 88 because four of the responses received could not be used due to missing data on multiple items.

Statistical Analysis

We use partial least squares (PLS) to analyze the relationships proposed in this study. PLS is similar to structural equation models and other covariance structure analysis techniques in that it combines data and theory to simultaneously estimate paths and loadings (Hulland,

1999). PLS permits multiple dependent variables or latent variables as well as multiple levels of measurement. In a model where multiple relationships exist, it is better to use structural equation models (Kale, Singh & Perlmutter, 2000). PLS also allows testing for the reliability and validity of measurement items in addition to developing models that test hypotheses (Barclay, Higgins & Thompson, 1995). Finally, PLS is preferred over other structural equation models because it 'makes minimal demands about measurement scales, sample size, and the distribution of residuals' (Fornell & Bookstein, 1982:449) .

Reliability. In PLS, item reliability is assessed by examining the loadings of the items on their respective constructs. In order to be reliable, each item must load at 0.7 or more on its respective construct as it implies that there is more shared variance between the construct and the item. As loadings are correlations, it means that more than 50% of the variance in the item is attributable to the construct (Hulland, 1999). Three of the items loaded at less than 0.7. Two of these items were intended to measure the 'appropriation strategy'. These items were 'my organization purposefully hires knowledgeable individuals who have worked in the past for its competitors' (loading 0.27) and 'my organization has systems and procedures to identify new knowledge from outside sources' (loading 0.51). After dropping the former item, the latter loaded at 0.54 and was retained because of the item's theoretical relevance and past research practices (Gray, 2002). The other item was intended to measure participation strategy: 'my organization encourages employees to share experiences with suppliers and other business partners' (loading 0.61). This item was dropped from subsequent analysis.

Convergent Validity. Researchers using PLS have predominantly used the measure of internal consistency developed by Fornell & Larcker (1981) to verify the convergent validity of a construct. This measure is similar to Chronbach's alpha. In order to exhibit convergent validity, the internal consistency measure should be at least 0.7 (Hulland, 1999; Nunnally, 1978). As presented in Table 1, the internal consistency measures for our study constructs are over 0.8 and thus exhibit adequate convergent validity.

Table 1. *Correlations between latent variables and Square root of AVE*

Sl. No.	Variable	Internal Consistency	1	2	3	4	5
1.	Appropriation Strategy	.82	.78				
2.	Participation Strategy	.84	.60	.75			
3.	Performance - Short Term	.96	.16	.13	.94		
4.	Performance - Long Term	.93	.45	.49	.31	.84	
5.	Controls	.94	.20	.25	.23	.09	.91

Discriminant Validity. Researchers using PLS establish the discriminant validity of the constructs with the measure of average variance extracted, i.e. the average variance shared between a construct and its items (Fornell & Larcker, 1981). In order to exhibit discriminant validity, average variance extracted should be greater than the variance shared between the

construct and other constructs in the model (i.e. the squared correlation between two constructs). This is demonstrated in a correlation matrix which includes the correlations between the constructs in the off-diagonal elements and the square roots of the average variance extracted for each construct along the diagonal. Please refer to Table 1 where both correlations and square root of AVE for each construct have been presented. All the diagonal elements are greater than the off-diagonal elements in the corresponding rows and columns, indicating that each of the constructs has adequate discriminant validity with the rest of the constructs (Hulland, 1999).

Hypotheses Testing. Hypotheses H1 and H2 were tested using PLS, which yields path coefficients that could be interpreted in a manner similar to OLS regression coefficients.

Figure 1. *Path Analysis*
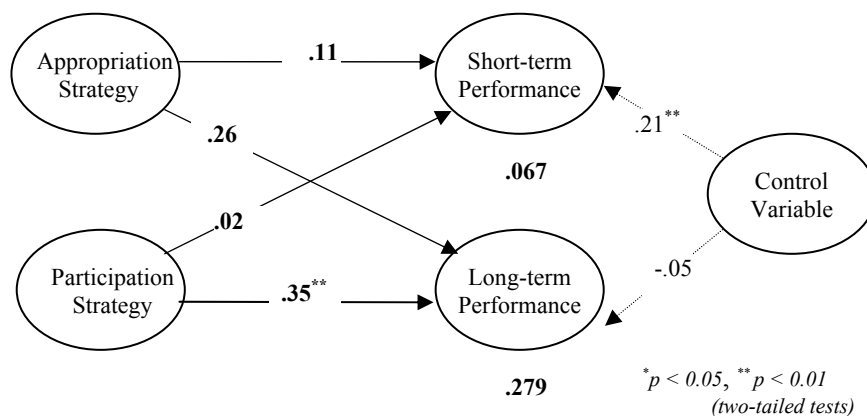
As the results in Figure 1 indicate, the model explained about 6.7% variance in short-term performance and 27.9% variance in long-term performance. The appropriation strategy is not significantly positively associated with either short-term performance or long-term performance, lending support to H1. As hypothesized in H2, participation strategy is significantly positively associated with long-term performance (at $p < 0.01$) but is not significantly positively associated with short-term performance. These results lend partial support for H2.

The latent construct representing the control variables is significantly positively associated with short-term performance ($p < 0.01$), but not with long-term performance. This indicates size and past performance may help firms to perform better in the short-term but do not help in long-term performance, i.e. long-term survival and success.

Robustness Checks In order to examine the robustness of the above findings, we conducted several analyses. First, we examined the representativeness of the sample by examining the industry and geographic characteristics of the sample and population through a chi-square test and found no significant differences. Second, we conducted a MANOVA on the financial and size characteristics of respondent and non-respondent firms and found no significant

differences. Third, we examined the possibility of common method bias with Harman's single-factor test (Podsakoff & Organ, 1986) using a principal component analysis and found that a single factor explaining the majority of the variance did not emerge. Fourth, we did not find any significant differences in the responses of early and late respondents and the paper and web responses to the survey. Fifth, we did not find any significant differences in the responses based on respondent education and management level. Finally, the sample size of 88 used in this study is sufficient to capture a moderate effect with a confidence of 0.05 and a power of 0.8 (Cohen, 1992). Further, the sample size is more than adequate to conduct analysis using PLS, which stipulates a sample size ten times the number of constructs or the number of paths (Chin, Marcolin & Newsted, 2003). The number of constructs used in our study is five and the maximum number of paths is three. Therefore, a sample size of 50 alone is adequate for conducting the analysis, whereas we used a sample size of 88. These analyses indicate that our results are robust.

Discussion

External knowledge is important for firm success and much research has focused on the benefits that accrue to firms due to external knowledge. However, very little research attention was directed at what strategies firms employ to manage external knowledge and their effect on firm performance. Our research has examined two strategies that firms employ to manage external knowledge. We found that the participation strategy is very effective in acquiring and applying external knowledge and thus yielding performance benefits. The appropriation strategy is not effective in providing long-term performance by acquiring and applying external knowledge.

Much of the past research suggests that firms need to identify new knowledge from the environment, acquire it and exploit it to gain competitive advantage (Cohen & Levinthal, 1990; Zahra & George, 2002). Taking this line of research a step further, we argue that such acquisition and application is possible only through active participation in the activities of the industry, through close contact with customers and suppliers and by sharing firm experiences with them. In the absence of such participation, a firm does not gain access to the external knowledge that is tacit and resides in the private domain of other firms. Firms that employ an appropriation strategy might scan the environment actively and acquire knowledge through research publications and patent data. However, those firms do not gain access to the tacit and private knowledge of other firms.

Our research complements the existing research on external knowledge management in two important ways. First, by emphasizing the importance of the participation strategy for managing external knowledge, we divert attention to the difficulties involved in acquiring external knowledge. Second, by providing an initial answer to the question of what would be the best strategy to manage external knowledge, our research contributes to the growing literature on knowledge management. Third, by examining the effect of strategies on two

different types of performance, our research emphasizes the need to maintain the complexity of the performance construct in empirical studies so that the effect of various strategies is studies in a holistic manner.

Our research, like any other study, has several limitations. First, we have collected data on independent and dependent variables from the same respondents. Although Harman's single factor test did not indicate the existence of common method bias, using data from multiple source would have enriched the study. Second, we have collected data from the key informant, whose responses may not have reflected the organization responses. Although we did not find any bias depending on the respondent characteristics, collecting data from multiple respondents in the same organization would have strengthened the study. Third, we have conducted this study in large Canadian organizations. The applicability of our findings to other contexts is not known.

Our research offers several fresh avenues for research inquiry. First, we divert research attention to external knowledge management, which is important for knowledge creation. Second, we underscore the limitations of the appropriation strategy in providing benefits to firms. The appropriation strategy is a passive and arms-length strategy. Therefore, it does not acquire external knowledge that is tacit and resides in the private domains of other organizations. The difficulties in transferring knowledge within firm boundaries has been studied in the past but the difficulties involved in acquiring knowledge from outside the firm boundaries has not received much attention. Our research points to the need to consider these difficulties and devise appropriate strategies to manage them. Third, our research points to the importance of understanding the complexity of the performance construct and the need to consider the effect of strategies on different types of performance rather than financial performance. Finally, our research adds to the growing body of literature on knowledge management and points to the need to research external knowledge management in a systematic manner.

Our research has important implications for managerial practice. First, our research suggests that managers need to pay attention to the importance of external knowledge because it can provide performance benefits. Second, our research suggests that managers need to pay attention to the difficulties involved in acquiring and using external knowledge. Finally, our research suggests that managers need to use a participation strategy to acquire and use external knowledge rather than an appropriation strategy, which limits the extent of acquisition and exploitation of external knowledge.

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Constructs and Items

Short-term Performance

Items in this section pertain to your observations of your company's performance in the latest fiscal year.

Compared to other firms in the industry, my organization's ….	Much below the average		At Par		Much above the average	
Profit margin is	1 2	3	4	5	6	7
Net profits are	1 2	3	4	5	6	7
Return on Capital is	1 2	3	4	5	6	7

Long-term Performance

Items in this section pertain to your overall observations about your organization.

	Strongly Disagree		Neither agree Nor disagree			Strongly Agree	
Employees in my organization are motivated to strive for better performance.	1	2	3	4	5	6	7
My organization has the potential to be successful in the face of technological and environmental changes.	1	2	3	4	5	6	7
My organization has the ability to continuously identify new business opportunities.	1	2	3	4	5	6	7
My organization can meet customers' future needs.	1	2	3	4	5	6	7
My organization has the capabilities to ensure its future performance.	1	2	3	4	5	6	7
My organization's leadership is capable and driven.	1	2	3	4	5	6	7

Appropriation Strategy

Items in this section are about your organization's approach to knowledge management.

My organization … … … …	Strongly Disagree		Neither agree Nor disagree			Strongly Agree	
Emphasizes the need to scan the environment for new knowledge.	1	2	3	4	5	6	7
Has systems and procedures to identify new knowledge from outside sources.	1	2	3	4	5	6	7
Purposefully hires knowledgeable individuals who have worked in the past for its competitors.	1	2	3	4	5	6	7
Closely follows the industry developments through mechanisms such as media, internet and informal contacts.	1	2	3	4	5	6	7

Participation Strategy

Items in this section are about your organization's approach to knowledge management.

My organization … … … …	Strongly Disagree		Neither agree Nor disagree			Strongly Agree	
Actively collaborates with other organizations to shape technology and standards.	1	2	3	4	5	6	7
Gains knowledge by participating with other organizations in common/ collaborative activities.	1	2	3	4	5	6	7
Encourages employees to share experiences with suppliers and other business partners.	1	2	3	4	5	6	7
Participates in industry-wide exercises such as benchmarking, experience sharing, and collaboration.	1	2	3	4	5	6	7
Regularly communicates with customers about products and/or process improvements.	1	2	3	4	5	6	7

Endnotes

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Thriving on Knowledge?
Empirical Evidence of the Current Status and Practices of Knowledge Management in Multinational Corporations

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Abstract

With the recognition of knowledge as an essential resource of organizations as well as a company's only enduring source of competitive advantage in an increasingly dynamic world knowledge management and related issues have become a widely and intensively discussed topic both in the academic as well as in the corporate world. However, it is sometimes difficult to tell whether this apparent passion for knowledge management is for real or if it is simply another management fad, doomed to fade in the near future. Looking at the current status and practices of knowledge management in the corporate world might help to find an answer to the question of whether this passion for knowledge management is a passing fade or if it is here to stay. Therefore, this paper wants to shed some light on the status quo of knowledge management practices in today's corporations. The insights offered here are based on a recent global study on knowledge management and organizational learning in multinational companies (MNCs) conducted by the authors.

Introduction

With the recognition of knowledge as an essential resource of organizations as well as a company's only enduring source of competitive advantage in an increasingly dynamic world knowledge management and related issues have become a widely and intensively discussed topic both in the academic as well as in the corporate world. Publications on knowledge management are legion, and business practitioners don't fail to stress its importance for the competitiveness of their corporations. However, it is sometimes difficult to tell whether this apparent passion for knowledge management is for real or if it is simply another management fad, doomed to fade in the near future. Looking at the current status and practices of knowledge management in the corporate world might help to find an answer to the question of whether this passion for knowledge management is a passing fade or if it is here to stay.

The numerous examples of knowledge-creating (or knowledge-managing) companies cited as role models in the extant literature might simply be particular, individual cases. According to the authors, there has not been any comprehensive and holistic empirical study of the current status and practices of knowledge management in corporations. Such a study is necessary to find out whether the passion for knowledge management is merely fed by knowledge management's "strong rhetorical appeal" (Alvesson, Karreman and Swan 2002, p. 282), or by its actual relevance in practice. According to Swartz (2003) "the jury is still out as to whether KM will become a significant and permanent component of management or just another short-lived management fad" (p.54). Of course, this paper will not be able to render a

final judgement on this issue, but it will try to redress the balance between knowledge management's rhetorical appeal and its empirically verifiable role in the corporate reality.

Therefore, this paper wants to shed some light on the status quo of knowledge management practices in today's corporations. The insights offered here are based on our recent global study (2002-2005) – supported by the Austrian Science Fund (FWF, P#14925) – on knowledge management and organizational learning in multinational companies (MNCs). The empirical evidence of the current status and practices of knowledge management we are going to produce in this paper can be divided into four main parts. First of all, the interviewees' understanding of the terms and concepts 'knowledge' and 'knowledge management' will be analyzed and the relevance and importance they attach to knowledge management will be discussed (Part I). Subsequently, we shall give an overview of the different knowledge management tools (KMTs) in use and examine the frequency, intensity and way of usage in the sample corporations (Part II). In a next step, we are going to depict the impact variables and influencing factors of the knowledge transfer process as they were discovered in the empirical study, compare it with what our model of knowledge flows within MNCs would have predicted, and finally try to offer possible explanations for the discrepancies found (Part III).

In part IV we briefly present and discuss the rather puzzling findings on the interviewees' satisfaction with their current knowledge management.

The study: knowledge management
and organizational learning in 9 mncs

The Model

Despite the strong interest in and the large number of publications on the issue of knowledge flows within MNCs, the literature is "still in the early stages of understanding the central aspects, mechanisms, and contextual factors in the process of managing knowledge in MNCs" (Foss and Pedersen 2004, p. 342). The authors have developed a comprehensive model of knowledge sharing in MNCs, which can basically be divided into three sub-models (cf. also Kasper and Haltmeyer 2002; Kasper and Mühlbacher 2004): A model describing the process of inter-organizational knowledge sharing, a model of the organizational context factors and a model of international/ inter-organizational context factors influencing the process. Since the context factors have a strong impact on the process of knowledge management, the process and context of knowledge management are highly intertwined. For a successful management of knowledge sharing between these organizations it is absolutely necessary to be aware of these different context and process factors, to know about their influence on the knowledge sharing process, and to adapt the knowledge management system (KMS) to these conditions (Kasper and Haltmeyer 2002).
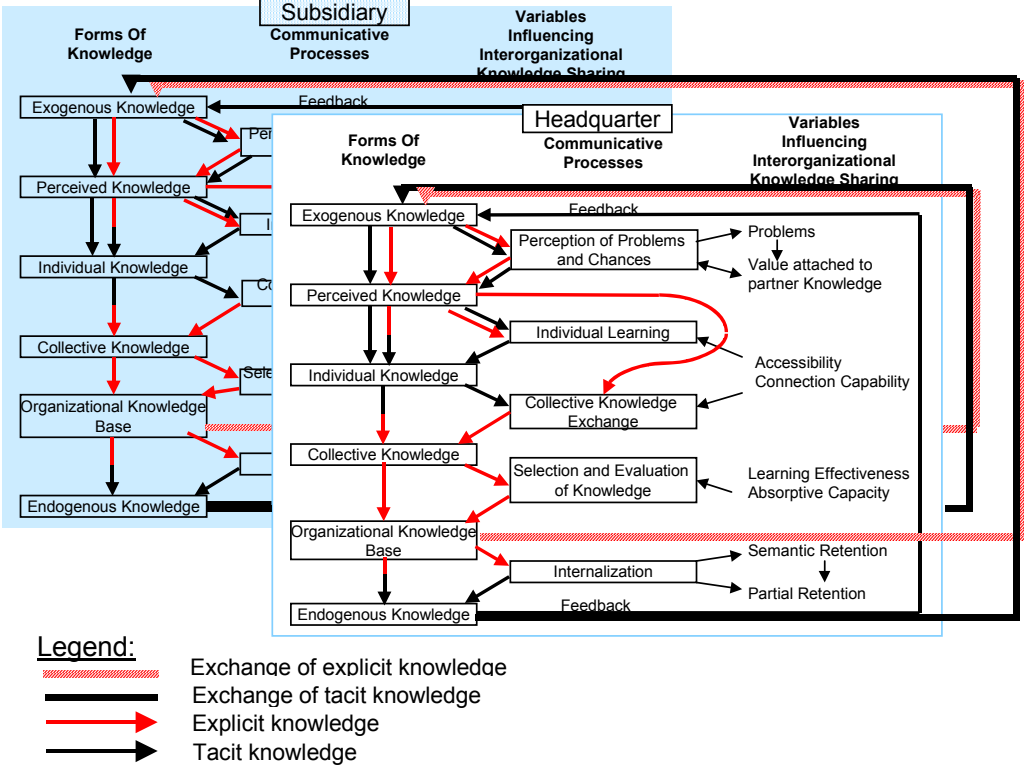
Exhibit 1. *The Model of Knowledge Sharing in Multinational Organizations*

As Exhibit 1 shows, knowledge sharing in multinational organizations means both the process of knowledge exchange between the involved organizations (e.g. headquarter and subsidiary) as well the process of knowledge transfer within the respective organizations

which consists of different levels. On each of these levels several process variables can be identified which have an influence on what happens with the exchanged knowledge in the organization. Only if the exchanged knowledge is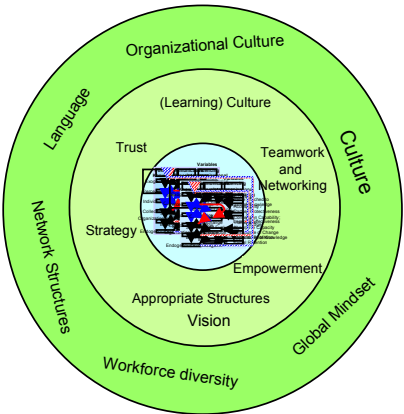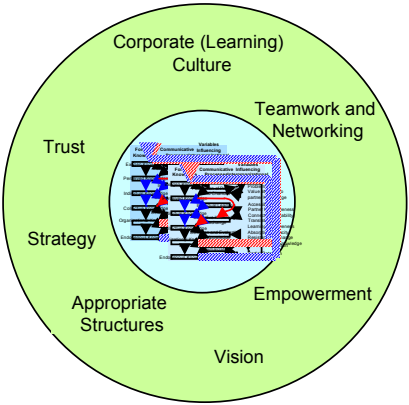 evaluated, processed, stored, and disseminated in the acquiring organization, it can finally be integrated in and amplify the organizational knowledge base. Thus, it is necessary to analyze inter-organizational knowledge sharing on both an inter-organizational level as well as on an intra-organizational level. Consequently, whenever we use the term knowledge sharing in this paper, it refers to the knowledge exchange between different organizations on the one hand and the process of the dissemination of the exchanged knowledge in the participating companies on the other hand.

This process of knowledge sharing however must not be treated in isolation but has to be embedded in the organizational and, as we look at MNCs, the international/inter-organizational context. As it will be described later on, these context factors shown in the two outside layers in our model (fig. 2 and 3 in Exhibit 1) have a considerable impact on the process of knowledge sharing as such. Looking at our model it becomes obvious that knowledge management in multinational organizations requires an understanding and appreciation of the complexities of acquiring, transferring, and integrating knowledge in a learning environment. "In the global arena, the complexities increase in scope as multinational firms grapple with cross-border knowledge transfers and the challenge of renewing organizational skills in various diverse settings" (Inkpen 1998, p. 69).

As a matter of fact, the process of knowledge management and organizational learning cannot be examined separated from its context. Since the context factors have a strong impact on the process of knowledge management, the process and context of knowledge management are highly intertwined. In addition to the organizational (learning) environment, which also has to be considered in investigating knowledge management within a single organization, with regard to knowledge sharing in multinational organizations it is also necessary to analyze the impact of the global learning environment. Referring to multinational organizations it is likely that there are fundamental differences in the environment of the involved organizations mostly resulting from cultural differences. For a successful management of knowledge sharing between these organizations it is absolutely necessary to be aware of these different context factors, to know about their influence on the knowledge sharing process, and to adapt the knowledge management system to these conditions (Kasper and Haltmeyer 2002).

It would go beyond the scope of this paper to describe all variables and influencing factors in detail here. However, we will briefly explain those variables relevant to the results, which were are going to present later on (see below).

Value:

The value attached to the partner knowledge determines whether or not an organization or an individual in the organization strives for acquiring this knowledge. To what degree this

knowledge is valued is influenced by the need of a certain solution or knowledge and its applicability in the organization. Especially in a multinational context the dimension of value is a critical factor in the very early stage of the knowledge exchange process, because what is seen as valuable knowledge does not appear to be fixed but rather derives at least in part from social conventions that differ from one social context to the other. Since organizational units filter information according to their (culturally influenced) systems of meaning and funds of knowledge, they tend to ignore information that is of low relevance to the local task but that might be of high importance to the global task (Macharzina, Oesterle and Brodel 2001).

Accessibility:

In order that perceived knowledge can be transformed into individual or collective knowledge by the process of individual learning and/or collective knowledge exchange, it must be accessible to the partners. Accessibility of partner knowledge can be by no means taken for granted. According to Inkpen (1998; 2000) there are two factors limiting knowledge accessibility – partner protectiveness and knowledge tacitness. Tacit knowledge is by definition highly tight to individuals, hard to formalize and to communicate and thus rather difficult to be made accessible for others. The degree of partner protectiveness, in our view, depends – among others – on the expectation of the knowledge providing partner whether and how the knowledge is going to be used in the other organization (can be enhanced by appropriate feedback), incentive schemes (subsidiaries might have little incentive to share their knowledge with other local units), and reciprocity and transparency of knowledge transfer. Moreover, inter-organizational trust also plays an important role for the accessibility of knowledge. In fact, only in a climate of trust, organizations will be ready to put their knowledge at the disposal of their partner organizations (Kasper and Haltmeyer 2002). De Long and Fahey (2000) put it like this: "The level of trust that exists between the organization, its subunits, and its employees greatly influences the amount of knowledge that flows both between individuals and from individuals into the firm's databases, best practices archives, and other records" (p. 119).

Learning effectiveness:

Whether or not the evaluation of the knowledge results in its integration in the organizational knowledge base depends on the learning effectiveness or absorptive capacity of the organization. Inkpen (1998; 2000) describes three factors influencing the learning effectiveness – knowledge connections (such as foreign assignments or visits by personnel) between the partner firms to build networks, relatedness of partner knowledge, and the cultural alignment between parent executives and alliance managers.

Networking/Networks:

Especially, but not only, for the transfer of the highly valuable tacit knowledge, it is important that the involved organizations offer appropriate personal communication possibilities / channels, so-called knowledge connections. Knowledge connections "occur through both formal and informal relationships between individuals and groups" and help to build a common language, an inter-organizational structure and culture (Inkpen 1998, p. 75). Formal and / or informal networks in an organization come into existence through the implementation and use of knowledge connections. Company-wide networks are an excellent mean to foster horizontal integration through the development of a shared sense of organizational identity. They enhance inter-personal contacts and interactions between individuals and thus enlarge an organization's capacity for rapid transfer of knowledge and information. Consequently, networks can be seen as facilitators for knowledge exchange.

Network structures/ Decentrality:

According to Macharzina, Oesterle and Brodel (2001) non-hierarchical, network oriented modes of international collaboration in MNCs have an organizational logic which is totally different from hierarchical, center-oriented modes. Organizations that decentralize decision-making may be more adaptive, more innovative, and are more capable to deal with complex environments than those organizations that maintain centralized decision-making and coordination (pp.642). To transfer knowledge, there must be both collective commitment of the partners on the one hand, as well as a certain amount of not only individual, but also organizational autonomy on the other hand. In the long run, knowledge sharing in MNCs can only work, if managers of the involved organizations have similar assumptions on the partner relationship, its objectives, and performance (Inkpen 1998; 2000).

Sample and Research Method

Since the study is of explorative nature, we primarily chose a qualitative research approach. Quantitative studies focus on the measurement and analysis of causal relationships between variables, not processes. Therefore, qualitative methods are more appropriate than quantitative methods to research questions focusing on organizational processes, as well as outcomes (Cassell and Symon 1994). Besides, according to Spender (1996b), "the objective of positivist research is the development of a coherent abstract representation of the world out there" while the focus of interpretive research is "on the ways in which we attach meaning to our experience" (p. 72). Many scholars distinguish between explicit and tacit knowledge (cf. e.g. Spender's (1996a, pp. 49-52) discussion of different types of knowledge) and Nonaka and Takeuchi's (1995) spiral of knowledge illustrates the process of creating knowledge in organizations through the interaction between tacit and explicit knowledge. In fact, this distinction between tacit and other types of knowledge is widely accepted among knowledge

management researchers (Spender 2003). Spender (1996b) emphasizes the contrast between research methods appropriate to explicit types of knowledge and those appropriate to implicit types, which according to him is also the contrast between the positivist and interpretive methods.

Nine renowned MNCs in 5 continents were selected to serve as our sample. We attempted to select companies that would provide us with an opportunity to collect rich data and to compare different approaches on knowledge management and the way knowledge is handled in a variety of different contexts. In each MNC, we interviewed 3 top and upper-level managers (mainly CEOs, HR-managers, CFOs) in the headquarters and in two different subsidiaries respectively. Thus, the research sample consists of 27 units of 9 MNCs from different branches and we earned both quantitative and qualitative data from 81 interviews in total.

The headquarters and two subsidiaries are each chosen to reflect as many regional and cultural differences as possible. Consequently, it was our aim to gain the support of units located in very different regions[2]. The international sample of prestigious MNCs, and the selection of experienced managers who play an important role in the knowledge management process, demonstrate the comprehensive and holistic character of this study.

In the course of the qualitative interviews, semi-structured questions regarding our model of knowledge transfer within firms were employed. The interview-partner could nevertheless answer openly and lead the interview mostly. The interviews were transcribed authentically and encoded according to our system of categories so that they could be used not only for qualitative word context analysis supported by NVivo but also for quantitative analysis using logistic data regression, multiple analysis of variance (MANOVA) and univariate ANOVA. Specifically, the encoding was done according to Mayring's qualitative content analysis, which is "an approach of empirical, methodological [sic] controlled analysis of texts within their context of communication, following content analytical rules and step by step models, without rush quantification" (Mayring 2000, June, [5]). Following our research questions, the aspects of text interpretation are put into categories which are formed inductively and/or deductively and revised within the process analysis and feedback loops.

To lend further quantitative support to the observations that emerged from the interviews and in order to triangulate the data to provide a more balanced viewpoint, we conducted several additional surveys. Central to the findings presented in this paper were two different collection instruments. First, a questionnaire on KMTs and processes used in the organization was employed. On a seven-point scale the usage frequency of 19 common KMT was surveyed. The influence of these KMT on the inter-organizational knowledge transfer was analyzed in a multivariate fashion using a logistic regression model. The antilogs of the model-coefficients were interpreted as the corrected odds ratio.

Second, an illustration prepared in accordance with structure formation technique was used to visualize and assess the knowledge flows and their intensity on both the personal and the technical level between the different units as perceived by the interviewee.

Results

The results section consists of five parts as outlined above. They present main findings from our empirical study on knowledge management in MNCs. Kasper and Haltmeyer (2002), Kasper, Haltmeyer et al. (2005) and Kasper, Haltmeyer and Kohlbacher (2005) may serve as further reference.

Part I: Knowledge and Knowledge Management: Theoretical Aspects and Empirical Findings

In the relevant knowledge management literature, a distinction between data, information and knowledge has regularly been made (cf. e.g. Nonaka and Takeuchi 1995; Davenport and Prusak 2000; Tsoukas and Vladimirou 2001; Willke 2001; Probst, Raub and Romhardt 2002; Willke 2004b). Data can be defined as "a set of discrete, objective facts about events" and in an organizational context data is most usefully explained as "structured records of transactions" (Davenport and Prusak 2000, p. 2).

Information has frequently been described as a message or a flow of messages and it can be thought of as data that makes a difference (Nonaka and Takeuchi 1995; Davenport and Prusak 2000). Knowledge refers to information embedded in the context of system-specific patterns of experiences and is always for a specific purpose (Willke 2004a, pp. 33 ff.). Wiig (2004) contends that knowledge is used to "interpret information about a particular circumstance or case to handle the situation" and that knowledge is about "what the facts and information mean in the context of the situation" (p. 337). According to Nonaka and Takeuchi (1995), knowledge is created by the flow of information, anchored in the beliefs and commitment of its holder and therefore essentially related to human action (p. 58). Dixon (2000) uses the term *common knowledge* to differentiate the knowledge that employees learn from doing the organization's tasks from book knowledge or from lists of regulations or databases of customer information. In this sense, "common knowledge is the "know how" rather than the "know what" of school learning" (Dixon 2000, p. 11). Holden (2002) seems to agree on that when he emphasizes that "in the management context 'knowledge' means organizational knowledge rather than the contents of encyclopædias or reference books" (p. 65).

Davenport and Prusak (2000) offer a very useful definition of knowledge, making clear that knowledge is not neat or simple:

"Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms" (p. 5).

Tsoukas and Vladimirou (2001) come to the following conclusion of what knowledge is:

"knowledge is the individual ability to draw distinctions within a collective domain of action, based on an appreciation of context or theory or both" (p. 979, original emphasis).

According to them, "such a definition of knowledge preserves a significant role for human agency, since individuals are seen as being inherently capable of making (and refining) distinctions, while also taking into account collective understandings and standards of appropriateness, on which individuals necessarily draw in the process of making distinctions, in their work" (ibid.).

Last but not least, Wiig (2004) offers the following operational definitions of knowledge: "The content of understanding and action patterns that govern sensemaking, decision making, execution, and monitoring" (p. 336). According to him, knowledge "consists of facts, perspectives and concepts, mental reference models, truths and beliefs, judgments and expectations, methodologies, and know-how" (Wiig 2004, p. 337).

With respect to knowledge management, it is critical to differentiate between explicit and implicit (= tacit) knowledge. Explicit knowledge is formal and systematic and can be easily communicated and shared with others. In contrast, tacit knowledge refers to a kind of knowledge which is highly personal, hard to formalize and thus difficult to communicate to others: it is deeply rooted in action (Nonaka 1996, p. 21). According to Leonard (1998) knowledge management "demands the ability to move knowledge in all directions – up, down, across" (p. 10), which is why we often talk of knowledge flows within organizations.

Wiig (2004) offers a very detailed definition of knowledge management:

„The systematic, explicit, and deliberate building, renewal, and application of knowledge to maximize an enterprise's knowledge-related effectiveness and returns from its knowledge and intellectual capital assets. The field covers deliberate and systematical analysis, synthesis, assessment, and implementation of knowledge-related changes to attain a set of objectives and to check that KM activities are carried out appropriately and meet their objectives." (p. 338).

In their article "The Eleven Deadliest Sins of Knowledge Management", Fahey and Prusak (1998) present a set of pervasive knowledge management errors and contend that "it is particularly important to detect these errors so that knowledge management does not become yet another management fad that promised much but delivered little" (Fahey and Prusak 1998, p. 265). Interestingly, the first error they identify in their paper is "not developing a working definition of knowledge" which might lead to a dysfunctional environment for knowledge work (ibid.).

However, as can been seen from the above, the terms and the concepts of knowledge and knowledge management are rather vague and full of ambiguity. As a matter of fact, knowledge management is therefore also an oxymoron: while knowledge is processual and fluid, management aims at control and order (Styhre 2003). Mylonopoulos and Tsoukas (2003) state that it could plausibly be argued that knowledge management is a contradiction in

terms: "On the one hand organizational knowledge is deeply contextual and embedded in the intangible, especially human, resources of an organization. On the other hand, for anything to be managed, an element of objectification and disembedding is necessary" (p. 139, cf. also Tsoukas and Vladimirou 2001, pp. 979-980). Therefore, defining the terms knowledge and knowledge management in a company and make all employees have a clear understanding of them is obviously a difficult task. Indeed, the results of our study seem to confirm this assumption.

Despite the vagueness and ambiguity of the different definitions of knowledge, the essential characteristics of knowledge in the way it is dealt with within the field of knowledge management should have become obvious. First of all, a main feature is the organizational context. Individual knowledge which is in no way related to the organization's activity cannot possibly be in the focus of our interest. Second, knowledge is also about certain abilities and actions that can be derived from it. Finally the application or possible applications of it are at the heart of knowledge management activities and knowledge management research. Given what has just been said, it becomes clear that the 'deadly sin' of not developing a working definition of knowledge and the difficulty in doing so because of the vagueness and ambiguity of the term are not so contradictory after all. However, none of our 9 target companies appeared to have developed a useful working definition of knowledge. Moreover, analyzing the statements of the 81 interviewees about what knowledge means according to them, we found that there does not really seem to exist a common idea of what knowledge in an organization actually is. This means that all of the companies surveyed by us committed the first error identified by Fahey and Prusak (1998) and thus run the risk of causing a dysfunctional environment for knowledge work. Indeed, some were not even able or willing to attempt to tell us what knowledge means to them or even negated that there could possibly be a definition of what knowledge is. Others again, tried to give definitions or tried to explain what knowledge means to them, but remained rather vague. E.g.:"*Knowledge to me means success*" (Sales director, engineering industry), "*Knowledge, it means, it's a piece of information about a certain topic*" (Executive vice president, chemical industry) "*Knowledge is the possession of a lot information which is transformed to be a sort of wisdom [...] but then when you think of it from a company point of view then it is quite vast [...] it is all the written documents we have gathered all around and thus it becomes very wide a term*" (Controller, chemical industry), "*Knowledge is a skill that you develop in your mind*" (Sales manager, steel industry), "*Knowledge is the actual result of the experience of the company*" (Operation manager, steel industry).

Interestingly, the interviewees who replied in that manner all came from companies in the production industry. At the time of our interviews, these companies did not have the position of knowledge manager or chief knowledge manager. However, the situation was different with the companies in the consulting or IT (consulting) business. There, we encountered knowledge managers and they were actually able to give a more precise definition of knowledge: *"Knowledge emerges from the exchange of intellectual capital. On a personal*

basis it's any type of organizational knowledge, any type of organizational information. On the company level you can think about it in terms of things that we have learned from doing the work for our clients and sharing that internally. Therefore, to me knowledge is about ideas and the uniqueness of those ideas and how we interchange and we share those ideas" (Knowledge manager, consulting business). Another knowledge manager from a company in the IT business cited Nonaka and Takeuchi's (1995) work and distinguished between tacit and explicit knowledge.

The understanding of the term "knowledge management" by our interview partners ranges from no idea at all up to a very comprehensive view, which we found out depends to a large degree on the industry the company is in and/or of the function of the interviewee. The following two statements illustrate this bandwidth: (service industry – manufacturing – consulting): 1) *"That terminology I heard about it before but I never actually dipped into it, so I don't know what it is exactly, what is behind it or the meaning of that"* (CEO, electronic components industry). 2) *"Knowledge management? Well, I don't know…knowledge management."* (Managing director, engineering industry). 3) *"…of course you must at first define what is knowledge for the company – the core values to the company. And these core values can be appropriately managed within the company and you also have to find a way to constructively motivate people to add up to this value. And also you create, you manage, you store it in the company properly so you can protect it and then you can also make sure a system way so that the people can access this knowledge and make use of this knowledge's application whenever is necessary, so they should be aware of this."* (HR manager, electronic components industry).

In general, it can be distinguished between a rather individual and an organizational approach to the concept of knowledge management on the one hand and between a technological or people-oriented view on the other side. Again, the different approaches are illustrated by appropriate interview passages below.

Organizational approach:

1) *"Knowledge management for me is capturing the experiences of the organization and putting them in a format and in a storage place which is accessible and meaningful to people throughout the company…"* (IT specialist, consulting business). 2) *"…what we were originally hired to do was to ensure that the key understandings and intellectual capital gained in the course of doing assignments was not lost. So, as I said to you before it's not just the data, the data is one part of it, but it's much more the analysis, the understanding, it's making that available centrally, in an easy format, to lots of other people; that's what I see as knowledge management."* (Consultant)

Individual approach:

"Knowledge management is transferring what you know, the experiences you have and what you have done to other people, to the people that will actually use this knowledge for

improvement of something that could be useful, not only for the company but the persons themselves ..." (Director Marketing and Sales, logistics industry).

People-oriented view:

"*Knowledge management is about empowering people. First of all it´s about people...*" (Managing director, IT services industry).

Technological view:

1) "*Ah, I think, knowledge management, that´s our brain system,...*" (Consultant). 2) "*For me, this can somehow be subsumed under the term content management. That means to store, to manage all data and information existing in an organization using different kind of media, different kind of tools, to process and index them and to make sure that they can be traced.*" (Associate partner, consulting business).

For most of those interviewees, who proofed to have at least a rough imagination of the meaning of knowledge management, (the collection and) the distribution of the knowledge/information seems to be a central part of knowledge management, which is reflected in the following statement: "*My understanding of the knowledge management is really that it's all about a kind of collecting and delivering information for different, from different sources to different type of users. ...*" (Executive vice president, chemical industry). Or also: "*In my view, knowledge management means to effectively distribute, effectively share and transfer my collected knowledge either personally or in writing it down.*" (Consultant).

Another interesting aspect is the goal-orientation: "*That is a kind of management practice to nurture that kind of thinking and strengthen the culture in the company so that in everyway to try to support that knowledge, data, information and experience will be utilized in order to make better decisions and better business activities.*" (General manager marketing, chemical industry).

From the above, it becomes obvious that for most companies in our sample, the understanding of knowledge and knowledge management on a conceptual level is rather tenuous and thus the prerequisites for creating a functional environment for knowledge work are not fulfilled.

Part II: Status Quo of Knowledge Management and Use of KMTs

Having taken a look at the current status of knowledge management from a conceptual point of view, we are going to analyze the status quo of knowledge management activities from a more practical standpoint now.

Current Status of Knowledge Management Implementation

In the course of the interviews we asked the respondents about the status of the knowledge management implementation in their organization. Out of our 81 interviewees, only 58 replied in a manner that made it possible to evaluate the current status of knowledge management. As shown in Exhibit 2 only 11 interviewees considered their knowledge management to be fully implemented (Standard). The majority (20 respondents) thought it to be still in the roll-out phase and another 11 respondents said it to be non-existent. The rest (6 interviewees) claimed their intention to implement it in the near future.

However, the answers did not turn out to be homogenous in each firm. In fact, only in two companies all interviewees held the same opinion on the current status of their knowledge management (one Standard and one Roll-out). The fact that there is no consistent view of the knowledge management practices in the MNCs surveyed implies that for the majority of the companies in the study, the knowledge management practices are poorly structured and communicated and/ or not fully developed yet.
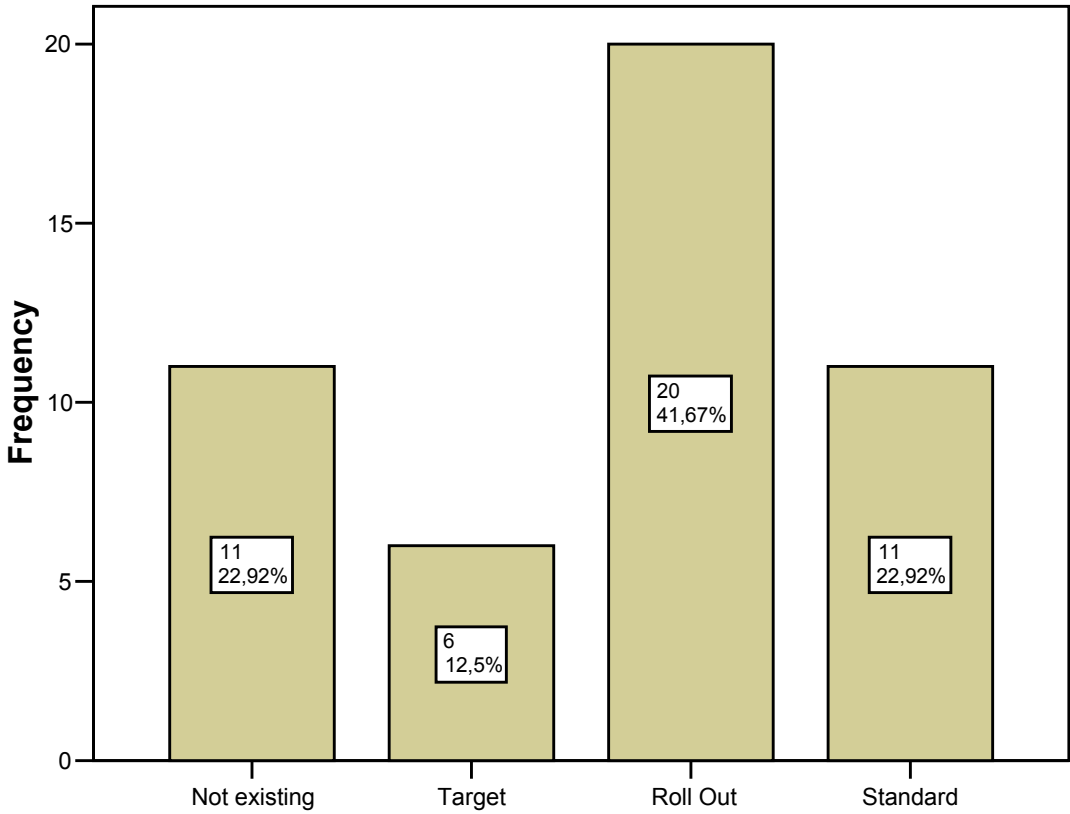

Exhibit 2. *Status Quo of Knowledge Management*

<u>Use of KMTs</u>[3]

Apart from the interviewees' perception of the status quo of the knowledge management in place, the implementation and the use of different KMTs can be seen as an indicator of the development of the knowledge management in a company. In fact, the recognition of knowledge as the most important source of competitive advantage has set off significant developments in management theory and practice, especially the increased application of information technology to handle organization knowledge (Spender 2003; Marr and Spender 2004).

For our empirical study, we have chosen an approach to classify knowledge management systems (KMS, i.e. KMTs) suggested by Hansen, Nohria and Tierney (1999). The authors found that in some companies, KMS center around the technological infrastructure, while other companies primarily foster personal communication and contact. Technologically focused companies, it is argued, attempt to codify and store knowledge in databases to make it easily accessible to anyone in the company. The authors call this a codification strategy. A personalization strategy, in contrast, implies that knowledge is closely tied to the individuals who develop it. In these companies, information technology primarily serves to enable communication among the members.

The Hansen, Nohria and Tierney (1999) approach does not only have a high face validity, but a suitable scale, based on Nonaka and Takeuchi's (1995) knowledge spiral, has also been developed by Becerra-Fernandez and Sabherwal (2001). We slightly modified this scale and aggregated the different KMT as personalization and codification instruments. To this end, we identified the personalization and codification tools and created two dimensions by splitting the scale.

The following two exhibits show the average use of the codification and the personalization tools in the nine MNCs surveyed in our study. According to Hansen, Nohria and Tierney (1999), codification tools encompass the technological infrastructure suitable to store explicit knowledge and make it easily accessible to anyone in the company. Personalization tools, in contrast, comprise instruments and methods which support the transfer of knowledge closely tied to the individuals.

The average use was surveyed by using a seven-point scale going from "very infrequently" (value 1) to "very frequently" (value 7) and "not applicable" coded by value 0. Exhibit 4 presents the average use of the codification tools and Exhibit 5 displays the average use of the personalization tools. With a total mean of 4.56, the personalization tools are used a little bit more frequently than the codification tools (total mean of 4.33). However, both means are relatively low and clearly show that the implementation and use of KMTs in the MNCs surveyed by is far from being at a satisfactory level.
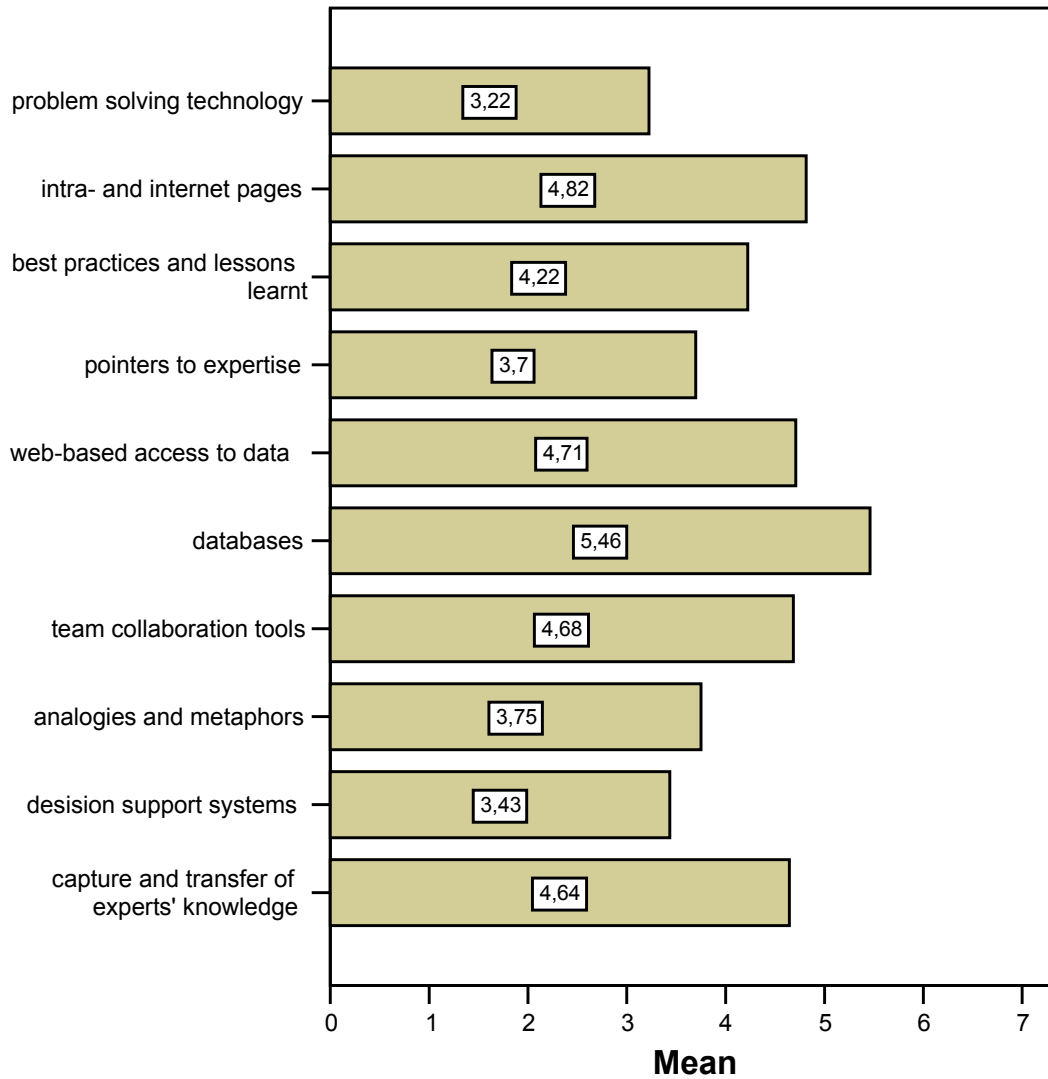
Exhibit 3. *Average Use of Codification Tools*

As Exhibit 3 shows, the most frequently used codification tools are databases followed by intranet and internet pages and other web-based access to data. Since codification tools help to store and access mainly explicit knowledge, information and mere data, this finding is hardly surprising. In fact, almost all companies use databases to store data and many have established intranet portals or other web-based access to data. Nevertheless, in the age of such buzzwords as "information/ knowledge society" and "knowledge-creating companies", the degree of usage of these KMTs seems to be rather low.
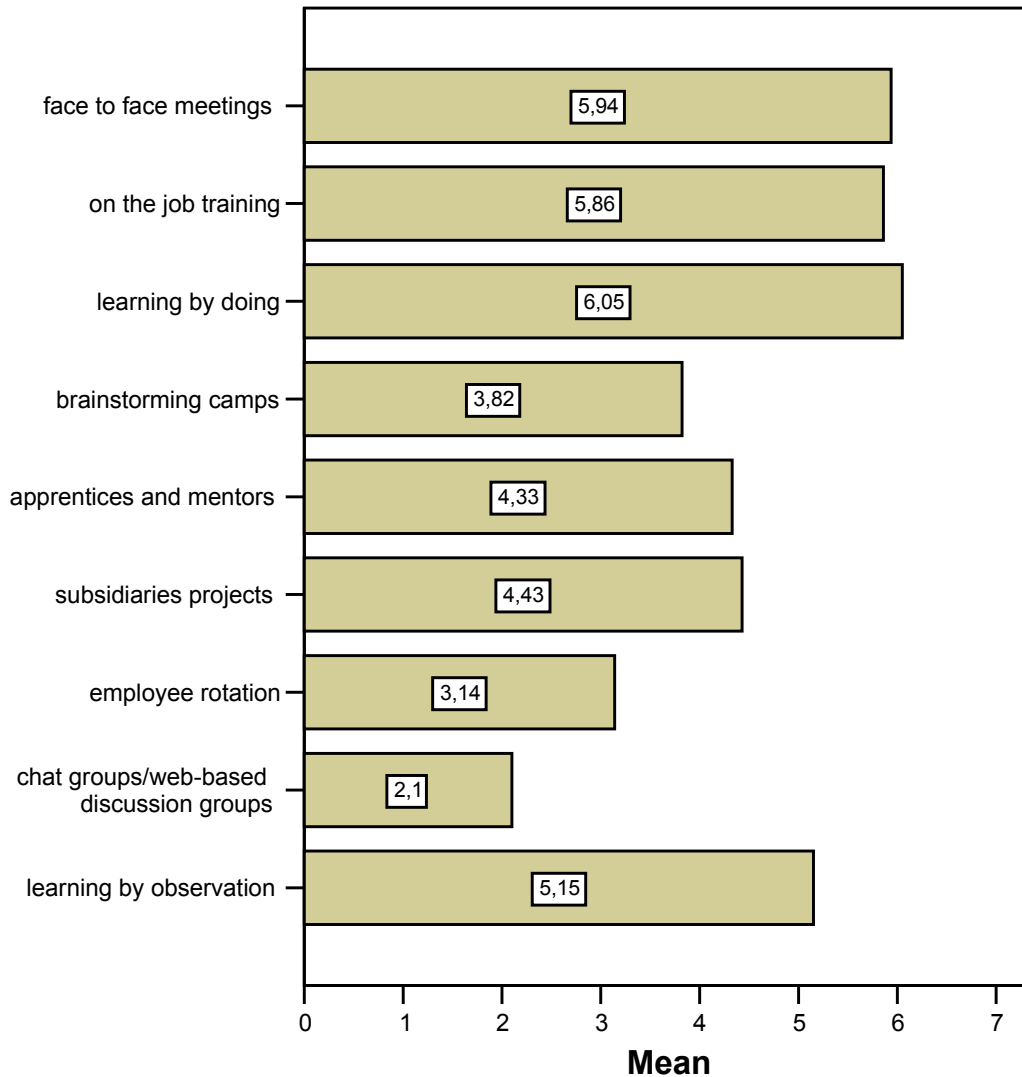
Exhibit 4. *Average Use of Personalization Tools*

It is remarkable that among the personalization tools especially those tools which are supposed to foster the inter-organizational knowledge sharing, i.e. subsidiaries projects, employee rotation, brainstorming camps and chat groups/web-based discussion groups are by far less employed than those personalization tools which are designed mainly for the intra-organizational knowledge transfer at a specific site.

Part III: The Process of Knowledge Sharing in MNCs:
Knowledge Flows and its Impact Factors

As described earlier in this paper, we asked the interviewees to draw a picture on their view of the knowledge flows within the MNC in terms of intensity and direction. In the following we are going to present some of our findings in this respect. Taken all 9 MNCs

together, the average personal knowledge flow adds up to 3.20 (on a scale from 1 = none to 5 = high) and the technical knowledge flow is slightly less at 3.08. Exhibit 5 and Exhibit 6 provide a rather detailed description and analysis of the knowledge flows on the personal level or technical level respectively. The means of outgoing and incoming flows taken together are shown for each site and for each MNC from an internal and external perspective (and also for all MNCs together = TM). The internal perspective reflects the rating of the interviewees working at the site, i.e. how much knowledge they believe to give and get, whereas the external perspective presents the situation how the interviewees from the two other locations perceive it, i.e. how much knowledge the site in question gives and gets in their view.

Furthermore a number of deviations calculated are shown in the exhibit to get an impression how each site / company can be classified in relation to the other sites / companies. It can be seen

- how the mean knowledge flows at one specific site deviates from the respective company mean
- how the mean knowledge flows within one specific MNC deviates from the mean over all 9 MNCs in the sample
- how the internal view differs from the external view for each site and each company

Thus, we can tell whether a certain company or a certain location lies above or below average in terms of the knowledge flows examined. And what is even more interesting if the internal or external evaluation is more favorable.

Having a look at the personal knowledge flows presented in Exhibit 5, it can be seen that except for company 5, which provides a very homogenous picture, the difference between the internal and external perspective is prominent. In 14 cases the internal perspective is better than the external and in 9 cases it is the other way round. In only two cases they are equal.

The analysis of the differences between the internal and external perspective for the technical knowledge flows (see Exhibit 6) at the different sites shows a similar result: 15 sites rate themselves better, 10 worse than the others. Thus, we can conclude that there is a tendency to a better self-perception.

Considering the internal perspective, four out of nine MNCs (2,3,5,8) seem to be very balanced in terms of personal knowledge sharing (largest deviation from company mean is +/- 0.25). In other words, in these MNCs the two subsidiaries and the headquarter show nearly the same intensity in knowledge sharing. Considering the external perspective this is only true for company 5.

In comparison to that the technical knowledge flows (see Exhibit 6) spread more among the locations of an MNC, at least in regard to the internal perspective. Only 2 MNCs (internal perspective) or 3 (external perspective) can be seen as balanced.

TM	Personal Overall 5=very strong, 1=none	Mean Site	Mean Company	Dev. Site	Dev. Company		Mean Site	Mean Company	Dev. Site	Dev. Company		Diff. Site	Diff. Company
	3,20												
		Internal		Internal			External		External			Internal-External	
1	HQ (6)	3,00	**2,97**	0,03	**-0,24**		2,50	**2,97**	-0,47	**-0,24**		0,50	**0,00**
	Subsidiary 1 (2)	3,48		0,51			3,25		0,28			0,23	
	Subsidiary 2 (8)	2,55		-0,41			3,50		0,53			-0,95	
2	HQ (11)	3,07	**3,08**	-0,01	**-0,12**		3,92	**3,08**	0,84	**-0,12**		-0,85	**0,00**
	Subsidiary 1 (9)	2,83		-0,25			2,58		-0,50			0,25	
	Subsidiary 2 (10)	3,33		0,25			2,58		-0,50			0,75	
3	HQ (18)	3,75	**3,91**	-0,16	**0,70**		4,17	**3,91**	0,26	**0,70**		-0,42	**0,00**
	Subsidiary 1 (16)	4,00		0,09			3,83		-0,07			0,17	
	Subsidiary 2 (17)	3,92		0,01			3,75		-0,16			0,17	
4	HG (12)	3,13	**3,88**	-0,75	**0,67**		4,67	**3,88**	0,79	**0,67**		-1,54	**0,00**
	Subsidiary 1 (14)	4,92		1,04			3,29		-0,58			1,63	
	Subsidiary 2 (15)	3,88		0,00			2,00		-1,85			1,88	
5	HQ (19)	3,25	**3,28**	-0,03	**0,07**		3,25	**3,28**	-0,03	**0,07**		0,00	**0,00**
	Subsidiary 1 (20)	3,25		-0,03			3,50		0,22			-0,25	
	Subsidiary 2 (21)	3,33		0,06			3,08		-0,19			0,25	
6	HQ (23)	3,33	**2,78**	0,56	**-0,43**		3,50	**2,78**	0,72	**-0,43**		-0,17	**0,00**
	Subsidiary 1 (22)	2,58		-0,19			2,00		-0,78			0,58	
	Subsidiary 2 (24)	2,42		-0,36			2,83		0,06			-0,42	
7	HQ (26)	4,25	**3,66**	0,59	**0,45**		3,50	**3,66**	-0,16	**0,45**		0,75	**0,00**
	Subsidiary 1 (25)	3,17		-0,49			4,50		0,84			-1,33	
	Subsidiary 2 (27)	3,75		0,09			miss.		miss.			miss.	
8	HQ (30)	3,50	**3,46**	0,04	**0,26**		3,08	**3,46**	-0,39	**0,26**		0,43	**0,00**
	Subsidiary 1 (28)	3,70		0,24			3,70		0,24			0,00	
	Subsidiary 2 (29)	3,25		-0,21			miss.		miss.			miss.	
9	HQ (31)	4,14	**2,63**	1,52	**-0,58**		3,33	**2,63**	0,71	**-0,58**		0,81	**0,00**
	Subsidiary 1 (32)	1,89		-0,73			3,00		0,37			-1,11	
	Subsidiary 2 (33)	2,52		-0,11			2,43		-0,20			0,09	

Exhibit 5. *Overview on personal knowledge flows (outgoing and incoming)*

	Technical Overall 5=very strong, 1=none 3,08	Mean Site Internal	Mean Company	Dev. Site Internal	Dev. Company		Mean Site External	Mean Company	Dev. Site External	Dev. Company		Diff. Site Internal-External	Diff. Company
1	HQ (6)	3,05	**2,99**	0,06	**-0,09**		2,87	**2,99**	-0,12	**-0,09**		0,18	**0,00**
	Subsidiary 1 (2)	3,10		0,11			3,00		0,01			0,10	
	Subsidiary 2 (8)	2,70		-0,29			3,00		0,01			-0,30	
2	HQ (11)	3,86	**3,68**	0,17	**0,60**		4,67	**3,68**	0,98	**0,60**		-0,81	**0,00**
	Subsidiary 1 (9)	3,50		-0,18			3,00		-0,68			0,50	
	Subsidiary 2 (10)	3,67		-0,02			3,17		-0,52			0,50	
3	HQ (18)	3,50	**2,87**	0,63	**-0,21**		3,17	**2,87**	0,29	**-0,21**		0,33	**0,00**
	Subsidiary 1 (16)	2,33		-0,54			2,25		-0,62			0,08	
	Subsidiary 2 (17)	3,00		0,13			3,75		0,88			-0,75	
4	HG (12)	3,50	**3,48**	0,02	**0,39**		4,25	**3,48**	0,78	**0,39**		-0,75	**0,00**
	Subsidiary 1 (14)	3,25		-0,23			2,88		-0,60			0,38	
	Subsidiary 2 (15)	3,63		0,15			2,75		-0,73			0,88	
5	HQ (19)	3,58	**3,25**	0,33	**0,17**		3,08	**3,25**	-0,17	**0,17**		0,50	**0,00**
	Subsidiary 1 (20)	3,25		0,00			3,33		0,08			-0,08	
	Subsidiary 2 (21)	2,92		-0,33			3,33		0,08			-0,42	
6	HQ (23)	3,58	**2,97**	0,61	**-0,11**		3,83	**2,97**	0,86	**-0,11**		-0,25	**0,00**
	Subsidiary 1 (22)	2,58		-0,39			2,42		-0,56			0,17	
	Subsidiary 2 (24)	2,75		-0,22			2,67		-0,31			0,08	
7	HQ (26)	2,75	**3,13**	-0,38	**0,04**		3,40	**3,13**	0,28	**0,04**		-0,65	**0,00**
	Subsidiary 1 (25)	3,33		0,21			3,00		-0,13			0,33	
	Subsidiary 2 (27)	3,17		0,04			miss.		miss.			miss.	
8	HQ (30)	4,00	**3,42**	0,58	**0,34**		3,07	**3,42**	-0,35	**0,34**		0,93	**0,00**
	Subsidiary 1 (28)	3,20		-0,22			3,37		-0,06			-0,17	
	Subsidiary 2 (29)	3,42		-0,01			miss.		miss.			miss.	
9	HQ (31)	4,14	**2,47**	1,67	**-0,61**		3,00	**2,47**	0,53	**-0,61**		1,14	**0,00**
	Subsidiary 1 (32)	1,57		-0,90			3,25		0,78			-1,68	
	Subsidiary 2 (33)	2,67		0,19			2,43		-0,04			0,24	

Exhibit 6. *Overview on technical knowledge flows (outgoing and incoming)*

Exhibit 7 gives an answer to the question which channel is used more – the technical or the personal – to transfer knowledge. In general it seems to be rather balanced, company 2 and company 3, however, stand out. In company 2 the technical knowledge flow clearly exceeds the personal exchange of knowledge not only for the whole company but also for each site. In company 3, in contrast, the focus evidently is on the personal knowledge flow, again for the company as a whole as well as for each site. Remarkable thereby is that subsidiary 1 seems to follow a clear personification strategy in terms of knowledge transfer. The mean personal knowledge flow to and from this subsidiary exceeds the technical by 1.67 or 1.58 depending on the perspective. In regard to the internal perspective such a personification strategy is also applied by subsidiary 1/company 4 but it is slightly qualified by the external perspective. Worth to mention is also subsidiary 1/company 7 which shows a big discrepancy between the internal and the external perspective (-0.17 vs. 1.50)

Personal Overall-Technical Overall	Diff. Site	Diff. Company		Diff. Site	Diff. Company
5=very strong, 1=none					
3,08					
	Internal			External	
HQ (6)	-0,05	-0,02		-0,38	-0,02
1 Subsidiary 1 (2)	0,38			0,25	
Subsidiary 2 (8)	-0,15			0,50	
HQ (11)	-0,79	-0,61		-0,75	-0,61
2 Subsidiary 1 (9)	-0,67			-0,42	
Subsidiary 2 (10)	-0,33			-0,58	
HQ (18)	0,25	1,03		1,00	1,03
3 Subsidiary 1 (16)	1,67			1,58	
Subsidiary 2 (17)	0,92			0,00	
HG (12)	-0,38	0,40		0,42	0,40
4 Subsidiary 1 (14)	1,67			0,42	
Subsidiary 2 (15)	0,25			-0,75	
HQ (19)	-0,33	0,03		0,17	0,03
5 Subsidiary 1 (20)	0,00			0,17	
Subsidiary 2 (21)	0,42			-0,25	
HQ (23)	-0,25	-0,19		-0,33	-0,19
6 Subsidiary 1 (22)	0,00			-0,42	
Subsidiary 2 (24)	-0,33			0,17	
HQ (26)	1,50	0,53		0,10	0,53
7 Subsidiary 1 (25)	-0,17			1,50	
Subsidiary 2 (27)	0,58			miss.	
HQ (30)	-0,50	0,04		0,00	0,04
8 Subsidiary 1 (28)	0,50			0,34	
Subsidiary 2 (29)	-0,17			miss.	
HQ (31)	0,00	0,16		0,33	0,16
9 Subsidiary 1 (32)	0,32			-0,25	
Subsidiary 2 (33)	-0,15			0,00	

Exhibit 7. *Difference between personal and technical knowledge flows*

Impact Factors

When describing our model of knowledge flows within MNCs, we have also explained certain important impact variables or factors (see above). In this section, we are going to analyze the influence of these on the personal as well as the technical knowledge flow respectively. We defined personal knowledge flow as a more or less direct exchange of knowledge on a person-to-person basis. This includes face-to-face meetings, telephone, e-mail, videoconferences etc (cf. also Hansen, Nohria et al. 1999). Technical knowledge flow, in contrast, means the sharing of knowledge via a technical intermediary with the collectivity. Here, knowledge needs to be codified and transmitted to the intermediary first, before it is transferred further to or 'picked up' by the final recipients.

Applying a logistic regression model – using the covariables decentralized structures, networks, value assigned to knowledge management, knowledge accessibility, and learning effectiveness for correction; the antilogs of the model-coefficients were interpreted as the

corrected odds ratio – we examined the impact of the five influencing variables described above on the inter-organizational knowledge transfer within each of our 9 target companies. The inter-organizational knowledge transfer in MNCs is represented by the knowledge flows between headquarter and subsidiary and between subsidiaries respectively.

Exhibit 8 and Exhibit 9 show the results from the logistic regression model, namely the influence of certain factors on the personal and technical knowledge flow (dependent variable). While 3 factors on the personal knowledge flow turned out to be significant on a 0.05 level (Exhibit 8), no significant factors influencing the technical knowledge flow were found within the same confidence interval (Exhibit 9). As for the personal knowledge flow, the highly significant factors were the following: decentralized structures, accessibility and learning effectiveness. As a matter of fact, decentralized structures increase the chances for a high personal knowledge flow by more than 500% relative to centralized corporate structures (OR = 5.053). On a 10% confidence level, both networks and value also display a positive effect on the personal knowledge flow. Thus, all the factors analyzed concerning their influence on the personal knowledge flow were significant. Here, the relative odds for a high personal flow increase by almost 400% in the case of existing network structures and by more than 170% in the case of high value being attached to knowledge management in the respective organization. However, value turned out to have a negative effect on the technical knowledge flow within a 10% confidence interval (OR = 0.683).

Accessibility and learning effectiveness – even though the extant literature (see above) considers them to have a positive influence – have a negative impact on the personal knowledge flow. It would be obvious to assume that a higher (level of) accessibility leads to an increased flow of knowledge within organizations. In fact, the knowledge management literature often builds on the assumption that improving employees' access to knowledge has positive outcomes (e.g. Rulke, Zaheer and Anderson 2000). However, accessibility reduces the chance for a high personal knowledge flow by 60.5% per unit (OR = 0.395) and learning effectiveness reduces it by 72.8% per unit (OR = 0.272). Complete data analysis showed stability for these results.

	beta	SE (beta)	Odds Ratio	-95%CI	+95%CI	p
Const.B0	-0.265475	0.7199968	0.7668417	0.1806979	3.254305	0.7123411
Decentrality	**1.620062**	**0.7455895**	**5.053402**	**1.131143**	**22.57617**	**0.02979815**
Networks	1.373028	0.7628053	3.947284	0.8535358	18.25471	0.07187456
Value	0.5352842	0.2785456	1.707934	0.9763645	2.987652	0.05465092
Accessibility	**-0.9279719**	**0.3247253**	**0.3953547**	**0.2059987**	**0.7587685**	**0.00426981**
Learning Effectiveness	**-1.301194**	**0.5700237**	**0.2722066**	**0.08667722**	**0.854855**	**0.02245451**

Exhibit 8. *Factors Influencing the Personal Knowledge Flow*

	beta	SE (beta)	Odds Ratio	-95%CI	+95%CI	p
Const.B0	0.3026257	0.6241333	1.353408	0.3868224	4.73528	0.6277694
Decentrality	0.9386377	0.571901	2.556496	0.8114232	8.054581	0.1007535
Networks	-0.457711	0.584685	0.6327302	0.1957401	2.045301	0.4337306
Value	-0.3808231	0.2254526	0.6832988	0.4346445	1.074205	0.09120058
Accessibility	-0.04408835	0.2466524	0.9568694	0.5833123	1.569655	0.8581376
Learning Effectiveness	-0.2132357	0.3442861	0.8079656	0.4049076	1.612241	0.5356861

Exhibit 9. *Factors Influencing the Technical Knowledge Flow*

These findings are somehow surprising. They show that a number of factors assumed to have an impact on the knowledge flow between different units of MNCs seem to be hardly influential at all or even operate in the reverse direction. Indeed, while decentralization and a perception of knowledge management as highly valuable could enhance knowledge sharing, high accessibility and elevated learning effectiveness might hinder the transfer of knowledge on a personal level. This clearly contradicts with what our model would have predicted (see above). We have already discussed the influence of accessibility on the knowledge flow in a recent paper (Kasper, Haltmeyer et al. 2005). There, we put forth the following feasible explanation for this stunning finding: On the one hand, it might be that there is actually no need to share information and knowledge, which is available and accessible, on a personal level. This is especially true if the available knowledge is accessible through (information) technology, such as databases, intranets and the like. Thus, it can be transferred and shared without involvement of any personal contact. In such a case, high accessibility on a technical level might well reduce the personal knowledge flow as it becomes partly superfluous. On the other hand, there is also the case that neither knowledge accessibility nor knowledge sharing is actually sought for. The CEO of a high-tech firm's subsidiary in PR China put it like this for instance: *"Each plant manages on their own basis and we seldom need to go over and understand what the others are doing. It does not help each other anyway"*.

The result that a high learning effectiveness hinders the personal knowledge flow is even more astonishing. However, a plausible explanation for this phenomenon might be the following: a high learning effectiveness in one unit (e.g. headquarters or subsidiary) already helps to gain and process the information and knowledge necessary locally and without the support from other units. Therefore, knowledge transfer and exchange between the different units might become unnecessary or at least less useful in comparison with and due to the high local effectiveness of learning and knowledge management. This means that the overall learning effectiveness of the MNC is actually not that high at all, but that it is rather the single units which have a high learning effectiveness on a local level.

In order to get an impression whether knowledge management is really seen as important by top managers and whether or not they are really committed to implement an appropriate system, to provide the right context and to act accordingly, it is not only necessary to know about the current status of the knowledge management in place but also to see how satisfied companies are with this status.

We asked our interviewees to indicate their satisfaction level with the knowledge management in their company on a 7-point Kunin scale (1 = very dissatisfied, 7 = very satisfied). The results show that the big majority of 74.1 % stated to be rather satisfied (46.9 %) or at least not to be dissatisfied (27.2 %). On the other hand only 25.9 % expressed a tendency of being dissatisfied. Taken together with the rather low level of implementation, tool use and inter-organizational knowledge sharing as described in the chapters above, this leads to the conclusion that for many companies knowledge management is a "nice-to-have" but if it does not work optimally there is not really any sense of urgent improvement. It might also be that the interviewees misperceive themselves or their knowledge management, i.e. that they perceive it as being better than it actually is (cognitive dissonance). Last but not least, it is also possible that the managers' expectations or quality standard of knowledge management are rather low so that they are more or less satisfied with the little they have. This again could be seen as a 'deadly sin' since knowledge management should have top priority for a company to remain competitive. Whatever explanation it really is, the relatively high satisfaction rates despite the rather poor state of knowledge management – or that the process of implementing knowledge management is still in its infancy – is somewhat astonishing.

Outlook: limitations and implications for further research

The above sections have given an overview of the current status and practices of knowledge management within MNCs. We have seen that many companies have already implemented or are trying to implement an institutionalized knowledge management and are doing efforts in this area. On the other hand, the status quo of the knowledge management activities still seems to be rather mediocre and – in contrast to the companies' managers' own subjective view – not very satisfactory from an objective standpoint. This shows that there is still a long way to go, errors ('deadly sins' of knowledge management) to be extinguished and change and improvement processes to be initiated. Knowledge management has been in the limelight of management research and business practice for too long a time already – around 20 years – to be simply a fad that will become a passing fade. Our experience in the field of knowledge management and our ongoing passion for knowledge together with the results from our empirical studies makes us believe that knowledge management is a concept and a management tool that is here to stay. However trying to give a satisfactory answer to the question stated in the title of this paper is still not an easy task. Thriving on knowledge? On the one hand, the findings from our empirical survey and the arguments from the extant

literature imply that knowledge cannot be managed or controlled in a direct and merely technical manner. Hence, despite the advances in information technology and artificial intelligence knowledge management in a narrow sense is still fictitious. On the other hand, taking a more comprehensive approach to knowledge management and thus considering a whole set of organizational context factors knowledge management might become effective and help to gain competitive advantage. Our study can provide such a holistic approach and aims to analyze several different factors of influence.

Nevertheless, certain restrictions applying to our study show the need for further research. First of all, the meaning of some of the findings remains somehow vague in the end. Additional reflection as well as empirical research on the significance and the causes of these results will help to shed more light on the issue of knowledge accessibility and its role in knowledge sharing within MNCs.

The result that a high learning effectiveness hinders the personal knowledge flow is even more astonishing and finding a plausible explanation for this phenomenon has proven to be rather difficult. As explained above, we rather evaluated the local learning effectiveness of each single subunit. Obviously, further research on an aggregate level of the whole MNC might provide deeper insights. Second, Gray and Meister (2004) contend that "beyond general assertions that improving employees' access to internal knowledge will lead to beneficial outcomes, the KM literature offers no testable theoretical model to explain this connection" (p. 821). Our findings and reasoning seem to be consistent for the most part. However, at his stage of our research project, we cannot offer such a testable theoretical model, neither for a positive, nor for a negative connection as it is proposed here.

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[2] The companies in our sample are located in Austria, Brazil, Canada, China, Czech Republic, Finland, Germany, Great Britain, Hungary, India, Luxemburg, Romania, South Africa, USA.

[3] A detailed analysis of the use of KMTs within MNCs and its impact on the knowledge flow and inter-organizational knowledge exchange as well as an analysis of the influence of accessibility on tool use can be found from Kasper, H., B. Haltmeyer and F. Kohlbacher (2005). Knowledge Managment - Fact or Fiction? Empirical Evidence of the Current Status and Practices of Knowledge Management in Multinational Corporations. 14th International Conference for the International Association of Management of Technology (IAMOT 2005), Vienna and Kasper, H., B. Haltmeyer, F. Kohlbacher and P. J. Scheer (2005). Accessible But Not Accessed – How Availability Hinders the Flow of Knowledge in Multinational Companies. European Academy of Management Annual Conference (EURAM 2005), Munich.

Preserving the passion for knowledge
Of engineers after the implementation of an ict-system:
the role of communities in a Dutch case study

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In this paper the usefulness of the concept of communities (of purpose, interest and practice) for knowledge management and the role of communities in preserving the passion of engineers for knowledge, will be demonstrated in a case study made in two engineering departments of S Ltd, a Dutch knowledge-intensive company, which offers industrial services and total solutions. These departments loose knowledge because engineers leave the departments every five years. Last year, to counteract this trend, the knowledge landscape e-Knowledge (ICT system) was introduced, aimed at preventing this loss of knowledge, encouraging the reuse of knowledge and making work processes more efficient. The problem is that the engineers hardly use e-Knowledge. In this study a close look will be taken at the knowledge processes involved in e-Knowledge and at the role that communities of purpose, interest and practice may play in preserving the passion for knowledge of the engineers. The results show that communities of interest can indeed play an important role in improving the use of e-Knowledge, since membership of these communities makes engineers more interested in e-Knowledge and its possibilities. It is recommended that S Ltd. encourages and facilitates initiatives of engineers to start new communities of interest in the future by offering time, money, and means of communication. Further to enhance expertise sharing between engineers it is recommended to raise the level of awareness of the engineers of their preferred ways to share expertise (face-to-face, with collegues with a good reputation) and of the opportunities they have to do this (in projects, during talks with the mentor, in informal (social) talks in which stories are exchanged).

Nowedays we live in a "knowledge society", in which knowledge is the most important means of production and not capital, raw materials or labour (Drucker, 1993). Knowledge can provide a sustainable advantage (Dierkens et al. 2001; Easterby-Smith & Lyles, 2003). Growth of the service sector, automation, the development of new (information) technology, changing structures and work processes of companies and globalisation and, as a consequence, growing competition are a few causes for this development (Van Zolingen, 1995). This is why knowledge management has become very important for companies According to Davenport & Prusak (1998) knowledge adds value because:

> "Eventually competitors can almost always match the quality and price of a market leaders' current product or service. By the time that happens though, the knowledge rich, knowledge-managing company will have moved on to a new level of quality, creativity, or efficiency. The knowledge advantage is sustainable because it generates increasing returns and continuing advantages. Unlike material assets, which decrease as they are used, knowledge assets increase with use: ideas breed new ideas and shared knowledge stays with the giver while it enriches the

receiver. The potential of new ideas arising from the stock of knowledge in any firm is practically limitless - particularly if the people in the firm are given opportunities to think, to learn, and to talk with another" (1998: 17).

Theory

Knowledge and knowledge management

Knowledge management in organizations is about knowledge. When one talks about knowledge, the question arises how it is to be defined. According to Davenport & Prusak (1998):

> Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the mind of those who know. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices and norms. (p 5).

Davenport & Prusak describe knowledge as a socially constructed reality, influenced by personal beliefs and values, forged in the rhythms of daily work, and visible in a company's products and services. Knowledge is complex because it is personalised. This makes it difficult to standardise and to share it effectively with others. Knowledge management in organizations is also about knowledge creation. Marsick & Watkins (1999) state 'Its focus is releasing creativity and invention in people, who in turn can use what they know to develop the capacity of people, improve practices and processes, and develop better products to serve the customer' (p 82). The process of knowledge management in organizations has been visualised by Weggeman (1997, 2000) by means of the so called knowledge value chain. The knowledge value chain comprises the following phases: determining knowledge in accordance with the strategy of the organization, listing the available knowledge in the organization, developing knowledge, sharing knowledge, applying knowledge and evaluating knowledge. The knowledge management process is continuous and cyclical in nature. The mission, the vision, the goals and the strategy of the organization are the driving forces of the knowledge value chain (Figure 1).
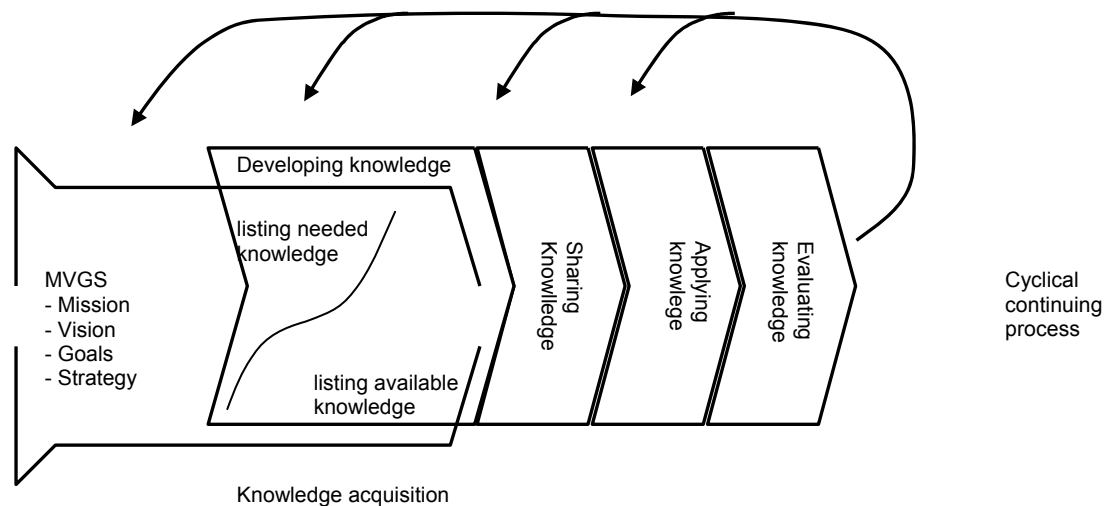
Figure 1. *The knowledge value chain (Weggeman, 2000)*

The term knowledge value chain has been chosen to emphasize that as knowledge moves further along the chain, its value increases from the perspective of the organization (Figure 1). Knowledge becomes really valuable for the organization if it is applied in the production process or in projects. But before application of knowledge is possible, it must first be known by employees and before knowledge can be shared, it must be developed and acquired. The arrows indicate that knowledge creation and knowledge exploration is an ongoing cyclical process.

Nonaka & Takeuchi (1995) describe organizational knowledge creation as a continuous and dynamic interaction between tacit and explicit knowledge. Tacit knowledge is personal, context-specific and therefore difficult to formalise and communicate. It consists of embodied expertise, a deep understanding of complex interdependent systems that enables dynamic responses tot context-specific problems. Explicit knowledge is transmittable in formal, systematic language. ICT systems are often used to codify explicit knowledge in information that is placed in shared repositories or organizational memories that offer the possibility of reusing information. In this view gathering, providing and filtering available explicit knowledge is central to knowledge management. A few decisions that have to be made in creating an ICT system to support knowledge management are: (1) what is the vision that guides choices about what to include or exclude?; (2) once selected for inclusion, how should information be updated?; (3) who should do the selection and inputting of information?; (4) how should knowledge be organized so it is easily understood and easily found?; (5) how can the system be designed so that people can easily add or access information?; (6) how should people be rewarded for adding their knowledge to a knowledge base so that others can access it?; (7) how should people be rewarded for using the system? (Marsick and Watkins, 1999).

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And a number of specific factors are playing a role in the quality of electronic knowledge systems: speed; simple log in and log out; user friendly navigation (surfing); good and simple search method; convenience in feedback; linking from knowledge to professionals: pointers to competencies of employees; actual and correct content (Bertrams, 1999). Two limitations of this repository view of knowledge management can be mentioned (Ackerman, Pipek & Wulf, 2003). First the transferred information is decontextualized, and this makes it not easy to apply to a current problem or situation without the help of experts. Ambiguity can only be overcome in face-to-face communication or interactions. Second ICT systems are not appropriate for the codification of tacit knowledge. Access to other people and/or experts is indispensable. In addition to ICT systems to exchange tacit knowledge underline expertise sharing, that focusses on the human components – the cognitive, social, cultural and organizational aspects of knowledge work – is needed. In relation to this Cohen and Prusak (2000) mention the importance of social capital, a company's 'stock' of human connections such as trust, personal networks and sense of community. Self-organized activities of organizations' members need full attention because sharing tacit knowledge requires face-to-face interaction and informal learning processes (Brown & Duguid, 2000) such as dialogue (Isaacs, 1999), apprenticeship (Lave & Wenger, 1991) and storytelling (Orr, 1996), of the kind that communities can provide.
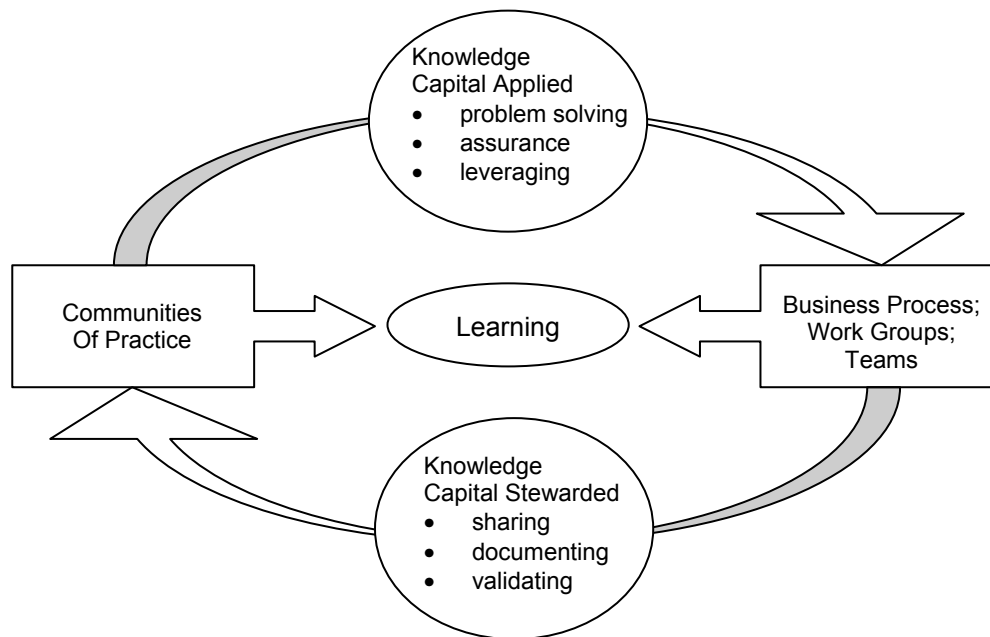
Communities

A community is based on shared activities and a shared need of knowledge (Huysman en De Wit, 2002). Communities differ from teams. Teams are accepted and structured entities within an organization, which is not necessarily the case with communities. Apart from that, the make-up of communities may change, while the structure of teams often is fixed. Three types of communities may be distinguished, i.e. communities of interest, communities of purpose and communities of practice. Communities of interest develop because of a shared need for knowledge. They evolve organically around special issues, they surpass divisions, and whoever is interested takes part (Huysman en De Wit, 2002). Communities of purpose are temporarily set up by management to accomplish a specified task. Communities of purpose often consist of professionals that are specialized in a certain domain (Iske, 2002). A project team is a good example of a community of purpose. Communities of practice are organized around shared practices and actions (Lave en Wenger, 1991; Wenger, 1998). Examples of communities of practice at work are technicians that serve copiers for the same company (Orr, 1996), midwives that work in the same village, and butchers that work in the same factory (Lave & Wenger, 1991). Wenger (1998) says: 'Communties of practice are an integral part of our lives. They are so informal and so pervasive that they rarely come into explicit focus (p 7). Wenger, McDermott and Snyder (2002) describe communities of practice as groups of people that 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 a ongoing basis. A community of

practice is a unique combination of three elements: a *domain* of knowledge, which defines a set of issues; a *community* of people who care about this domain; and the shared *practice* that they are developing to be effective in their domain. Wenger, McDermott en Snyder (2002: 27, 28) describe these three elements as:

- The *domain* of a community of practice creates the common ground and a sense of common identity. A well-defined domain legitimizes the community by affirming its purpose and value to members. The domain inspires members to contribute and participate, guiding their learning and giving meaning to their actions. Knowing the boundaries and the leading edge of the domain enables members to decide exactly what is worth sharing, how to present their ideas, and what activities to pursue. The existence of the community of practice is bound to the importance attached to the domain by its members. Once the domain loses its value the community of practice will cease to exist.

- The *community* creates the social fabric of learning. A strong community fosters interactions and relationships based on mutual respect and trust. It encourages the willingness to share ideas, expose one's ignorance, ask difficult questions, and listen carefully.

- The *practice* is a set of frameworks, ideas, tools, information, styles, language, stories, and documents that community members share. Whereas the domain denotes the topic the community focusses on, the practice is the specific knowledge the community shares, and maintains. When a community has been established for some time, members expect fellow members to have mastered the basic knowledge of the community. This body of shared knowledge and resources enables the community to proceed efficiently in dealing with its domain.

According to Wenger, McDermott and Snyder (2002) a community of practice is more than a website, database or a collection of best practices. It is about people that interact, learn together, build up relationships, while developing a sense of belonging and mutual commitment in the process. Working with others that share your overall view of the domain and nevertheless express their individual views on any given problem contributes to creating a social learning system that goes beyond the sum of its parts. Interpersonal realtionships are important. Knowing each other makes it easier to ask for help: you know who is likely to have an answer and you can feel confident that your request is welcome. Isaacs (1999) speaks of a dialogue here. During a dialogue experiences, mental models and skills are shared, which creates a collective intelligence - people together arriving at a shared understanding of a problem and a collective solution that combines the ideas of many people. In line with these observations, as far as knowledge exchange and learning is concerned, two main functions of communities of practice may be distinguished. On the one hand, a community of practice is a living context that can give newcomers to an organization access to competence and also invite a personal experience of engagement by which to incorporate that competence into an identity of participation. Communities of practice are a priviliged focus of acquisition of knowledge. On the other hand, a properly functioning community of practice in an

organization is a good context to explore radically new insights without members being made fools of or getting stuck in some dead end. A history of mutual commitment to a joined enterprise is an ideal context for this kind of leading edge learning, which requires a strong bond of communal competence along with a deep respect for the particularity of experience. When these conditions are in place, communities of practice are a priviliged locus for the creation of knowledge (Wenger, 1998: p. 214).

Figuur 2. *The multimembership learning cycle (Wenger, McDermott & Snyder, 2002, p.19)*

For a knowledge creating organisation is essential that its knowledge, the communities (of practice, purpose and interest) and the business process should be carefully geared to each other. In a knowledge creating organization there is a strong entanglement between the communities (of practice, purpose and interest) engaged in knowledge and the business processes in which knowledge is applied. This is also called the 'double-knit' organization (Wenger, McDermott en Snyder, 2002). Practitioners that function both as community members and operational team members connect the competence of communities with the need of knowledge of teams and business units. In this respect a community differs from a centre of excellence, where specialists develop knowledge without being themselves involved in line operations. This 'multimembership' creates a learning cycle (Fig.2). Community members that also function in a team exchange with their community any skills they have acquired and any problems they have encountered in the team. Any newly acquired skills and solutions for problems are added to the 'practice' of the community and any unsolved problems may be discussed in greater detail. Subsequently, armed with new knowledge and possible solutions, the community members return to their team.

In this time of shifting market needs Wenger, McDermott en Snyder (2002) even see communities of practice as 'foundation structures' of knowledge creating organizations. Communities of practice are organized around knowledge domains and connect people from different units that are working in projects related to this domain. When teams, projects, markets, and formal structures organized around products and services are constantly changing, the domains of communities of practice and their informal voluntary structures may continue to exist, thus creating stability in an organization.

Controllability of communities by management

Communities are hard to control since the development of situated knowledge often occurs unconsciously and unplanned. Communities may be looked upon as strong informal connections for knowledge exchange. Managers, on the other hand, who are often focussed on formalized working and learning processes, tend to be less attentive to the development of knowledge occurring in daily interactions. Communities are a great challenge to management. They often depend on initiators that have to meet specific requirements. Since the life of a community often depends on the interest that the individual members have in it, they are hard to handle as a management instrument (Huysman & De Wit, 2000).

Though communities of practice are essentially informal and self-organisatory in nature, they will profit by cultivation and react to attention that respects their character: "You can't tug on a cornstalk to make it grow faster or taller, and you shouldn't yank a marigold out of the ground to see if it has roots. You can, however, till the soil, pull out weeds, add water during dry spells, and ensure that your plants have the proper nutrients. And while you welcome the wildflowers that bloom without any cultivation, you may get even more satisfaction from those vegetables and flowers you started from seed." (Wenger & Snyder, 2000, p.143).

In the literature different ways to cultivate communities of practice are mentioned (Wenger, McDermott & Snyder, 2002; Wenger & Snyder, 2000; Cohen & Prusak, 2001). To identify communities or get them off the ground and preserve them in the course of time, managers should be keen to identify potential communities of practice that may enrich the strategic possibilities of an organization. Managers may offer an infrastructure that supports communities and enables them to apply their expertise effectively. Communities of practice are vulnerable: they are not legitimate and lack the budgets of established departments. In order to let communities fully flourish they might be incorporated into the 'business' and given specific support. One way of supporting communities is to provide them with official sponsors and supported teams in order to put tools and co-ordination at their disposal. Another way is to make infrastructure available such as experts from outside the organization, travelling facilities, meeting facilities and communication technology. An additional stimulus will be to recognize the efforts put in by employees for the benefit of communities. It is also important to support communities in paying attention to their added value. To achieve this, it

will be necessary to support communities in their need to create events, activities, and relationships that help their potential value emerge and enable them to discover new ways to harvest it. The best way for a manager to estimate the value of a community, is to listen to the stories of its members, which can be collected systematically. Davenport and Prusak (1998) point out that outside people are often attracted to write down these stories. The employees themselves are often "too busy", are under time pressure or want to go on with their work. Employees' contributions are often restricted to what takes little effort and time. It is also important to support the creation of the rhythm of community events such as regular meetings, Web site activity and informal lunches.

Method

Research question

Although at present knowledge management, ICT and communities receive much attention, there has been little research into the value <u>the combination</u> of ICT and communities may have for knowledge management in practice. From the theory (Wenger, 1998; Wenger, McDermott, & Snyder, 2002; Ackerman, Pipek & Wulf, 2003) it becomes clear that communities that offer access to experts and direct contact between people at work can foster the exchange of tacit knowledge that the ICT systems of S Ltd. cannot offer. Therefore in this paper the following research theme will be explored: does attention for the combination of an ICT-system and different communities (of purpose, interest and practice) enhance the use of the ICT system and in this way preserve the passion for knowledge of the engineers of S Ltd.? Or: How can a knowledge intensive organization shape knowledge management with the aid of both ICT and communities? To answer this question we will ask ourselves: What kind of communities exist in S Ltd. engineering? How do these communities support the process of knowledge management in S Ltd. engineering? Can these communities encourage the use of the ICT system e-Knowledge? Can these communities be managed?

Selection case and respondents

The headquarters of S Ltd. has its seat in Germany. Most products that are sold in the Netherlands are developed and produced in Germany. More than half of the company's added value in the Netherlands is derived from project management, knowledge, advice and engineering, hardware and software development, manufacturing and assembly. A further contribution is made by logistics, training, installation and setting up of new machines, service, maintenance and repairs. In addition to selling products, S Ltd is specialized in providing total solutions. As a company S Ltd. has been interested in making workprocesses more efficient by implementing a knowledge landscape e-Knowledge as well as by developing and sharing knowledge about communities of purpose, practice and interest. Since

e-Knowledge has not yet been fully used by engineers, S Ltd. is interested in the potential of communities to make the engineers more motivated to use e-Knowledge.

Within S Ltd. the research was done in two engineering departments of their Netherlands office at the Hague, i.e. the department of Chemistry, Food and Luxury Foods, Paper (CVP), and the department of Water and Infrastructure, Oil and Gas (WOG), which together have a staff of 50 engineers.

For the purpose of this research six projects were selected, i.e. three projects in the department of CVP and three projects in the department of WOG. Selection criteria were the availability of ongoing projects and the time available for observations. Another selection criterion was the presence in each project of newcomers and experienced engineers. From these projects four lead engineers and eight engineers were interviewed. From the eight engineers five were experienced engineers and three were newcomers. In addition, four lead engineers and three department heads were interviewd. Outside the projects 2 project leaders in knowledge management were interviewd, one stationed at The Hague and one stationed in Brussels (the Belgian office of S Ltd.).

All fifty engineers of CVP and WOG were involved in the evaluation of the Simatic community. The questionnaire was sent by computer to the engineers and after recall 37 questionnaires were sent back, which makes a response percentage of 72%.

Procedure and instruments

In order to gain an insight into knowledge processes in the community of practice of engineers, data about knowledge sharing between engineers on the projects were collected by interviewing engineers, project leaders and department heads. Besides, the new Simatic community was evaluated by means of an electronic questionnaire.

- For interviewing the engineers an interview guide was used that contained two sections. One section consisted of topics based on the conceptual framework of communities of practice, developed by Lave and Wenger (1991)[2]. These data show how beginning engineers acquire experience while participating in, and becoming members of, the community of practice of engineers. They illustrate what experiences, materials, and corporate culture, in brief what 'practice' engineers experience at S Ltd's, and how they become competent engineers. The second section contained questions on such topics as knowledge sharing, e-Knowledge, communities and projects. These are typically the elements from the engineers''practice' in which the emphasis is on knowledge.
- The interview guide for the department heads was based on the knowledge processes from Weggeman's knowledge value chain (Fig. 1). The different knowledge processes were the topics from the interview guide. The Management were asked what they thought these knowledge processes should be like for the work of the enigineers.
- The questionnaire used to evaluate the Simatic Community contained questions about the contents of the e-Knowledge system, and about the contacts of the engineers in and

outside the department. Other questions were concerned with knowledge processes such as questions about data collection, data codification, and data validation.

Results

The knowledge streams within S Ltd. engineering

Within S Ltd. engineering several initiatives are noticeable in knowledge processes. In Figure 3 the knowledge landscape (grey cylinder), the taskforces (= core teams), the projects, and the communities (of practice, purpose and interest, see grey rectangle) can be distinguished. In this paragraph we will describe how these initiatives connect and how they can support each other. The description is based on the data collected in the interviews with the two project leaders in knowledge management. It outlines the possible knowledge streams within and between the different departments. Some of these knowledge streams are already being put into effect within S Ltd. engineering, such as the formulation of skills (a knowledge chart listing the knowledge and skills of engineers), and the updating of skills when a course or project has ended. Other knowledge streams, such as the verification of best practices, have not been put into effect but are deemed desirable. The main assumption of Figure 3 is that knowledge is stored in the knowledge landscape and in the communities of practice, purpose and interest, thus making it available to all projects. This is the meaning of the fat grey arrow pointing downwards from the knowledge landscape to the projects. The projects are also in touch with the communities of practice, purpose and interest through its members, the engineers. The engineers working on a project may also be members of a task force or core team, so that the expertise of the core teams will flow to the projects. In this way the communities of practice, purpose and interest are accessible to all engineers of EPI ENGI (= S engineering). Depending on the goals of a community and the confidentiality of the matters exchanged or developed in a community, it may be decided to accept members from other divisions of S Ltd. outside The Hague.
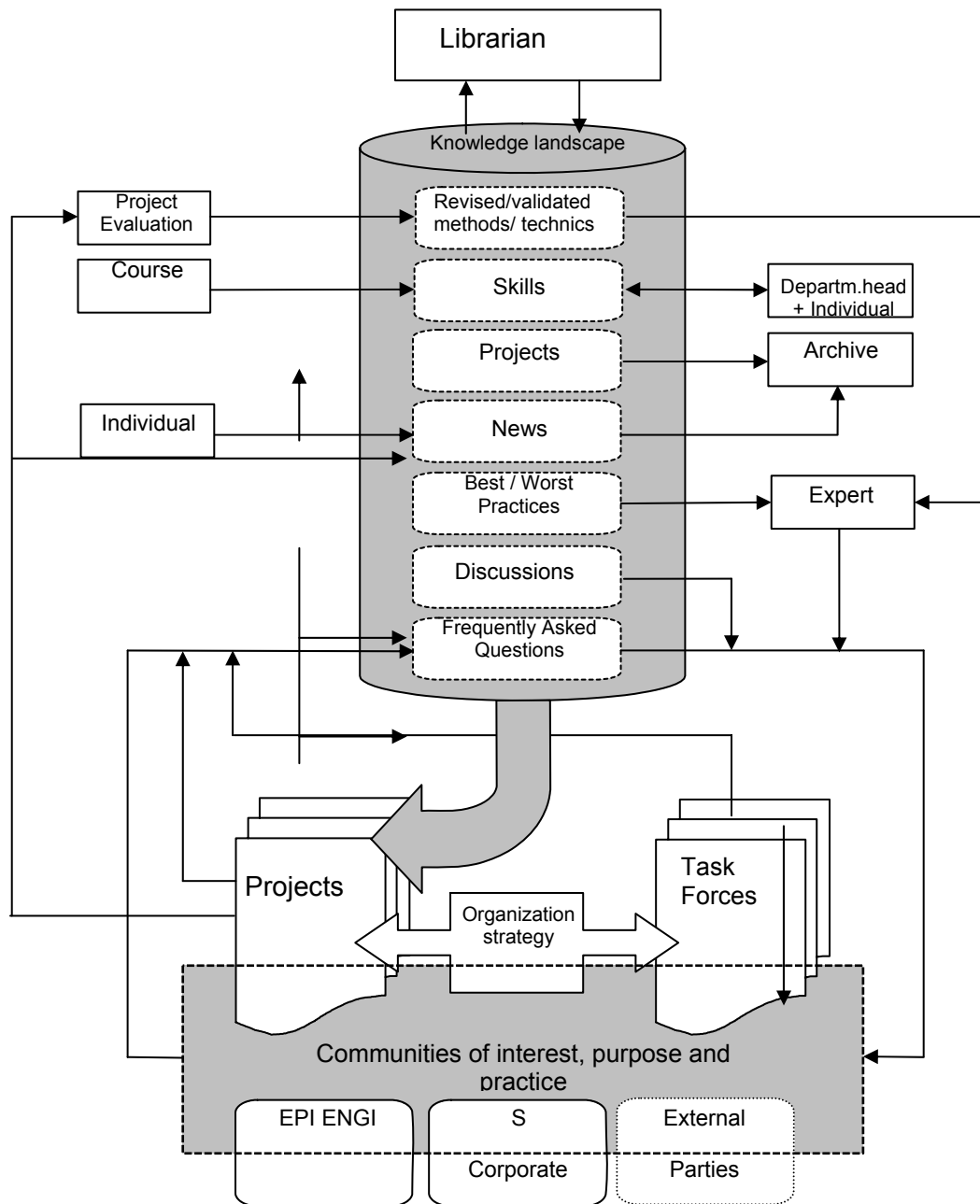
Figure 3. *Overview of the knowledge streams within S Engineering*

Another option is to involve external parties such as suppliers or customers in a community. The boundaries of a community are vague since the dimensions of a community are independent of the organization. The knowledge landscape e-Knowledge has been developed to support the projects. One of its aims is to provide projects, communities of purpose, practice and interest as well as task forces with a platform for storing and exchanging information. Another aim is to give individual engineers a chance to bring up a new item or to start a discussion, though an engineer is more likely to do so in the context of

the project he is working on or the community of practice, pupose or interest he happens to be a member of. After having acquired new knowledge by taking part in a project or a course, the engineer will bring his skills (a knowledge chart with the knowledge and skills of the engineers) up to date. In this way any new knowledge will be accessible to all projects. As soon as the projects are ended, they are evaluated and subsequently included in a list of finished projects. From these evaluations best and worst practices may be derived, which are included in the knowledge landscape.

It may also be decided that certain methods or techniques are so good that they should be applied on other projects as well. Engineers hold the view that only the experts, the highly experienced enigineers, are qualified to revise submitted best practices and good methods and techniques for inclusion in the knowledge landscape. The official appointment of an expert for revision and validation is still a difficult issue. It is possible to include the revision task in a job description. Another option is to leave this task to experts that are interested and motivated to do the revision task on their own accord. To structure this process, however, a 'knowledge coordinator' or 'librarian' should be appointed. It will be the librarian's duty to deal with anything that happens within the knowledge landscape and to keep up to date with the developments in the knowledge domain within his department. This 'knowledge coordinator' will be put in charge of revising and validating any new knowledge in the knowledge landscape as well as updating the knowledge landscape of the communities of practice, purpose and interest. If necessary, he relies on the knowledge of experts. Revision and validation involves deciding on any new item whether it is interesting enough to be admitted to the knowledge landscape. Existing items have to be revised regularly to see if they are still valuable, and if not, they should be removed from the knowledge landscape. A second type of librarian is the system manager. He is the person in charge of the technical design and ICT support of the knowledge landscape.

The task forces (core teams) of the communities of practice, purpose and interest can be made responsible for preparing an overview of the Frequently Asked Questions within their knowledge domain. Questions about the Simatic Community, for example, are not relevant to a community that is engaged in project management. This is another reason for linking specific items of the knowledge landscape to specific task forces and communities. In practice this means that every group needs its own (protected) knowledge environment. Within e-Knowledge this is the virtual team environment, which is named flexteam.

The communities of purpose, interest and practice within S engineering

Within S Engineering Ltd. three types of communities may be distinguished, arranged in an order of decreasing formal structure and controlabillity by management, i.e. the Community of Purpose, the Community of Interest and the Community of practice. The groups involved within S Engineering Ltd. are the core teams, the Simatic Community and the Community of practice of engineers respectively. The Community of practice of engineers

is characterised by their 'practice', the way in which the engineers work and communicate. This determines the knowledge processes and learning processes within S engineering.

The community of purpose: the core team

Within S Engineering the core teams are the communities of purpose. The core teams are engaged in the improvement of specified things or themes, such as offers, the coordination of assignments, work methods, products and systems, support of utilities or support of e-Knowledge.

According to recent research within CVP (S Ltd., 2002) the engineers believe that the core teams improve knowledge sharing and standardization, resulting into savings in costs and time. Yet the core teams still have to assert themselves because:
- The projects take a higher priority than the core teams. Since the projects are often more expensive than estimated, the time set aside for core teams is often used for projects.
- The fact that engineers often work with clients outside S Ltd. makes it particularly hard for core team members to find time to meet face-to-face.
- Members of core teams are assigned by management on the basis of their experience in a certain domain. Though this may seem a logical choice, an engineer may no longer be interested in this domain.
- Not every engineer is as enthousiastic and interested to take part in a core team. Less interested core team members see this work as a necessity.

The core teams are a suitable instrument for management to influence the knowledge processes within S engineering. Core teams are very formal. They can be set clear objectives, such as to validate items from the knowledge landscape that are older than one year.

The community of interest: the Simatic community

The Simatic community is the only existing community of interest within S engineering. At the moment there is a second, more recent initiative, the Teleperm Community. This community relates to older PLC systems that are set up within S engineering. The initiative to start the Simatic community has come from the engineers themselves. Some of them had already been working on a mail service, in which they sent members e-mail with information about new products, tips and tricks and so on. These engineers expressed the need to structure their activities in a community. First they formulated their objective, target group and domain: "Quicker and better access to the information you need in everyday routine". To enhance its value the engineers sought to make this community cross divisional. Its field of activity is development tools. The name Simatic was derived from the Simatic product group, which covers all matters concerning the community. Next the Simatic community asked management for its approval and for a place within e-Knowledge (a flexteam) in order to collect information for the Simatic community. Management approved of a 'flexteam' for the

Simatic community, to which only the engineers of the CVP and WOG departments have access. Interested people from other departments may get a (temporary free) licence. In order to secure more resources for the Simatic community within S Ltd. and to increase its surplus value for the company, new members were also recruited, not only within the engineers' project team and within their department, but also from other departments and divisions. This community of interest makes it possible to acquire external knowledge and apply it on projects. Fom EPI ENGI this flow also runs to other departments of S Ltd., which may work out badly for certain tools that took EPI ENGI a lot of time and money to develop. For that reason management laid down the condition that these tools should only be available to the engineers. A second condition was that the surplus value of the Simatic community should be evaluated after three months. In order not to discourage the initiative, the management decided not to impose any further restrictions. The members of the Simatics community were held fully responsible. At present the Simatic community is still developing. The community's co-ordinators seek to enlarge its membership list, in order to increase the number of contributions to the flexteam. They also think about organizing face-to-face activities, which have not been realised yet. So far the members of the Simatic community have only communicated by way of the computer.

As part of the empirical research done for this article the Simatic Community was evaluated after one month. Most of the engineers (29 out of 37 respondents) of the CVP and WOG departments appear to know about the activities of the Simatic community. Thirteen engineers use the flexteam of the community on a daily or weekly basis. Though the quality of the contributions and information in the flexteam is considered to be good, the number of contributions leaves something to be desired. Another point is that not all contributions are easy to find. A very positive point, however, is that in a few cases information of the flexteam has already been put into effect. No longer having to answer the same questions again and again is seen as a possible advantage in the long run.

At present the surplus value of the Simatic Community is restricted to the contents of the flexteam. For a few enigineers (9 out of 29) the Simatic community is a means to contact people in or outside their department. In the future more surplus value of the Simatic community is expected from members meeting frequently and tackling problems together. In the future these meetings might be used not only to exchange information but also to tackle problems on the pc. Further presentations about products and systems during these meetings is an item mentioned by the engineers.

The biggest obstacle for taking part in the Simatic community is lack of time. Enigineers see activities for the Simatic community as something extra rather than part of their daily work. For some engineers the accessibility of the flexteam on intranet is a problem. Only a few engineers that worked outside were able to connect with the flexteam. For members of the Simatic community outside S Ltd. the licence costs are an obstacle.

Communities of interest are highly autonomous. Arising from shared work-related interests, they develop their own goals. A community of interest enables experts to find each

other quickly, thus making it easier to develop new solutions and techniques. The informal nature of communities of interest makes it hard for the management to set them certain tasks, such as frequent validation of the contributions to e-Knowledge, to check their relevance. Of course the management can set up a core team to validate and clear e-Knowledge. Such a core team can use the expertise available in the community of interest when it is unable to validate a contribution by itself.

The power of a community of interest such as the Simatic community is that its members have joint interests outside e-Knowledge. E-Knowledge is only a means to an end. Several engineers of the Simatic community, for example, who had not contributed anything to e-Knowledge before, posted contributions to the flexteam of the Simatic community. This is why accumulation of knowledge and information in e-Knowledge has not been successful so far outside the flexteam of the Simatic community.

The community of practice: the engineers

The engineers form a community of practice. This community is less tangible than the Simatic community. A new engineer becomes a member of this community when he joins S Ltd. Socialization and learning in the community of practice of engineers occurs on the job. A new engineer learns by taking part in the daily 'practice' of the community, where he can observe colleagues and communicate with them, and work in a variety of situations. How fast a newcomer can develop into an experienced egineer depends on factors such as access to colleagues, the variety of work situations, the quality and availabillity of tools, resources, skills and knowledge needed in the work stuation.

In the introduction of knowledge management S Engineering decided on material knowledge bearers such as: hardware, software, documents and products. Initially there was no attention for any personal knowledge available in the heads of the engineers. By portraying the community of practice of the engineers, this article seeks to highlight the exchange of personal, tacit knowledge between engineers.

The role of communities of practice, purpose and interest in knowledge management

In this paragraph the role of the different communities is described on the basis of the adapted knowledge processes[3] from Weggeman's model (Figure 1): knowledge acquisition, knowledge codification, validation, knowledge sharing, knowledge application and reuse, knowledge evaluation. The data used are based on interviews with engineers and department heads. During the study it emerged that management and engineers had divergent needs and ideas as regards knowledge management. For this reason, the data about the communities of purpose, interest and practice are always preceded by data on what the management thinks about each phase of the knowledge chain.

Knowledge acquisition

<u>Management</u>

With respect to knowledge acquisition management attributes much surplus value to collecting knowledge from e-Knowledge.

<u>Community of practice of engineers</u>

For acquiring knowledge engineers have various tools at their disposal, i.e. manuals, the 'hotline' from S Ltd. (at the headoffice in Germany), a site with product support, news groups, discussion forums, e-Knowledge, and the modules and information on their own laptop. Any knowledge not available in S Ltd is acquired at courses or conferences, sometimes as part of a personal development plan. Acquiring knowledge is no problem for the engineers in S Ltd. since they form an open community, in which everybody is willing to share his knowledge with colleagues and explain it to them. On the basis of their personal network engineers know what person to contact if they want to know or learn something, making their decision on the experience and reputation of their collegues. Engineers strongly prefer contacting a colleague to consulting e-Knowledge. Since colleagues are not located far apart, this makes for an easy and quick exchange of knowledge.

<u>Communities of purpose and communities of interest</u>

Core teams acquire their knowledge through the engineers. These communities of purpose are highly suited for sharing knowledge across divisions and developing new knowledge. As far as the Simatic community is concerned, which is a community of interest, the acquisition of knowledge has so far been limited to the virtual team environment (the flexteam). In the future cross-divisional knowledge sharing is aimed for in order to involve other departments in the Simatic community.

Knowledge codification

<u>Management</u>

Management attaches much surplus value to the codification of knowledge through e-Knowledge. In this way knowledge will be preserved when engineers leave the department or S Ltd.. When it comes to translating implicit knowledge into explicit knowledge, the management team sets a good example by using a flexteam to promote the communication between MT (management team) members.

<u>Community of practice of engineers</u>

In contrast to managers, engineers assign little surplus value to the use of e-Knowledge. Engineers hold the view that, since every project is unique, reuse of knowledge is severely limited. Engineers also find e-Knowledge not user friendly and, besides, they think their own

work keeps them busy enough as it is. One engineer states that he doesn't codify all his skills because there are skills he doesn't want to use anymore, since he has been doing different work. For these reasons engineers hardly use e-Knowledge.

Communities of purpose and communities of interest

Core teams can play a big role in codifying and storing knowledge. This is presently done in the flexteam (virtual space in e-Knowledge) of the department concerned. In every department there are a few engineers that are actively involved in core team activities. The core teams are strongly department-related. The highly formal character of these communities of purpose allows management to set them certain tasks and objectives. This is more difficult with the communities of interest since they set their objectives themselves, within the strategy of the organization. Learning and securing knowledge in the flexteam of the 'new' Simatic Community has made a fairly good start. Contributions have been made by people that were not earlier active within e-Knowledge. The connection with the subject and the community feeling may in the future lead to codified knowledge being secured even better.

Validation

Management

The management is in favour of a structural approach to the validation process. It is suggested that someone be structurally allocated the task to judge the contributions in the knowledge landscape by topicality and contents. If in validating the items his knowledge should be lacking, he can resort to the core teams or to individual engineers having much knowledge in the field of a specific contribution.

Community of practice of engineers

Though there has so far been no systematic validation of items for the knowledge landscape, this has not led to any direct objections. It should be doubted, however, whether there is sufficient motivation on the part of the engineers to engage in knowledge exchange, since knowledge exchange is little used in the knowledge landscape. What has actually been designed, is the validation of the skills (knowledge chart) within the knowledge landscape. The engineering staff are themselves responsible for updating their skills, which are validated during a performance or planning interview with their department head. The reliability of this knowledge chart is sometimes disputed in practice. In spite of the directives on how to indicate the level of skills, some engineers label the classification of skills given by some colleagues as incorrect . After all, through their personal network they are also familiar with the skills of their colleagues. Engineers daily and unconsciously validate their implicit knowledge by observing how other engineers work and tackle problems. This particularly happens in the project teams.

Core teams (communities of purpose) can be appealed to for validation of all sorts of contributions in the knowledge environment that are relevant to the core team in question. It appears to be common practice for somebody to be appointed who is accountable for the contents and topicality of the knowledge medium. Within the organization S Ltd an engineer can be made responsible per medium (such as the knowledge exchange of a flexteam). Another way is to set up a separate core team that is to engage in all these validation activities. Within the separate communities of interest and communities of purpose this is usually arranged by the co-ordinator. He supervises the contents of the virtual team surroundings, approaching the members on validation whenever he doubts the topicality or quality of any contribution.

Knowledge sharing

Management

As far as sharing knowledge is concerned, the management also attributes a big role to the knowledge landscape and the flexteams. It has clear ideas as to how the knowledge landscape is to be approached according to a specific procedure. This includes raising much used best practices (BP) to methods and techniques (MTT) (see Figure 3).

Community of practice of engineers

When it comes to sharing knowledge within S engineering, it strikes one that engineers are highly willing to help a colleague. Whenever somebody comes around with a question or a problem, time is usually directly made available to help the other or at least answer him. On the issue of sharing knowledge outside engineering opinions of the engineers differ. A large part of the engineers and management fear that expensively developed knowledge and tools of S engineering will leak away to other departments. If this knowledge and these tools were used by these other departments, this would damage the competitive position of S engineering. This lack of trust acts as a brake on cross-divisional sharing of knowledge.

As to sharing knowledge through codification, engineers feel the need to know from whom a certain contribution or module (in e-Knowledge) comes. This has got everything to do with the quality of the module and the confidence and reputation the engineer concerned enjoys. Some engineers have the need to look at problems together and to see how the other handles them. In their view this would lead to faster and better solutions.

The acccessibility of intranet is a limiting factor in sharing knowledge through e-Knowledge. During the activities on location the intranet is often not accessible to the engineers. Besides, engineers often lack the time to engage in activities related to e-Knowledge. Sharing implicit knowledge mainly occurs during regular activities. Mentors are allocated to new engineers to help them find their way within the organization and acquire knowledge about it. To improve the learning effect for the new engineers, experienced and

less experienced engineers are put together on projects within S engineering. The same happens with the experienced engineers, where people from different specialisms are put together. So transfer of knowledge within S preferably occurs through face-to-face communication and socialization, i.e. the direct transfer of implicit knowledge. Explicit knowledge available in a system can support this process. Through the skills (a knowledge chart) available in the knowledge landscape it is possible to trace engineers that posses the knowledge desired. Within S engineering the scope of knowledge transfer through communication is limited to the direct environment of the project team and the department.

Communities of purpose and communities of interest

The members of the core teams (communities of purpose) periodically come together to discuss the latest developments in their 'field'. Their findings are communicated through the flexteam of the department. It might be useful for the future to combine similar core teams of the various departments or bring them into contact with each other. This will enable them to grow into cross-departmental and cross-divisional networks, in which knowledge can be developed and shared. Within the Simatic Community, the 'new' community of interest, sharing knowledge outside the virtual team environment has not yet come off the ground. This sharing is essential for building up a common history, which also enhances involvement with the community. People are easier to approach through e-mail or the virtual team environment if they have had physical contact earlier. The power of a community of interest lies in the involvement with subject or domain, which is a motivating factor. Besides, communities are eminently suited to bring together people of different departments and divisions on a specific topic. At present the co-ordinators of the Simatic Community are highly active in recruiting members outside S engineering.

Knowledge application and reuse

Management

The management believe that it is possible to apply and reuse existing modules. Though the projects are unique, within several projects for instance a drive mechanism or a crane is used. In this context the management also sees possibilities for standardization. "70% of all cranes are similar, it is the last 30% that makes a crane a dock crane." The same goes for the exchange of shared installations between projects.

Community of practice of engineers

Though engineers believe that every project is unique, a large part of them do not see the point of reusing existing modules of others. Moreover, they often prefer redesigning a module in order to make it better than the previous one, using the latest state of the art and their present knowledge. As to reusing modules of others, engineers point to the danger that, due to lack of insight, certain knowledge is not sufficiently understood or correctly applied.

According to the engineers, one might arrive at a kind of compromise whereby the working of the model is outlined, but for details contact can be made with the engineer that has brought in the module. Application and reuse of explicit knowledge within S engineering mainly occurs at an individual level. Via his laptop an engineer keeps his old modules and information of completed projects, knowing that they may possibly come in handy for future projects. Within the CVP department operates a core team that is engaged in centrally collecting them. Collective reuse of explicit knowledge is a more complicated matter. Not until the collected modules and information in the knowledge environment are accepted by the various engineers, have they become organizational knowledge and will they begin to be generally reused. In fact, the application of implicit knowledge occurs automatically, provided it is stimulated by a rich (working) environment in which there is collaboration with experienced colleagues and specialists.

<u>Communities of purpose and communities of interest</u>

The use and reuse of knowledge from the core teams (the communities of purpose) will mainly occur through the contents of the flexteam. The engineers may also approach the members of a certain core team with questions. This can be done through knowledge exchange, but also by directly contacting core team members. Whether the knowledge of the flexteam will be widely used by the engineers, will be dependent on the involvement with the core team concerned and the trust in the quality of the contributions. As to the reuse of explicit knowledge through the flexteam, the core teams depend on the quantity and quality of the items in this virtual team environment. In addition, these communities of interest and purpose are dependent on their position in the organization. Though the Simatic community has officially been affirmed, it is still no crucial unity; the use of the community and the number of engineers involved should still be expanded. Not until the members of the community physically come together and thus learn from each other, will the application of implicit knowledge of other engineers come off the ground. Though for the Simatic Community these meetings have not yet been worked out, the members of the core teams do meet periodically.

Knowledge evaluation

<u>Management</u>

The management sees possibilities for evaluating applied knowledge and the newly developed tools through description of best and worst practices once a project is being completed.

<u>Community of practice of engineers</u>

The evaluation of applied knowledge within S-engineering has not yet been given concrete shape. What is done, however, is that compliance with quality standards within a project is

checked by means of a project audit. According to a few engineers, a possibility to evaluate the application of existing knowledge in practice is looking over the shoulders of the person that reuses the existing module or knowledge.

Communities of purpose and communities of interest

Feeding back the applied knowledge to the core team makes sense, in particular, if what comes out of this knowledge is at odds with the ideas and experience of the engineers. To secure the contents of the flexteam, new findings and experiences ought to be fed back. As to the application of knowledge from the community of interest, a similar approach might be adopted. This also depends on the needs of the members of the Simatic community.

Conclusions and discussion

An important assumption of this study is that with knowledge management two forms of knowledge have to be taken into account. On the one hand, there is explicit knowledge, which can be transferred with the help of an ICT system and, on the other, there is implicit knowledge, which is expressed in the experience and skills of engineers and which is acquired, in particular, in professional practice. For knowledge management this means that pure technology led knowledge facilitation is insufficient. Yet so far S Ltd has put much emphasis on managing explicit knowledge e.g. with the help of e-Knowledge. In the empirical research this one-sided attention to managing explicit knowledge is found back in the views taken by management on the use by engineers of the knowledge landscape e-Knowledge. As a result the knowledge landscape has hardly been used by the engineers to share their knowledge. It emerges from literature that communities (of practice, purpose and interest) can play a central role in the knowledge management of both implicit and explicit knowledge, because they offer opportunities to expertise sharing and informal learning through working together with experts and/or workers with much experience (Wenger, 1998; Wenger, McDermott, & Snyder, 2002). This paper focusses on the question if attention for the combination of an ICT-system and different communities (of purpose, interest and practice) can enhance the use of the ICT system and in this way preserve the passion for knowledge of the engineers.

Research has been done in two departments of S Ltd to find out if this is the case in these departments, what role the various sorts of communities play in knowledge management and how the functioning of these communities can be further improved, also in the light of the fact that too little use is made by the engineers of the recently introduced knowledge landscape e-Knowledge

The engineers of two engineering departments of S Ltd make up a *community of practice*. They work together in projects. During their work they consult on how to deal with problems, exchange knowledge or develop new ideas. Young engineers learn from their older and experienced colleagues, who in turn learn from one another since they are specialized in

different areas. Engineers pass on implicit knowledge to each other during practical work, sometimes consciously, sometimes unconsciously. S Ltd might encourage implicit knowledge transfer further by making the engineers more aware of this process and by bearing in mind, when setting up project teams, that these should at any rate include both inexperienced and experienced engineers with different specializations. According to Nonaka & Nishiguchi (2001) crossfunctional teams (of engineers) encourage knowledge exchange through dialogue. Engineers' mental models and skills are converted into common terms and concepts by means of two processes. Engineers share the mental model of others and reflect and analyze their own. Ackerman, Pipek & Wulf (2003) mention this as expertise sharing. To create crossfunctional teams the knowledge chart in e-Knowledge can be used. The engineers are a highly open community, in which everyone is willing to exchange knowledge with each other and to help others. This good atmosphere, by Nonaka & Nishiguchi (2001) labelled an atmosphere of 'high care' is a basic condition for knowledge exchange between employees. The trust that develops in such an atmosphere is the basis for active empathy (assessing and understanding what the other truly needs based on broad acceptance of the emotial lives of others) that is essential according to Von Krogh, Ichijo & Nonaka (2000) for establishing good working relationships – and good relations and in turn lead to effective knowledge creation. This openness can be further developed by compiling success stories of helping and support. These stories should be specific enough to include the point in the process at which the support was given, the nature of the support, and its positive result (see also Orr, 1996; Kleiner & Roth, 1997). Giving the engineers - now physically separated from each other per project - a greater view of each other's activities by removing the partitions between them, could further stimulate this openness. A very positive point is that the principle of multimembership (see Figure 2) is applied at S Ltd. This means that, while working on projects in practice, engineers are also members of several communities (of interest and purpose), with which they exchange knowledge and skills. Moreover, they have e-Knowledge, with which they can exchange knowledge. So within the community of practice of engineers the (implicit) knowledge and skills of the experienced engineers are shared with colleagues during work. In this way knowledge can continuously be secured at S Ltd . If this process proceeds properly, the departure of one engineer does not really matter, since there are always one or more engineers left that have (part of) the expertise of the departing colleague. Besides, it may be arranged that the exit talk held with every departing engineer is attended by an experienced engineer. Engineers prefer exchanging knowledge orally to sharing explicit knowledge through e-Knowledge, the reasons given for this being that in their view most knowledge used in projects is unique; reuse of knowledge without consulting the expert that created it may cause wrong application of this knowledge in practice; intranet is not always accessible when the enigneers work outside the company; e-Knowledge is not user friendly and up-to-date and that engineers just like to develop new knowledge and their own solutions. They believe that the use of e-Knowledge can be improved by indicating for best practices and modules which engineer supplied them, because knowledge from an engineer

with a good reputation is eagerly reused. The importance of a good reputation has also been mentioned in the literature (Davenport and Prusak,1998; Cohen & Prusak, 2001). What is also needed, is a good validation of new knowledge that is stored in e-Knowledge. Modules should not be too specific since they must only contain knowledge that can be reused. It is also essential that e-Knowledge become user friendlier and more accessible and that the knowledge it contains be relevant and kept up-to-date. At this moment finished projects are evaluated insufficiently or not at all, due to lack of time. A possible solution might be to set up a core team that is occupied with this task, for instance by constructing histories of the course of the various projects and making them available through e-Knowledge as fast as possible (see also Wenger, McDermott and Snyder, 2002; Huysman and De Wit, 2000). It is concluded that e-Knowledge from S Ltd. lacks a number of essential conditions for a good functioning ICT knowledge system mentioned by Marsick & Watson (1999) en Bertrams (1999). The preference of face-to-face communication of the engineers should be further facilitated by the management through offering time and 'natural' places for communication to exchange experiences, tell stories and engage in social talk (Cohen & Prusak, 2001).

Further a close look was taken at the role of various kinds of communities in the process of knowledge management by S Ltd.

The great value of *a community of interest,* for instance the Simatic community of S Ltd., lies in the engineers being focussed on sharing their knowledge and information with each other. To allow them to do this easily from their workplace, the engineers have at their disposal a sheltered knowledge environment on e-Knowledge, the flexteam. Such interaction in a virtual place is also mentioned by Nonaka, I., & Nishiguchi, T. (2001). That engineers who are members of the Simatic community are increasingly more willing to put their knowledge into e-Knowledge is due to the interests of the engineers themselves. Engineers that were not active in e-Knowledge earlier, now do use the virtual team environment, the flexteam, which also satisfies the management's wish to make knowledge independent of individual persons and secure it in a system. The processes involved in knowledge validation also come under the responsibility of the Simatic community. The engineers jointly see to it that the contents of the virtual team environment remain up-to-date. Should the domain of the Simatic community no longer be relevant in the long run, it will simply cease to exist.

What makes the *communities of purpose*, such as the core teams in S Ltd., valuable to management is that, unlike communities of interest and communities of practice, they are fairly easy to direct and control. Management should preferably facilitate only the latter two types of communities. The added value of core teams is that, on the one hand, they are highly suited for knowledge exchange between departments and, on the other, that using their specific knowledge they can validate any contributions supplied by communities of interest for inclusion into in e-Knowledge. A co-ordinator (or core team) might be appointed, who is to be made accountable for the contents in the knowledge landscape, and who allocates to certain core teams any new knowledge to be validated.

It is the *task of management,* in particular*,* to encourage, support and facilitate community initiatives and, if possible, to direct them. Support may be given e.g. by providing time, physical space and cyberspace to already existing communities and to any new initiatives in this field, which may be further directed by setting up core teams with specific goals. Face-to-face contact appeared to be essential and preferred by the engineers of S engineering. So extra support of time and space for face-to-face communication, social talk, exchange of stories, and experiences between engineers to built connections and to strengthen commitment, involvement and trust must have priority in the support of knowledge and expertise exchange. This approach fits in the culture of 'openness' that already characterizes the community of practice of the engineers at S Ltd..

Reviewing the role of various kinds of communities in the process of knowledge management at S Ltd., we arrive at the following conclusions. The community of practice of the engineers has an important role in expertise sharing, the exchange of tacit knowledge; the Simatic community, a community of interest, plays an important role in motivating engineers, e.g. to use e-Knowledge and the core teams; finally, the communities of purpose play an important role in validating knowledge for inclusion into e-Knowledge and the dissemination of knowledge among departments. An essential result of this study, that adresses the original problem of S Ltd. that engineers hardly use the (new) ICT system, is that taking part in a community of interest based on their own interests seems to be a powerfull motivator for the engineers of S Ltd. to start using the (new) ICT system. This means that to preserve the passion for knowledge of engineers, the introduction of a new ICT system should include the possibility to form new communities of interest that are geared to the interests of the engineers.

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Endnotes

A Passion for Giving, a Passion for Sharing

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What is this special energy that drives us, as teachers and as researchers, to share our knowledge--and our questions--with others? Why do we engage in this uncertain exchange in which we give of our time and energy without knowing what we will receive in return, nor indeed whether we will receive anything at all for it? Where does this passion for our profession come from, what keeps stoking its fires—and what threatens to extinguish it? Current organizational theories of learning and knowledge do not provide ready answers to these questions.

Knowledge is often conceived of as a marketable good that can be paid for, stored, and accessed by third parties in a market exchange mode. In this mode, individuals only share their knowledge with others if they see a direct return on their action. It is an emotion-free process based only on the estimation of costs and benefits. But such a conception of knowledge has very little to say about our own experience of knowledge sharing, be it with our students, our colleagues, or other stakeholders. This mismatch may not be surprising because affective aspects have generally been neglected in the field for fear of the threat to rationality that 'passion' might represent (Scherer & Tran 2001: 369). However, by eliminating emotions—including passion—from the analysis of knowledge sharing, we risk excluding the essential meaning that the process holds for its participants. We need a different theoretical frame to help us understand the connection between the ways we share our knowledge and the way we feel about our profession.

The theme of the Trento conference on organizational learning and knowledge inspired us to explore interactions in a context where knowledge is the key resource and learning the raison d'être, namely academia. We decided to undertake this exploration with the help of gift exchange theory (Mauss 1923, 1950/1999). Having seen the usefulness of this theoretical lens in making sense of interactions within a French company (Richebé 2002), we were curious about what it might bring to light when applied in the academic community. How could it help us understand the dynamics, both positive and negative, of knowledge sharing in which we and our colleagues participate? The prospect of interviewing members of our professional community with a theory whose origins lay in anthropological studies of distant tribes intrigued us. Furthermore, studies on the behavior of modern academics have proven useful for generating insights of interest for the wider community, as well as providing very lively reading (e.g., Gersick, Bartunek & Dutton 2000). It seemed fitting to embark on a fun intellectual journey about a topic that means a lot to us personally for a conference entitled "A Passion for Learning, A Passion for Knowing."

This paper summarizes our work so far, it is a stepping stone in a journey we expect to continue. We describe the combination of approaches we have taken to tackle the challenge and then present some of the key findings and paradoxes that seem to be emerging. We conclude with questions and ideas for next steps.

Engaging in listening and reflection: The process

This project started out with a flurry of emails between us as co-authors and with creative and reflective colleagues[3] in different places. We were writing to each other about particularly satisfying aspects of our work as academics and particularly frustrating moments, and we were commenting on articles we had read or were in the process of writing. The advantage of emails over telephone conversations is that the flow of thoughts could be shared, reflected on and responded to across distances and over time, a crucial consideration when working internationally and on multiple projects in parallel. By writing to each other, we clarified what we wanted to do, how we could approach the task—and also what we wanted to avoid (namely lose the spirit of fun and adventure in this study by slipping into dry academic mode).

The exploration of the subject of knowledge sharing in the academic community became in itself a process of knowledge sharing. It entailed finding and sending each other articles and books on gift exchange theory, sharing our excerpts of the literature, and it entailed conducting conversations with colleagues who were willing to share their experiences with us. We used these two sources of knowledge—literature and interviews—in parallel but separately. The rich body of literature on gift exchange theory gave us ideas and sensitized us to what to listen for, but we did not want to bias our interviews. So, although we read the literature in parallel to conducting interviews, we consciously held it at bay by avoiding using terminology from the theory, and by not explaining to our respondents which theoretical framework would guide our analysis until after the interview had been completed.

So far, we have conducted nine interviews with academics in a social science research center in Berlin and a business school and university in Nantes. The sample includes women (3) and men (6); senior fellows and professors (3), mid-career academics (3); and young researchers (3). Their disciplinary backgrounds are social sciences (sociology, political science) and law. The interview guideline was simple: we started by asking our colleagues to think back to what they had been doing over the past week or two and to talk with us about knowledge-based interactions they had had in that period. We then branched out to explore memories of other interactions, to ensure coverage of as wide a range of types of interactions typical of academic life as possible, and to see the way knowledge interactions over time are connected with relationship-building processes. During the course of the interview, we followed up with questions about particularly satisfying interactions and particularly frustrating ones, and we asked what they enjoy about their work. If the issue of power and status did not arise spontaneously, we raised it, and if the use of the internet was not mentioned, we asked about it. The interviews took about an hour to an hour and a half. The French colleagues were interviewed in French, which both of us work in, and fortunately, the German colleagues accepted to be interviewed in English, so we did not have to translate the interviews in order to be able to analyze them together.

It is an unusual experience to conduct research within our professional community rather than "on" another organization in a different sector. The fact that we had background knowledge about activities and processes in the institutions made it easier for us to understand

them than is the case when we conduct interviews in organizations and industries we do not know. Although all but one of the colleagues we contacted agreed to be interviewed, usually quite enthusiastically, in the actual interview situation, several were visibly not completely comfortable with being taped and having their thoughts analyzed later. We transcribed all the interviews and sent them to the respondents to check, and a few followed up with additional thoughts via email. The level of interest many colleagues showed was stimulating, asking how things were coming along and what sense we were making of the interviews in a way that respondents in other settings do not usually do, because the researchers have left and returned to their offices. Each time a colleague asked what we were finding, it helped us to pull our thoughts together. Another dimension to this research experience that differentiated it from our previous projects conducted "on" other organizations is that we engaged in a great deal of self-reflection about our own roles, behaviors, and relationships in our professional communities. We saw our daily reality through different eyes as a result of trying to make sense of how our colleagues described their experiences.

The process of analyzing the interviews and linking them to the literature was an iterative one that involved shifting back and forth between putting the gift exchange lens on and taking it off again, like a pair of glasses. We wanted to see what the lens would help us discover and explain, while also keeping our minds open to the possibility that the lens could distort the reality our interviews contained. After having conducted and transcribed three interviews, we spent a day and a half together starting to draw out themes and checking back with the literature to see to what extent what we were hearing corresponded to the concepts and dynamics of gift exchange theory. We did not change the interview guideline after this first step of analysis, but it sharpened our hearing during the subsequent interviews and made us even more curious about what was to come. In the next phase of analysis, one of us summarized key points raised in each interview, and the other culled through the transcripts and excerpted passages under thematic headlines. When we met again to compare the data analysis, we found that our two approaches had generated a very closely matched coding of the data.

The glasses we looked through: Key ideas from Mauss' gift exchange theory

The concept of gift exchange is almost a century old, reaching back to the 1920s when Marcel Mauss was seeking to understand "the nature of human transactions in societies that surround us and directly preceded ours" (1950/1999:p. 148, our translation). At the time, he drew on his own observations of exchanges and contractual relations in different societies in Scandinavia, Polynesia, Melanesia and the American Northwest, and he also used studies by other anthropologists, especially Malinowksi's work on the Kula in the Trobriand islands in the Pacific.[4] Mauss noted that there were different dynamics between what he termed "gift exchange" and "market exchanges" and he was particularly interested in the Potlatch form of gift exchange, in which power, status and rivalry between tribes play significant roles. This

interest highlighted the existence of forms of gift exchange that could be destructive. Even though Mauss focused his research on distant societies, he stressed that the concepts could serve to analyze interactions within our societies. "It is possible to extend these observations to our own societies. A considerable part of our morals and our life is embedded in this same atmosphere of gift, of obligation and liberty being interlinked" (Mauss 1950/1999, p. 258, our translation). Scholars have in fact taken up this suggestion and studied the dynamics of gift exchange in modern Western societies, for example at Christmas (Lowrey, Otnes & Ruther 2004) and among venture capitalists in Silicon Valley (Ferrary 2003).

A key insight Mauss derived from his study of what he called "archaic" societies is that the gifts exchanged between tribes or individuals appeared to be freely given but they were actually connected to obligation. "The exchanges and contracts take the form of gifts, in theory voluntary, but in reality were given and returned under obligation" (Mauss 1950/1999: p. 147; our translation). He identified three social obligations underlying the dynamics of gift exchange: the obligation to give, to receive, and to return, but this dynamic must remain tacit.

According to Mauss certain key characteristics of gift exchanges distinguish them from purely market exchanges:

1. Gift exchange is embedded in a collective context. Individuals participate in gift exchange must have "a keen sense of themselves as well as of others" and must "take account of subgroups and society" in their actions (Mauss 1950/1999, p. 263, our translation).

2. Gift exchange is characterized by an apparent or declared disinterestedness of the participants. The gift exchange is done in a "noble way, in appearance disinterested and modest" (p. 176 our translation).

3. Gift exchanges take place over time, as a succession of credits and debts, rather than as a simultaneous event. "By definition, a shared meal, a talisman taken away, cannot be returned immediately. 'Time' is required for fulfilling all kind of counter-gift" (p. 199, our translation).

4. The exchange-dimension of the process must remain tacit. The receiver must act as though it were not an exchange, "as though he or she were only receiving" (p. 177, our translation). The return gift is not offered until later (e.g., at the next visit). If the gift exchange is done in a spirit other than one of nobility and generosity and signals an interest "in view of immediate gain, it is viewed with strong contempt" (p. 202, our translation), which implies a crisis in the relationship.

5. Gift exchange contributes to creating a connection between the actors, because the gift contains something from the giver that is transmitted to the receiver: "presenting something to someone means presenting something of oneself … accepting something from someone means accepting something from that person's spiritual essence, of their soul" (pp. 160-161, our translation.) The other side of the coin is that "refusing to give, neglecting to invite, just as refusing to accept, are tantamount to declaring war; it means refusing alliance and communion" (pp. 162-163, our translation).

6. Gift exchange involves power, status and face. "Competition, rivalry, display, the pursuit of grandeur and interests are the diverse motives that underlie all these acts" (p. 187, our translation).The choice of whom to give to--and whom to receive from--occurs within a social hierarchy. Power relations and status affect and are affected by gift exchanges.[5]

7. Gift exchange is not limited to object of economic utility and value. "It is above all polite gestures, rites, festivities…" (p. 151, our translation) and these are accompanied by emotions because "all that one receives with joy and presents with success …. all is a source of aesthetic emotion, not only of emotion of moral order or of interest (pp. 274-275, our translation).

While Mauss distinguished between the dynamics of gift exchange and market exchange, he did not see the two as incompatible. In fact, the existence of one is precisely what enables the other to occur. For example, gift exchanges occurred when one tribe arrived to sell products to another.

Numerous other scholars have continued to develop and apply gift exchange theory. It is beyond the boundaries of this paper to summarize their perspectives, some of which stem from disciplinary orientations, and others from national traditions.[6] One of the contentious issues worth mentioning here is role of self-interest and calculation in gift exchange. While Mauss stressed the importance of declared disinterestedness as a key distinguishing feature from market exchanges, he observed that the freely given, disinterested gift was in fact "only a fiction, a formality, and a social lie, when underneath it all, there is an obligation and an economic interest" (1950/1999:147; our translation). Lévi Strauss (1966) and Bourdieu (1980) indicate that the actors may not be conscious themselves of the dynamic, but it is the researcher's responsibility to lift the veil and make sense of the diverse logics underpinning the process. It is to our work as researchers in this study that we now return.

A first glance at the interviews:
how the respondents describe knowledge sharing

The first step here is to summarize the kinds of knowledge exchange processes that occur in the academic community with a view to establishing the relevance of gift exchange theory in this context. The interviews document that the work of academics is multifaceted and entails many kinds of knowledge-based interactions. Members of the academic community engage in exchanges for a variety of explicit and implicit reasons, and they do so in varied contexts, which are experienced as more or less conducive to knowledge exchange.

Diverse types of interactions and knowledge

All our colleagues told us that their past weeks could not be considered typical ones. For example, several were in the final stages of writing a large report and emphasized that usually

they had many more interactions than was possible currently, and they characterized this phase as "lonely" and the days as being "cruelly similar". Those with management responsibilities said that the very nature of their work defied the identification of a typical week:

The first typical thing is that I NEVER[7] do what I set my mind on doing when I am on my way to work. First, I say to myself, this is what I will be doing to today, and then, EVENTS begin to unfold and I am deprived of control.

They often lamented that such managerial responsibilities entailed knowledge exchanges without substance.

I would say that the knowledge that we DO exchange is in 90% of the cases not scientific knowledge, not substantive knowledge, it's administrative knowledge….In my life as an assistant: I would discuss substantive ideas, I would focus on my work, I would exchange ideas with others. NOW that represents a VERY minor percentage of my exchange with others…. here you are constantly juggling three or four balls, and you work in a highly fragmented fashion.

However, the diversity of interactions was also seen positively. One senior respondent explained that what he loves about his work is precisely the fact

that no day is like another and that during the course of a week you can do things that appear to be totally unrelated. And that you can meet many people, and that is intellectually stimulating.

The knowledge-based interactions mentioned in the interviews included: teaching and co-teaching, commenting on papers by colleagues or in blind review processes, advising younger researchers, working with co-authors, participating in academic management meetings, conferences and colloquia, conversations over lunch, meeting with managers in companies for projects and talking with journalists. One also mentioned a point raised by a taxi driver and another referred to learning from a child.

Diverse reasons for knowledge sharing

After listening to examples of knowledge-based interactions, we probed to see what motivated our colleagues to engage in them. A number of different reasons emerged, sometimes alone, sometimes in combination. a) The respondents see it as their job, their responsibility to do so (e.g,. reviewing articles for journals, correcting papers for students); b) they do it out of interest in the subject; c) because they need the knowledge from the other and learn from the interaction; d) they like the person involved; e) they feel it is fun to do.

A professor described his perception of what motivated academics to respond positively to his requests for contributions to the books and conferences he was organizing:

I must say that I HAVEN'T had any difficulties in getting the right people for the right place and right time because ***[8] if they are convinced about the usefulness

of the conference and the mixture of people and topics, then, normally, they
agree…. in the scientific community, you always have the effect that when
something new is being established, everyone wants to belong to that new
development from the very first moment.

Explaining why he is willing to respond positively to requests for comments on colleagues'
papers, a respondent highlighted the learning process:

I think it is a good training to get very fast into things and to get a sense or feeling
for papers to gain some, *** I think one can learn to criticize the papers and to
read them fast and to find the points, the weak points. And there is always a
surplus or a value added for me as well.

A doctoral student who teaches was emphatic about the pleasure:

I love TO SHARE … so I think … in this teacher-student relationship, I like the
contact. And then sharing knowledge in research is also about being in dynamic
collectives.

A combination of reasons is given for engaging in knowledge-based interactions with
companies:

here I really had to face some people who are telling me from the beginning what
you are doing is just theory and it has no effect for our companies. And then I
have to explain it … it was a good experience…. I think what they bring is ***
telling us what is happening inside their company and what are the problems they
face and *** also they make things more concrete. And I think it is important if
you want to talk to students about [topic x], it′s important to have concrete
examples.

The respondents mentioned bringing together different types of knowledge: sometimes the
interaction happens because one has specific skills or information that the other needs. In the
context of a research project, for example, a senior researcher explained

we have a division of labour. She is the expert in the details of these data and how
to organize them and the problems that come up from the data and codifying them
and so on, and I am in a way giving the idea of the question of the research.

Sometimes, for example in the context of a long-term co-authorship relationship, the
combination of two factors is mentioned: the need for different types of knowledge and a
personal dimension.

Why I think we need each other. First of all, because we like each other and have
a good personal relationship. I think that keeps us together. I think we need each
other because we like to do comparative work, and we don't have sufficient
knowledge about the other country.

The value of sharing knowledge across disciplinary boundaries was emphasized by all the respondents.[9] They highlight the fact that such sharing requires a certain mentality and a bridging function to be able to understand each other's ways of thinking.

> *I have a sort of *** translation function, translating *** in terms of methods and, what is most important, in terms of language….My experience is that you must FIND PEOPLE WHO REPRESENT IN THEMSELVES *** the willingness and the ability to TALK; TO WRITE AND TO THINK in an interdisciplinary way. If you can get THOSE people together, that is really a success but you don't meet them very often.*

Experiences are also a type of knowledge that respondents stressed sharing, sometimes adding that they do it via story-telling:

> *It's ALWAYS an exchange where the SPECIFIC MODE of experience of others adds important elements to my own understanding…. TELLING STORIES, really. We exchanged experiences WITH A VIEW TO MAKING SENSE OF IT, which we did in our separate ways, but after conversations.*

A respondent offered a rich metaphor to describe the need for drawing on different types of knowledge:

> *I have the feeling that every person gave something unique to this proposal and it was needed at a certain time and my feeling is that it always came at the right time. This is very subjective, it′s just my feeling how things came together but I think no other person could have replaced the other….I have the feeling that it was like, I don′t know *** a soup which couldn′t taste the way it tastes when someone′s contribution was missing.*

Overall, the interviews indicate a duality: the effective giving and receiving of knowledge requires both difference and commonality. The respondents highlighted situations in which there was a clear need for the other's different knowledge, and enough common language or common ground to be able to understand and use each other's knowledge.

> *I think it's the result of a combination of a certain openness on all sides, and cooperative attitude on all sides, a kind of necessity, not just voluntary action. A recognition that we need this forum for this unit to survive. Within that then, you have a very good mixture of people who contribute different things, analytically, or the way they discuss and combine ideas.*

There is an interesting difference between the reasons respondents give for engaging in knowledge sharing, and the picture that emerges from the stories they tell about situations in which they shared their knowledge with others. These reveal that the exchange entails not only the flow of skills, ideas and experience between the people involved, it is also about gaining recognition and self-validation. For example, several mention the satisfaction and pleasure they have in seeing their ideas have an impact and in receiving thanks from students.

And they are grateful. After 20 years they say "I am so happy I had this seminar with you". It's very emotionally rewarding.

Such recognition is linked to identity-building, and its importance becomes particularly visible in situations where it was absent or withheld. Several respondents described situations in which they had felt a lack of respect or gratitude after having given their knowledge to a person or a group.

It was destabilizing ... the way he formulated his comments [on my presentation]. Of course it affected me because I really have the impression of ... conducting my research in depth, of investing myself completely in it.

Diverse contexts for knowledge sharing

Knowledge sharing is at the heart of academic life, but our interviews show that academic settings do not all lend themselves well to good knowledge exchange. One colleague described how things should be in academia, then explained how different reality is:

The ideal world is that a bunch of people talk to each other, that they discover joint interests, that they agree to teach a seminar together, and that you then end up with three or four people who realize they have a common substantive interest. ... The typical example in German universities is that it immediately becomes detached from substantive meaning, it becomes a status symbol. Who gets the resources? Who forms a research cluster?... We have NEVER discussed a substantive idea

It is striking that in response to our question about examples of particularly unsatisfying or frustrating experiences with knowledge sharing in the academic community, most of the respondents brought up examples of academic meetings and formal events, the very events that are purportedly designed for knowledge sharing among colleagues or for students.

I am increasingly frustrated by formal meetings in academia…. Because, for one thing, they ARE formal, they talk to each other as if they are negotiating state treaties rather than exchanging experiences and information. There's a hell of a lot of tactics involved which bores me, and there is a MAXIMUM of terminology with a MINIMUM of experience.

Dissatisfaction was expressed by colleagues at all professional levels. The previous quotation came from the most senior respondent, and below a mid-career academic described what happened at an important research policy and planning meeting:

The meeting this morning… long lectures on things you don't want to hear. Very boring. A pseudo-debate about suggestions to improve a text. I used some words, [he] understood them as something TOTALLY different. Boring.

The examples of particularly good and rewarding knowledge exchange tended to be about informal situations, very often linked to meals.

The lunchtime meetings with [2 people from different departments] are always like small, creative (laughs) explosions…. It doesn't matter what we talk about, it's always interesting (laughs). This time, we were talking about writing styles and typical things in the writing process and whether people can only express their ideas by writing them down or whether they can think about writing and how this influences their work. It's all very practical on the one side, and philosophical on the other. It's a very good mixture. We're a good *** team for creating exchange.

The productive informal meetings often were linked to formal ones:

It [meeting of a professional association] is also successful because these people come together NOT only to attend a workshop, there are three who invite people to their HOME, there is not only catering or something like that. This creates an atmosphere of WORK which allows another style of communication than a normal workshop. I think it is very, very important to have these PERSONAL RELATIONS between people who REALLY want to bring forward a discipline.

At informal knowledge exchanges, participants were able to share knowledge that would not have been appropriate to share in a formal context.

I think the context is important. *** If you meet them [managers] for example at an interview maybe they would not have told me in this way [referring to breakfast conversation].

In other words, the existence of formal meetings, even if they are less effective for knowledge sharing, is what enables the occurrence of informal meetings. And the contrast between the two heightens the awareness of the value of the easy flow of knowledge in the informal context.

Some respondents characterized positive exchange environments as "clubs" or "clans."

That [college] was a PERFECT place for exchanging information. One met informally at lunchtime. There were so-called seminars which weren't really seminars because they were essentially invitations to outside speakers who would then present a case. Then there would be quite a LIVELY exchange, formally and informally, with a very large group present – up to 80. ... But [college] was a notoriously open club, and still is ... We were ALWAYS open and there were ALWAYS new people.

The club or clan concept was linked to the suspension of hierarchy and power, a feature that was mentioned frequently in connection with good knowledge sharing experiences.

the whole point about the club context is that you never show it. Some of them are also professors and heads of departments and so on, but, as members of the club, they are fellows. And,*** it is certainly NOT DONE to indicate that you either have or would like to have power. Which is not to say that it's not there. Obviously, it is there. I don't know. ***It works in very strange ways.

I come from a discipline where the question of stature and seniority is taken very seriously…. I think that here, typical for social science, is more informal and that also YOUNGER people who are BRIGHT and have good ideas are respected from the very beginning.

The informal and clan setting enables follow-up knowledge exchanges within formal settings.

*[Aluimni dinners] are particularly valuable because they enable you to have contact with environments you do not necessarily have access to under other circumstances, to key people in those environments…. Afterwards of course you feel much more comfortable with those people…. It [alumni group] is a kind of clan actually. ... We can request *** ummm *** whatever we want from each other.*

Each of the three most senior respondents brought up very positive knowledge sharing experiences in periods they had spent in a special setting, like centers of advanced study. They emphasized two dimensions: the ability to focus on their work, and the opportunity to meet and talk with a diversity of other academics. The following examples reveal the intensity with which these two professors spoke about these special academic contexts:

This was the most gratifying experience of my academic life… the freedom to focus on your work. A sequential mode of doing one thing at a time. I wrote five articles there. I worked like a madman practically from 7 or 8 in the morning to midnight, whenever I felt I had reached a satisfactory stage of my daily work. I had no-one complain, whereas in normal family life you have to have dinner at a certain time. I have probably never worked so hard in my life and I never experienced it as being alienating or hard. That was PURE self realization, pure fun and joy.

The greatest earlier opportunity was when I spent a year at the Center for ... I suppose that is, in a sense, the purpose of a center for advanced study. That's where I encountered the economists and was very close to them. That's where I encountered historians. It was an INCREDIBLE period of exchange. Those are environments which are created for INformal as well as semi-formal meetings.

Not all such periods were equally successful in stimulating knowledge exchange, however. One of the respondents remembered a disappointing period in one such center:

I stayed there for nearly a year, more than half a year, in these concrete buildings (the fashion of the late 60s) with a lot of famous people from different parts of the world. We came together, but nothing HAPPENED. There was no white steam like after habemus papam.

Attempts to impose knowledge exchange were seen critically. For example, one respondent reported how unproductive and frustrating it had been to be paired up with a colleague by the director of the institute, with the objective of co-authoring a book: "the two

of us … never developed a functional intellectual relationship, but distrust." Nevertheless, while knowledge-sharing cannot be imposed, it can be enabled, but this takes time:

> *My experience from the previous group is that it is no use to **** guide the interactions too much. We are just coming together at first and, because all the people here are very **** conscious of methodological questions, we had a lot of sessions talking about what methodological APPROACH we want to take in this huge field of ….*

The internet is a relatively new context for knowledge sharing and we wanted to see how our respondents were using it. So, we specifically listened to see if they would bring it up spontaneously (only two did so), and we raised the topic when it was not mentioned. Probably because the internet and email had played a crucial role in our work on this project, both in contacting each other and in exchanging ideas with other colleagues, we were somewhat surprised how seldom our respondents described it as a significant context for knowledge exchange. The three most senior respondents do not use it at all, although they do rely on assistants, secretaries and librarians to seek and send information for them via the internet. Only one respondent mentioned having recently signed up to a listserve, commenting that he had already received several good tips from it and that he intended to become an active contributor himself in future. One respondent, who makes extensive use of the internet to obtain and share knowledge with colleagues and from companies, now maintains a blog. This new medium for sharing knowledge has several advantages:

> *what I like is it is really transparent because you can write what you want and everybody can read your ideas and can also react and have interaction. And everybody can read also the comments. If it's an email or when you put a paper on the internet and somebody is writing an email, ok, I have the information but the others can not learn about the comments. *** It is also a great opportunity because you can share your thoughts and without any control, because it´s me who is the blog master. So I can publish something whereas normally if you want to publish a paper there is always some process of selection and also over a long period of time. But here in a moment you have the idea and it will appear…*

In summary, this first glance at the interviews documents the centrality of knowledge exchange in the academic community. The respondents describe giving and receiving knowledge in different kinds of contexts, and their accounts reveal a variety of reasons for doing so. The application of this theoretical lens therefore justified—but does it help us see and understand more than the naked eye and untrained ear would do? At second glance, several deeper insights emerge.

A second glance at the interviews: making sense of paradoxes

Embedded in the relatively straightforward descriptions of knowledge-sharing activities we found some apparently contradictory or paradoxical statements from our respondents. One

paradox revolves around the emphasis placed on disinterested giving by the respondents, while also speaking in the mode of calculation. A second paradox involves the importance attached to suspending status in knowledge exchange, while showing a high awareness of status differences in the academic community. And a third paradox relates to the importance of passion for knowledge sharing, coupled with the particular difficulty of communicating knowledge one is passionate about. Mauss' conception of gift theory helps elucidate some of these paradoxes.

Paradox 1: Talking about disinterested giving in strategic terms

In almost all the interviews there were points at which the respondent distanced himself or herself from "strategic," "calculated," or "self-interested" behaviors that they observed in other colleagues. For example, one respondent contrasted her own behavior to that of another doctoral student, noting that

> *he dreams of becoming a university professor so for him it is a strategic choice to have an office on site. It might end up counting against me, we'll see, but I don't have the feeling I am strategic…. I do have interactions … but they are not calculated… when I engage with people it is not with any kind of expectation, you know. I go about it spontaneously, I don't try to calculate what I might get out of it or not.*

Nevertheless, this respondent, like almost all our respondents, described some of their knowledge sharing behavior in terms of the costs and benefits the exchange entails for them. In some cases they expressed the sense that the give-and-take was balanced out. For example, a researcher who was often asked by colleagues to comment on their papers explained that

> *when I think I need some help or someone to read my papers there was always someone. It is not imbalanced. I have no problem with that.*

But in other cases he reported feeling that there was an imbalance in the give-and-take in a knowledge sharing relationship:

> *[The professor] of course used this group. He used it to manage the [larger] group, that was absolutely OK, but he also used the ideas of this group in some conferences, I heard. Well, that was another kind of irritation, I must say…*

A senior professor described a relationship with a former student, saying "I benefited as much as he did", and later described a colleague whose style of commenting on papers he felt revealed an undesirable form of self-interest:

> *I think he made a point of being helpful because he was interested, as you know, in the generation of knowledge. *** Sometimes it was a bit TOO deliberate. … He wanted the impact of his comments to be felt all over the place. (Q: You mean to have his thoughts reverberate through other people's articles?) Yes.*

In other words, while our respondents denounced what they perceived to be the "calculated" behavior of others, they describe their own behavior in terms that reveal an underlying awareness on their part of how much had been given and how much had been taken by the different parties involved in exchanges. Looking back at knowledge sharing relationships he had had many years earlier with his own professors, a senior academic explained how he saw the equation:

I'm in debt to two of my academic teachers. They helped me get onto the right path, I don't mean in terms of career but in terms of direction, as the substance of what they taught. Yes, I would say that I owe them something. But it's more in human than in substantive terms….. It's totally ex gratia relationship…. It's not a relationship that can be described in terms of paying and repaying. It's what they wanted to do and what I wanted to do. I showed respect ***and they showed pleasure and that was about the extent of it. It's give and take, but not give and take in any commercial sense.

Such descriptions suggest that the respondents are conscious of the importance of having each party benefit from the exchange so that some kind of equilibrium is maintained. However, they do not see themselves entering into the relationship with this goal in mind. Nevertheless, the interviews reveal that the respondents try to avoid situations that might be imbalanced. A young researcher wrote in a follow up mail to the interview that

I became aware of that it would be difficult to ask some people for their advice because I would have the feeling that I couldn't give anything in return that might be of interest for them.

The same respondent felt fine about seeking comments from a colleague because

He makes you feel it´s interesting for him, too. On the other hand we have the feeling we are open to do that for him, too.

This utilitarian language is couched in an explanation that stresses the importance of not calculating or pursuing knowledge exchange in a self-interested manner,

But it is not like you are giving me that and I am going to give you that in return, that´s not it. I think it´s more like sharing this feeling of being curious about things and being grateful for experiencing new stuff that you wouldn´t have seen without someone asking you could you read that piece and give me your opinion on it. It´s more like those people, I have intuitively the feeling I can ask are grateful for the ideas they are going to meet when they read it and actually this is my feeling, too. I have a feeling it is sharing curiosity, we share something, we don´t give and return, that's my kind of interpretation.

The researcher emphasizes the difference between exchanging and sharing, the latter being perceived as anchored in positive emotions, such as a deep interest or passion for a subject. This is in contrast to exchanges that are characterized as limited to a utilitarian give-and-take situation:

I have the feeling that the bigger the personal distance, the more it gets into give and take situations. When you have the feeling you really share something with someone, may it be a special interest or curiosity or passion, i.e., something that somehow emotionally connects people and makes them happy, the knowledge exchange becomes more diffused and you are just happy to do the things you love to do and it does not matter so much who gave what when to whom.

Another respondent expressed discomfort about an interaction that had been started by a professor abroad who had spontaneously sent comments on a paper, a step that might have been a freely given gift. However, he had included in his letter an indication that he expected comments on his own work in return. This behavior was labeled "an Anglo-Saxon exchange relationship" but the respondent did not see such interactions as limited to those cultures, and added an example from a German institution:

He had good ideas though and I really benefited from him. So, I thought, after all why not? I wouldn't like to have it everywhere in my life because it also creates pressures and, in a way, it's restricting in terms of interactions. If you always have to think in advance about whether or not you are able to give something back if you ask someone or the opposite, it's a very calculated type of interaction.

The consequences of not maintaining an equilibrium in an exchange relationship were illustrated by a respondent whose new director refused to pay the travel expenses for attending alumni group meetings. The respondent had previously drawn on the knowledge and contacts generated through this network to benefit his institution but now declared he would adhere to strictly contractual limits in his fulfilment of activities and no longer do anything "over and above" what was expected.

Mauss would probably not have been surprised to hear how our academic colleagues reflected about their behaviour and motivation and that of others engaging in knowledge exchange. He observed that actors experience their giving and receiving of gifts as disinterested acts—and that they tend to be very critical of others who appear to be calculating and strategic. Nevertheless, he saw that the gift was part of an exchange process, one that entailed reciprocation (a concept Gouldner (1960) later developed in greater detail). He who receives <u>must</u> give in return. But the expectation of reciprocity cannot be formulated—otherwise what Bourdieu (1980) called the "taboo of calculation" would be broken.

In terms of gift exchange theory, it is therefore not surprising that each of our respondents either affirmed the disinterested nature of their own behaviour or denounced the strategic behaviour of others, indicating that calculated behaviour was less humanly rich and satisfying. They associated a kind of honor with sharing knowledge purely out of commitment to the subject or to a person. People who behave otherwise were seen as morally and humanly somewhat inferior, although they might well be professionally higher. Within the same interviews, the respondents also talked about their exchanges quite pragmatically, with a

utilitarian view, while at the same time often explaining that they were not talking about market exchanges.

In other words, what emerges is an awareness of two types of exchanges. One is characterised as strategic, calculating, give-and-take. The emotions associated with this form of exchange tended to be negative. The respondents used words like impersonal, restricting, too deliberate, irritating. The other type of exchange is described as *ex gratia*, and as sharing, but it is also described by explaining what it is <u>not</u>: can't be described in terms of paying and repaying, give and take but NOT in a commercial sense, NOT give and return, without trying to calculate what one can get out of it. This second form of exchange is usually linked with positive emotions. The respondents said, for example: emotionally connects people and makes them happy, REALLY sharing something, passion, sharing this feeling of being curious about things and being grateful, trust, friendly atmosphere, respect, pleasure, just happy to do the things we love to do.

Paradox 2: Seeking to suspend status, yet engaging in asymmetric exchanges

Almost all our respondents, irrespective of their own seniority, stressed that knowledge exchange works better when differences in status and hierarchy are suspended. The director of a center stressed that he tried to establish an atmosphere of equality among professors, students and administrators because

> *It's important, I think, to have a framework of no hierarchy.*

As indicated above, they valued settings like clubs and clans that enabled such suspension. They also reported seeking to suspend it in their direct knowledge exchanges. For example, a professor insisted that he has

> *never regarded student contacts as father/son contacts, always regarded them as contacts between equals.*

Paradoxically, however, differences in status were omnipresent in the descriptions of knowledge exchanges. Some exchanges were described as asymmetric or unilateral by nature as a consequence of differences in status. The asymmetry in giving or receiving was considered acceptable precisely because of the roles assigned to status. For example, it is the role of senior academics to help younger colleagues, so their support can be sought without returning the favor. A senior professor recognized that *If you are higher up in the hierarchy, your job is to provide life chances*, and he also described giving younger researchers ideas and extensive comments on papers.

Younger researchers recognize the status differences and are selective in seeking knowledge sharing with seniors.

> *I realized since a few years that *** people in a higher position are very selective in their contents and that I would contact them only in very, very important questions. ... When I think they have a special interest in the paper and they are the persons who can really judge that I made a point in the argument then I would*

give it to them but ***. Yes, I think I am reluctant. I would hesitate to just go to the director of the department and say I have just a question on this or that work. I think I wouldn´t do it.

Another respondent explained he did not feel discomfort about an imbalance between asking for comments on papers from senior scholars in his field but not giving them feedback on theirs:

Hm, but there is already an imbalance I think because they are experienced and so it´s more ME who could learn from their experience, than I could do comments on their work.

The imbalance is—or can be—corrected by signs of gratitude or deference. The senior professor cited above added:

If you are VERY lucky, you sometimes get a thank you for having provided them [the life chances].

What emerges from the interviews is a high level of awareness of status differences and a careful process of selecting knowledge-sharing partners. The choice usually entails a recognition and maintenance of differences in status. There is also evidence in our interviews of knowledge exchanges contributing to overcoming, at least in part, existing status differences. Two of the younger researchers interviewed, and another who was mentioned in an interview, had succeeded in breaking through a status barrier by contributing in a particularly engaged way to knowledge sharing processes in their institution.

I think that here, typical for social science, is more informal and that also YOUNGER people who are BRIGHT and have good ideas are respected from the very beginning. Especially in these questions on [topic], there are two young men who are *** EXTREMELY bright and I ENCOURAGE them to take part and also LEADING part in the group.

Mauss would recognize these processes, because he noted that gift exchange begins with the mutual choice of partners to an exchange. "Those who want to enter into an exchange seek out the best possible partner in the opposite tribe. The stakes are high because the association one tends to create establishes a kind of clan between the partners. In order to choose, one must therefore seduce and impress. While taking differences in rank in mind, one must reach the goal before the others do" (Mauss 1950/1998, pp. 186-187; our translation). There is therefore a kind of tacit competition underlying the choice of partners and the possibility of giving knowledge to others is linked to the individual's position in the community. Engaging in knowledge exchange therefore is more than just about giving or receiving knowledge, it is also about rank, role and importance within the community. Status influences the balance that is considered appropriate in the gift exchange, such that it is acceptable to receive more than one gives when engaging with someone of higher status, but is expected to give as much as one receives from an equal, and a senior is expected to give more to partners of lower status.

Each exchange therefore contributes to demarcating the boundaries of status in the community.

There are risks entailed in gift exchange. In seeking to engage in an exchange with someone of higher status, one undertakes the risk of not being accepted. Senior members of the community maintain the difference in status by refusing to enter into an exchange. One of the prominent professors we interviewed explained that

> *I receive an ENORMOUS number [of papers], certainly one manuscript a day…*
> *all kinds of people send me manuscripts… to many of them I don't respond at*
> *all….*

He responds to those he finds worthy of his interest, depending

> *Partly whether I'm interested in the subject and partly how close we were,*

and

> *DEFINITELY [to former students].*

This is why Mauss explains that, "one sometimes addresses guests with a certain trepidation, because if they were to reject the offer, they would show themselves to be superior" (1950/1998, p. 210, note 7; our translation).

Paradox 3: The difficulty of communicating what one is most passionate about

The word passion was used by several respondents spontaneously in describing aspects of their knowledge exchanges in academia. Some spoke about being passionate about a particular topic (e.g, freedom). Others mentioned the importance of feeling passionate in order to be good at their work. As this mid-career colleague explained:

> *I think you have to be passionate … then you have several resources to draw on*
> *… when you have passion … you also have seduction. Somehow it is also about*
> *seduction. Passion, credibility, umm, everything.*

Being passionate oneself was sometimes linked to awakening passion in others:

> *If you give *** if you awaken a passion for something in a student, give him or*
> *her a desire to do something, then *** somehow you have fulfilled your mission.*

In the interviews passion emerges as a feature that gives meaning to academic work; and the other side of the coin is that knowledge exchange is often described as what makes the work of academics so rewarding. Several respondents emphasized the strong emotional satisfaction of having sparked off exchanges (e.g., between students) in such a way that they were no longer directly needed in the exchange.

> *It's absolutely fantastic to get that in a course: to no longer be the only one to*
> *speak and to get the students to EXCHANGE among each other.*

The paradox attached to the importance of passion in academia is that the topics we most passionate about are also those that we often find the most difficult to communicate. This

insight was first brought to our attention by a colleague in email exchanges. He reflected on the difficulties he had experienced teaching courses about topics that he cared about most.

It's hard to describe, but I felt like I had all of this passion inside and just couldn't communicate it. Or else I was trying too hard. The students said they got the point and seemed to think it made sense, though I was feeling pretty awful.

Alerted to this paradox through our colleague's reflection, we were struck when analyzing the interviews by how often respondents mentioned that something that was particularly important to them was also something they had a hard time putting into words.

I don't know how to describe it, but I think it is very positive.

Gift exchange theory helps elucidate this paradox a bit. Mauss emphasizes that the gift must contain something of the person, some part of the soul, as he puts it. He emphasizes the emotional aspect of gift exchange. But the theory does not yet really account for the phenomenon as experienced by our colleagues. So it is one of the aspects of knowledge exchange that we will continue to explore. And there are many more…

Conclusion and next steps

The theory of gift exchange clearly has the power to help us make sense of interactions in the academic community. It can throw light not only on virtuous cycles of knowledge sharing, but also on painful and difficult situations. Gifts are sometimes given to show the greater power of the giver by overwhelming the recipients with something that they cannot reciprocate. Scholars of sociology and anthropology have identified implicit rules governing the process of gift exchange in diverse cultural contexts, rules whose purpose is to nurture relationships. If the rules are not respected, if they are unintentionally or intentionally broken, the relationship is disrupted. Problems also occur if the parties apply different frames of reference to the exchange, such as when one treats it as a market exchange while the other operates under assumption that it is a gift exchange (Richebé 2002). Gift exchange theory can therefore complement emerging research on phenomena like knowledge sharing hostility (Husted & Michailova 2002), and fear of contamination or exploitation (Empson 2001). It can help close the gap in relationship and network studies that was identified by Gersick et al. (2000) when they looked at academia, namely harmful relationships.

Among the topics that we are curious to pursue are:

- The role of national cultures, and of disciplinary cultures in shaping predilections for different types of knowledge sharing. Respondents in our study so far have speculated on differences between Anglo-Saxon and continental European approaches, for example, and on the differences between economists and social scientists. We would need to expand our sample in order to gain a clearer sense for differences and similarities in knowledge sharing as gift exchange in different academic cultures.

- The process of choosing what to share and what not to share. Godelier, looking at gift exchange processes noted that it is equally important to study what is kept and not given. Academics are torn between wanting to show how much they know and wanting to avoid having what they know taken by others. A respondent noted off the record, after the tape recorder had been turned off, that there is a problem in social sciences with keeping "vultures circling overhead" away from data that one has not yet had a chance to publish.

Therefore, after a preliminary sharing and publication of our findings thus far, which we hope will be accompanied by useful feedback from colleagues, we intend to continue our study, very much in the spirit of research so well put by one of our respondents:

What I LOVE about empirical science is the adventurous experience that you develop an idea, that you get excited, that you can't wait to see the data, that you do your calculations, and then hold your breath to see the result. That is adventurous in a sense. To experience science as adventure, that is really exciting!

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[3]   We are particularly grateful to Victor Friedman and Tanja Busch for sharing their experiences, uncertainties, and encouragement throughout this project.

[4]   Mauss (1950/1999) on p. 178 refers to Malinowski, M. (1922) *Argonauts of the Western Pacific*, London and Malinowsky, M. (1920) "Kula", Man No. 51, pp. 90ff.

[5]   Blau explored the aspect of power and status in greater detail. He observed: "A person who gives others valuable gifts or bestows important services make a claim for superior status by obliging the receivers to him. If the receivers return benefits that adequately discharge their obligation, they deny the giver his claim to superiority" (Blau 1964/1998, p.108).

[6]   For example, economists such as Akerlof (1982) treat gift exchange simply as a deferred market exchange and they generally disregard the other characteristic features of gift exchange described by Mauss. Ekeh (1974) analyses the different intellectual routes taken by Anglo-Saxon and French researchers in their development of gift exchange theory.

[7]   Capital letters indicate words that the respondent expressed emphatically.

[8]   Asterisks indicate pauses made by the respondent while speaking.

[9]   This is probably a result of the composition of the sample: the respondents were predominantly social scientists and all working in institutional contexts that value communication between disciplines. It may be symptomatic of disciplinary orientation that the one colleague who did not accept to be interviewed is an economist, and several respondents commented on the difference in knowledge sharing between economists and social scientists. For example, a professor reflected that in his experience, "Economists hate interdisciplinary work, because for them it's status-threatening because they consider the soft social sciences to be inferior. Political scientists and sociologists are much more open because they don't have this status anxiety. I think that ACROSS disciplines there is greater readiness among political scientists and sociologists than among economists….: WITHIN their discipline, I see more economists working together than political scientists and sociologists."

Capturing Passion and Knowledge for Innovation

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Abstract

Organisations survive and prosper through strategic focus and leadership (Hambrick & Pettigrew, 2001; Vera & Crossan 2004) and through the knowledge, energy, commitment and application of its employees. Central to the successes of the firm are firm-based systems, processes and practices related to the generation, use and reuse of knowledge (Skyrme, 1999). This theoretical paper addresses the research questions: how can organisations harness the passion for knowledge? Are there organizational arrangements and processes that support and foster the passion for knowledge?

We review processes identified in managing knowledge across boundaries (Carlile, 2004) and the necessity for multiple processes of translation and transformation as well as transfer. We also review literature about knowledge in the context of both strategic and operational focus of a firm, examining the organizational arrangements and processes in an organization known for continuous new product development. We identify processes that support and foster the dynamic capabilities of continuous innovation based on knowledge creation and absorption, knowledge integration and knowledge reconfiguration (Verona & Ravasi, 2003). We apply these notions to a study of scientists engaged in public sector agriculture research in multiple dispersed locations and conclude with implications for the management of knowledge for innovation and recommendations for managers.

Introduction

The challenge for organisations is to encourage knowledge creating processes of individuals (Kelly, 2003, Koestler, 1964) and teams (Schrage, 2003), develop the knowledge capacities of the organizations (Cohen & Levinthal, 1990; Zahra & George, 2003), integrate knowledge from multiple internal and external sources (Matusik, 2002) and leverage from the knowledge of individuals to collective processes of knowledge generation.

Organisations which successfully perform in the highly competitive global marketplace must tap into sources of private and public knowledge (Matusik, 2002), harness the knowledge, skills and abilities of their staff and find ways of generating new knowledge. This challenge is even more pressing in fast changing environments. One indicator of successful management of knowledge generation and use is the continuous development of new products and services which have economic value for the firm. We investigate research which includes a focus on individuals as creative forces as well as organisations which must translate the novelty or new ideas into innovation in fields of new products, processes or services. Hence we investigate multiple levels of knowledge creating processes to formulate knowledge processes and practices which contribute to innovation.

Managing for knowledge includes managerial practices which encourage a passion for knowledge in purposeful employees as well as practices which lead to commitment to the

firm. At the individual level, classical studies of individuals and teams concluded that the psychological requirements of individuals in the workplace include intrinsic satisfactions of the task with extrinsic rewards and punishments and a task orientation where an individual's interest is aroused, engaged and directed by the character of the task. Indeed, it is recommended that individuals should have control over materials and processes of the task and the "task should be structured to induce forces on the individual toward aiding its completion or continuation" (Emery & Thorsrud, 1990: 180). In addition, where work groups have some autonomy and a wide sharing of the needed skills, the group can provide continuity in task performance unlikely to be achieved by individuals alone or under supervisory control (Emery, 1993: 183).

The sharing of knowledge by employees plays an important role in knowledge development of an organisation. Such knowledge processes are influenced by the motivation of the sender, the receptivity of the receiver and the relationship between actors. One study of engineers and scientists found four features that distinguished effective from ineffective relationships: knowing what another person knows and thus when to turn to them; being able to gain timely access to that person, willingness of the person sought out to engage in problem solving rather than to dump information, and the degree of safety in the relationship that promoted learning and creativity (Cross, Parker, Prusak & Borgatti, 2003).

More recently an investigation of how personal sources of information contribute to actionable knowledge found that people cultivate different kinds of information relationships that are the source of 5 components of actionable knowledge: (1) solutions (both know-what and know-how), (2) referrals (pointers to other people or databases), (3) problem reformulation, (4) validation, and (5) legitimation. The quantitative study revealed that, while source expertise predicted receipt of these components of actionable knowledge, so too did expertise of the seeker and features of the relationship between the seeker and source (Cross and Sproull, 2004).

This paper addresses the research questions: how can organisations harness the passion for knowledge? Are there organizational arrangements and processes that support and foster the passion for knowledge? Case studies of large successful firms such as 3M, Buckman Labs, Proctor and Gamble have often been used to identify the capabilities and knowledge based processes which form the basis of their success.

Multiple Knowledge processes

Managing knowledge for innovation is not a straightforward process. There are multiple players, systems to negotiate and practices to be developed. Innovation can be decribed as a set of interacting knowledge processes (Skyrme, 1999). These processes include the *absorption* of existing knowledge from the external environment, the *creation* of new knowledge through creative thinking and interchange of ideas, the *rapid diffusion* of ideas and insights through knowledge networking; the *validation, refining and managing of innovation*

knowledge, *matching* of creative ideas to unmet customer needs and in solved problems, and *encapsulating and codifying knowledge* into an appropriate form such as a tangible product, a production of a new internal process, training material for a new service a marketable design, patent etc (Skyrme, 1999:51).

One approach is to identify forms and sources of knowledge and knowledge processes, such as those summarised below that can contribute to innovation are summarised in Table 1.

Table 1. *Forms of Knowledge and Processes.*

Forms of knowledge	Knowledge Processes, systems and structures
Customer knowledge	Developing deep knowledge through customer relationships, and using it to enhance customer success through improved products and services
Knowledge in products and services	Embedding knowledge in products and surrounding them with knowledge-intensive services
Knowledge in people	Developing human competencies and nurturing an innovative culture where learning is valued and knowledge is shared.
Knowledge in processes	Embedding knowledge into business processes, and giving access to expertise at critical points
Organizational memory	Recording existing experience for future use, both in the form of explicit knowledge repositories and developing pointers to expertise
Knowledge in relationships	Improving knowledge flows across boundaries: with suppliers, customers and employees etc.
Knowledge assets	Measuring intellectual capital and managing its development and exploitation.

Source: Developed from Skyrme (1999).

This typology indicates the range of knowledge that may be useful in innovation processes as a starting point. The challenge lies in processes of bringing together such diverse sources of knowledge and in bridging the boundaries between them.

First we review research regarding processes internal to a firm for managing knowledge across boundaries that are useful the creation of meaning and a common knowledge (Bechky 2003; Carlile, 2004). Carlile (2004) reminds us that the effectiveness of managing knowledge across boundaries indictes that the relationship between actors is one where they not only share their knowledge, but also assess each other's knowledge often through a common knowledge that actors use to share and assess each other's domain-specific knowledge. He contends that "acknowledging both domain-specific knowledge and common knowledge at a boundary provides a useful distinction to better understand the challenges as actors try to work across domains when innovation is desired" (Carlile, 2004).

Second from the innovation literature, we present a case study of Oticon, a long-established Danish firm with a reputation for successful continuous product innovation

(Verona & Ravasi, 2003). This case study investigated the knowledge-based capabilities of the firm that formed the foundation of their continuous product innovation. The case used analytical frameworks based on four components of a firm: actors, systems and structures, physical resources and culture. For example in the knowledge creation and absorption processes, actors included the skilled researchers, long term relationships with clients and collaboration with international experts.

The importance of this study of Oticon is the detailed analysis of the multiple forms of knowledge development. The organisation is investigated using a framework of actors, structures and systems, physical resources and culture, but it is the combination of these factors which creates the dynamic capability that leverages the processes to new product creation. "Each of these four processes must to coexist and be coherent in order to generate competitive advantage through continuous innovation" (Verona & Ravasi, 2003: 601).

Within Oticon, specific strategic directions included setting organizational priorities and reviewing projects by the senior strategic group allowed for combination and recombinations of dispersed knowledge.

Finally we apply the principles of knowledge generation in both studies to a distributed public sector organisation engaged in research and development in agriculture, where staff were renowned for their depth of knowledge and expertise as well as passion for their work, in an organisational context with major changes in structure and purpose and a stronger business orientation.

Common Knowledge and Shared Meaning

Our understanding of knowledge processes builds on the importance of the links between "the local and the particular and the timely and the universal, the general and the timeless" (Suchman, 2003) and the crossing of knowledge boundaries which contribute to rich understandings and the need for common knowledge. We support the notion that organizational knowledge a form of distributed social expertise where "knowledge is something people do together" (Gheradi & Nicolini 2003: 205) and where knowledge is constantly constructed and is therefore dynamic and provisional (Gheradi & Nicolini, 2003:207).

In this context organizational knowledge is more than an accumulation of knowledge from multiple sources and often requires translation, "The process of translation creates the networks and the actors as much as the object: actors, relational networks and translation processes are constructed through interactions" (Gheradi & Nicolini, 2003: 210) where translation is often through intermediaries or through artifacts, techniques and technologies.

Bechky's (2003) work also supported the perspective that knowledge is shared through a process of transformation where members of different communities co-created common ground that transforms their understanding of the product and the production process.

Domain specific knowledge as well as common knowledge may need to be transformed to effectively share at the boundaries.

Carlile (2004) discusses knowledge in terms of difference, dependence and novelty, summarised below. He describes examples of common lexicon is developed that is sufficient to share and assess knowledge such as taxonomies or storage and retrieval technologies. Common meanings are developed to create shared meanings and provide an adequate means of sharing and assessing knowledge at a boundary, eg. such as cross-functional teams. Novelty generates different interests between actors that impedes their ability to share and assess knowledge. Common interests are developed to transform knowledge and interests and provide an adequate means of sharing and assessing knowledge at a boundary.

Difference, are found in amount of knowledge present such as between a novice and an expert, as well as difference in the type of specific domain knowledge in problem solving. Here knowledge is not only localized but invested in a given practice whihc takes takes time and investment to develop, but is also seen to be 'at stake' when new understandings or novelty are presented.

Dependence is must take into account other's knowledge to achieve goals, where differences in kind not just in degree require capacity to develop adequate common knowledge as resources and tasks change" Carlile (2004:556). *Novelty* to share with others and novelty to assess and involves the capacity of the common language to express it and the ability of the actors involved to use it.

Case study of continuous innovation

Oticon, a leading company in hearing aid industry was known for its continuous supply of new products in nineties. Verona & Revasi (2003) argue that the dynamic capability of this firm is founded on the processes of knowledge creation and absorption, knowledge integration and knowledge reconfiguration. These processes can be explained in further detail. For example, *'knowledge creation and absorption* reflects a long term commitment to basic science, its potential rechnological and market possibilites and creation of a international reputation and ability to absorb knowledge from the outside. *Knowledge integration* or the capacity to shape and manage a context that stimulates latent and dispersed resources so they can jointly contribute to developing and launching new products. *Knowledge configuration* regareds the creation of an open structure that makes it possible to redefine role systems and relational patterns in a flexible way inorder it make it easier to recombine resources continuously; this process of recombination allows the company to keep the new product pipeline filled" (Verona & Ravasi, 2003: 579).

These researchers contend that the building blocks of product innovation are "the actors, structures and systems, physical resources and culture and but it is the dynamic capability that leverages them to new product creation. Each of these four processes must to coexist and be

coherent in order to generate competitive advantage through continuous innovation" (Verona & Ravasi, 2003: 601).

The organisation consists of a number of different actors, different physical resources, structures and systems and cultures. Different units of Oticon have particular responsibilities but it is the bringing together of multiple forms of high level knowledge and reconfiguration that forms the basis of Oticon's success. These processes are illustrated in Figure 1.
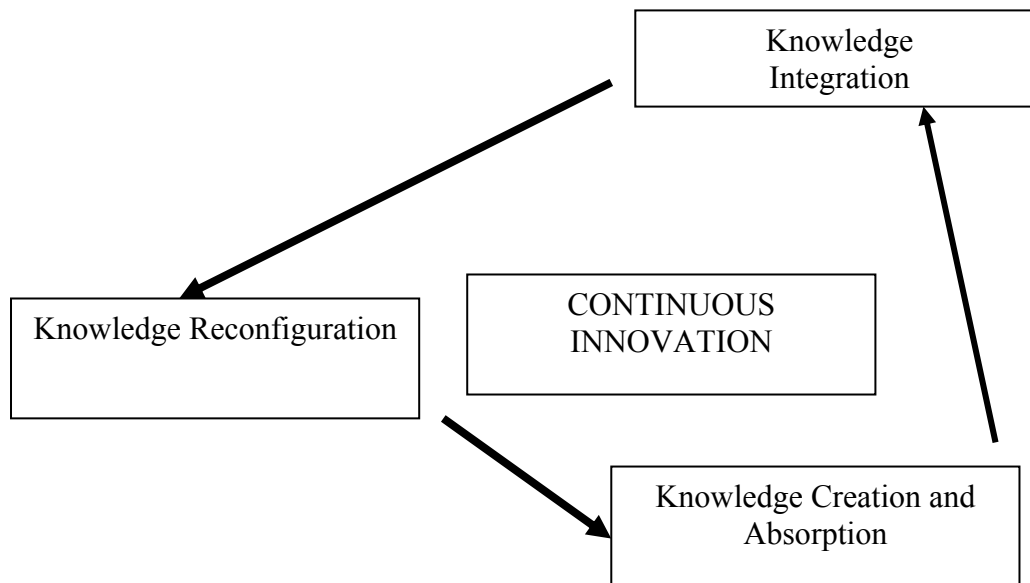

Figure 1.
Unbundling dynamic capabilities: the knowledge-based processes at Oticon (Ravasi& Verona, 2003: 579).

Application of framework to case study of public sector R&D agricultural organization

We chose for our study an organization where the purpose of the organisation was to create knowledge and services and give them away for the public good rather than maximize private profit. We particularly explored business groups established with a focus on pareticualr aspects of agriculture from horticulture to farming systems.

We carried out 60 semi-structured interviews with senior and middle management staff members and external stakeholders, observer status note taking at senior management and board level meetings and content analysis of archival records. Units at project, program and business group and organizational levels were purposely sampled.

Research on knowledge processes in innovation from two processes at the R&D project teams and the whole organisation suggest the importance of local development of ideas, combinations or integration of these ideas as well as potential reconfigurations of such knowledge with different structures for different product outputs. Interviews with scientists identified a number of ways in which these scientists develop new products, processes or applications for their clients and include developing:

- plant varieties better suited to particular end users eg durum wheat for pasta; malting barley for brewers,
- plant varieties which will grow under certain conditions, such as increased resistance to pests or diseases, in crops such as bananas, citrus, pineapples,
- plant varieties suitable for local conditions for sub-tropical climate eg strawberries
- plant varieties which have better returns for processors in the marketplace eg. larger plants which make the marketing of products more viable and give better prices for growers.

These research teams are focused on particular outcomes and engaged in processes for longer term solutions such as reducing chemical usage, promoting sustainability of industries, integrated pest management, improved market access for crops and vaieties and natural production systems.

Scientists are close to their customers with regular contact through field days with farmers and their representatives, phone calls, close to industry groups such as grain grower associations who want research into particular pests and diseases, close to funding sources such as research and development corporations and industry associations which provide funding for specific outcomes. The research processes involve meeting the requirements of the customers, from growers or millers or processors, but also using knowledge gained in one area to benefit customers in other areas.

These scientists can apply their knowledge and skills to enable responses to situations that occur.

The knowledge created in these projects is *embedded in the individual* and in the teams which develop projects. Knowledge *embedded in technologies* in field trials, testing procedures and the networks of stakeholders and to some extent becomes system *embedded knowledge* of organisation.

The knowledge generation is maximised in a number of ways by instituting practices which require multiple disciplines and collaboration, and include:

1) Structuring project groups with a core of scientists from a range of different disciplines with the ability to bring in other scientists if new developments occur.
2) Strategic planning for their internal teams and business groups, setting directions on an annual basis
3) Developing plans for collaborative teams and reviewing

4) Regular meeting regularly on a team basis as well as on a project basis to encourage synergies across projects

5) Meeting consumers on their own turf; getting a clear idea of the local issues, and the challenges they are facing;

6) Developing relationships with other members of the project team who come from different organisations

7) Scientists using their knowledge of crop production and varieties to extend and develop applications developed in one field to a different crop.

8) Systematic experimentation and application of useful unexpected findings to end users.

These approaches improve the understanding of situation, develop relationships between members and encourage non obvious processes of trust and involvement.

The challenge the business unit was facing was to identify processes which would lead to new possibilities in porganisational arrangements to allow new ways f working within the larger organisation.

We apply Ravasi & Verona's (2003) framework to the knowledge processes at the organizational level using the headings of knowledge creation and absorption, knowledge integration and knowledge reconfiguration and the results are summarized in Table 2.

	Actors	Physical Resources	Structures and Systems	Culture
Knowledge creation & absorption	Skilled researchers with depth of expertise; Long term relationships with an extensive pool of farmers; Collaborations with experts from international research centers and universities	Well established premises, some laboratories	Operational autonomy of the researchers; Director of each institute some discretion over the use of the annual budget; Budgetary constraints from head office; Knowledge of markets that can be fed back into growing cycles possible outlets for produce working with industry associations as the voice of farmer	Orientation to scientific and applied research; Open attitude towards the scientific community willingness to share research results
Knowledge integration	Technical experts loosely affiliated with professional areas; Employees with eclectic skills, able to work in an conventional environment	Transport available to cover large distances

Easily accessible electronic archive | Regular meetings with whole team and advisors; Cross-functional teams; Businesss manager personnel appointed;Self-participation in projects | Push toward business orientation; Broad departmental identification; Interaction and dialogue encouraged; |
| Knowledge | Experienced senior | Strong | Workplace design tightly | Top down control |

reconfiguration	managers; established forms of practice within larger organisation	departmental configuration; senior leadership team with concentrated allocation of financial resources	structured; tight coupling of busienss units	Little openness to individual proposals and individual creativity; Strategic processes driven from top

We found that the processes of knowledge creation and aborption, knowledge integration and knowledge reconfiguration processes were well present within the business groups we studied. We also found that these processes did not extend to the larger organisation where the actors and the structure and systems and culture were focused on a more hierarchical and tightly coupled manaer.

Conclusions and Implications for Managers

Our research with knowledge processes in business units of a large public sector research and development organisation identified the passion that people invested in their work and the gaining and application of knowledge, often through problem-solving. The business units also struggled to develop new practices at the team, business unit and with new relationships with the broader organisational level. Reviews of recent studies of capturing knowledge for innovation level and the larger organisation level and used these as a lens through to review our previous work.

We found that processes of transfer and translation were encouraged by the structures, systems and culture of the business units. These business teams also engaged in transformation activities regarding the business practices they now supported and the loose coupling of these units and the flexibility this provided lead to new and productive ways of working. However little of the common and shared meanings developed within the business units was transferred to the larger organisation.

We conclude that these processes of knowledge creation and absorption, knowledge integration and knowledge configuration were present in the harnessing of passion and knowledge at the business unit level of the organisation although they were not transferred across the broader organisational boundaries through the tight coupling of the larger organisation and the lack of possibilities of reconfiguration at that level. The notions, ideas and new 'business' ways of thinking while required of the business units challenged existing practices and the higher executive functions of the organisation were called into question. The business processes of research, development and extension were largely 'contained' within tight bureaucratic structures. Capturing passion and knowledge for innovation is a complex multifaceted process. We found that knowledge transfer, translation and transformation processes were present at the business unit level but these solutions at the local context were not successfully negotiated throughout the organization.

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Endnotes

A traveller's tale: on joining a peer learning community; moments of passionate dis / connection in a quest for inquiry

Dr Margaret Page[1]

What kind of a story is this?

This story is about the opportunities and distress of doing experiential teaching from a critical perspective in a peer learning community. It is written from a feminist perspective; while context specific it raises wider questions about the practice of critical management education ((Ellsworth 1992; Fenwick 2005; Grey et al.1996; Luke and Gore 1992).

The experience of travelling between different worlds, each with their own cultures, codes of behaviour and values has been explored widely by post colonialist feminists (Anzaldua 1987; Lugones 1997). The perspective taken by the author of the paper arises from her reflections on the shock, or collision of passions and values that she encountered as she took up a place in this environment (Anzaldua 1987). It explores the emotional realities, systems of meaning and politics of this encounter, the struggle to sustain inquiry and learning where high anxieties were experienced (Vince 1996.; Vince and Martin 1993). Finally it offers reflections on the ethics and politics of that encounter and conditions and resources conducive to inquiry in management education.

Through this story the paper explores the gendered dimensions of the struggle enacted between staff and students, students' desire for instrumental knowledge and anxieties raised by critical pedagogical practices (Grey, Knights and Willmott 1996; Luke and Gore 1992; Ellsworth 1992). Alongside this the story foregrounds the ambiguity of authority in the peer learning community, and the difficulties in creating and sustaining conditions conducive to inquiry for herself and for students (Reynolds 2000; Reynolds and Trehan 2003). These are explored from a psychodynamic and systemic perspective that addresses the politics and risks of inquiry as a practice of change (Vince 1996; Vince and Martin 1993).

The paper is structured as a play within a play, in which the story enacted in the students' inquiry illumines dilemmas experienced by myself as female and feminist traveller in an allegedly genderless world. The paper begins with my 'arrival' in this community of practice and introduces the first 'clash' around values and practices, introducing inquiry as a framework from which to engage with students. In the second section 'traveller, sojourner or new citizen' I describe the principles of the community I had joined and explore the conflicts, challenges and ethical dilemmas I encountered as I explored what place I might take up within

it. In the third 'alien invites terrestrials to play', I describe a student inquiry into their experience of gender on the programme, and reflect on the inquiry process and outcomes. Finally I reflect on the 'politics and risks of inquiry' in this context and draw conclusions for pedagogical principles and practices.

Context

The context in which this story unfolds is a university based programme that was explicitly humanistic in philosophy and practice (Heron 1991; Mulligan 1991). The programme aspired to offer an alternative community where students could develop their potential as human beings. The culture of peer learning and experiential teaching and learning environment contrasted to the more instrumental and driven performance cultures predominant in the university in which it was situated and the organisational environments inhabited by students. This construction of a learning culture that was 'alternative' to organisational environments in which students were change agents posed a series of interesting paradoxes.

Students and staff had to negotiate conflicting expectations of learning associated with these contrasting contexts, and at certain points both experienced an explosive mix of desires anxieties and frustrations. As facilitators of this programme academic staff were also invested in maintaining an environment where we were free from constraints associated with performance demands and constraints associated of the academy; yet in our academic roles were responsible for maintaining academic standards through the assessment and teaching processes. Tensions arising from being on the boundary between programme and academy, yet invested in the alternative programme culture and values, posed interesting challenges. Some of these concerned the ambiguity of how authority was shared between staff and students for determining content and process of teaching and learning (Heron 1991; Mulligan 1991; Reynolds and Trehan 2003: 176). Another major tension that will be explored in this paper the tendency to 'other' the academy and organisations to which they belonged and to loose sight of the espoused aim of the programme which was to find ways of bridging these environments in order to change them (Heron 1991; Reynolds 2000).

The conflicts between forms of inquiry offered by critical management education and students' desire for more instrumental approaches to teaching and learning have been widely discussed (Ellsworth 1989; Grey et al. 2004). The emotions and anxieties that have to be negotiated in order for learning to take place pose specific ethical and methodological challenges for those in teaching as well as learning roles (Ellsworth 1989; Fenwick 2005; Reynolds and Trehan 2003; Vince 1996). In this paper I will explore the associated risks as well as opportunities: could it be that in certain environments inquiry cannot be sustained? How in this instance did different ways of learning and knowing work against each other?

Arrival

Alien from another planet arrives and considers applying for citizenship

> *An interface between different knowledges,*
> *different knowledge claims,*
> *in which difference is spoken*
> *through the conjunction knowledge/power*
>
> (Stanley 1997:2).

Arriving in this specific culture posed its own challenges. My home territory had been a highly politicised environment in which institutional inequalities was a part of a shared discourse, and where there was general consensus that institutional equality was a desirable goal. In this environment there were no discourses of equality or inequality. Power and difference was construed as a negative force, externalised onto the relationship between the programme and university, or the programme and their organisations. Divisions within the programme were neither named, nor considered relevant to student learning. The focus was predominantly on individual development, and students seemed invested in constructing a community where espoused values were consensus and homogeneity.

Starting at my bus stop in L.B. Hackney, I stood outside a Turkish community centre where there were frequently hunger strikers lying on the pavement demanding releases of political prisoners,, 'stop the war' and 'troops out of Iraq' posters, and a variety of community initiatives. Arriving on the campus, I admired the rich variety of well tended trees and well fed swans with their cygnets, and felt like an alien landing on another planet, beautiful, cold and remote from inner city struggles.

US post colonialist feminists developed the concept of travelling between worlds to describe their experience of moving between mainstream and margins (Anzaldua 1987; Lugones 1997). This seems an apt term to think through my experience of moving between these environments with different and often opposing knowledge paradigms *belonging to none, partaking of each* (Anzaldua 1987: 100). Anzaldua describes the experience of traversing different cultures as an embodied process of being 'between' two cultures, an inner war. I struggled to hold onto aspects of the world I had 'left', and to find a place within the world I was seeking to join.

What was the nature of this world?

The principles of humanistic peer learning community were developed from the humanistic psychology movement of the 1970s and 80s. As such the pedagogic principles carry the shortcomings as well as the strengths associated with this movement (Fenwick 2005; Perriton and Reynolds 2004).

Reynolds considers some of the shortcomings of humanistic notions of community that he maintains underlie many of the more participative and experiential approaches to management education and development (Reynolds 2000). These accurately describe the challenges I experienced as a new member of the community I joined. They concern pressures to confirm to core beliefs and values (Giddens 1994), inadequate attention paid of asymmetries of power (Coopey 1995; Fielding 1997, or at worst, pressures to choose between assimilation and expulsion in order to ensure the integrity of community (Noddings 1996:254).

In response, he counter poses a 'politics of difference' as the basis of a critical educational methodology (Reynolds 2000:71). To support this approach he develops an alternative notion of community based on cosmopolitanism, drawing from Giddens notion of 'dialogic democracy' (Giddens 1994:131), and Ellsworth's notion of 'defiant speech' that confronts the 'contradictory intersection of voices constituted by race, gender, class, ability, ethnicity, sexual orientation [and] ideology' (1989:312). He suggests that the notion of dialogue which emerges is 'grittier' than notions of 'sharing' and 'reconciliation' associated with more pastoral ideas of community. In a subsequent article, Reynolds and Trehan (2003) explore how participative pedagogies might enable this grittier approach to dialogue. Their aim would be to work with differences so as to provide learning for living and working in the wider social context (p. 164).

However in a study in which they invited post graduate students to explore how they experienced difference on management education programmes, they found that differences were a source of discomfort for students, to be avoided rather than confronted. Similarly as a faculty member on this and other programmes I have found that exploring differences of power and identity within student groups can be both risky and painful. Students come together to learn through sharing experience, and while happy to discuss differences elsewhere are often keen to preserve consensus and homogeneity within their course group. In particular, invitations to explore gender difference have been received with hostility by female students, who may have adopted a strategy of avoiding discussion about gender in order to assert an equal presence on the programme (Sinclair 2000; 2005).

Reynolds and Trehan suggest that recognition of difference in programme design and tutor response to difference should be added to participative approaches to learning as a necessary element of critical pedagogy. They make suggestions for addressing student discomfort such as allowing students to work in sub groups based on some shared characteristic or points of view, but assert that students should also work across boundaries with a commitment to debate and dispute. Tutors should be equally prepared to work with differences between themselves as members of the course team- and to create spaces for students expressing a

minority view or difference with tutors (p. 176). From this perspective, they suggest, the question becomes how to enable learning from the 'here and now' of the classroom experience of difference in order to understand the experience of working and managing difference in organisations. The danger is that complex social interactions are reduced to psychological simplistic explanations - a tendency on management education programmes (177).

In my teaching sessions with students I set out to open up opportunities for students to explore the qualities of their individual experience on the programme, for differences to be explored as a positive resource. I discovered when I did so that powerful group defences came into play to preserve the consensual culture of the peer learning community. This effectively sabotaged learning from the experience of difference on the programme and raised challenging questions about the qualities of context and methodology needed to support learning. A further set of questions then arise concerning how and in what circumstances defensive dynamics can be utilized to support learning in groups (Simpson et al 2000).

As a newcomer to the programme my interactions with students were characterised initially by curiosity. Differences in my approach to teaching were interpreted at best as unfamiliarity with programme culture and practice, at worst as incompetence. I began to feel like a refugee, expected to assimilate in order to demonstrate that I was worthy of citizenship. Before long I seemed to embody difference as a generic category, and to attract projections commonly experienced by members of minority communities in majority cultures: a mixture of determination to hold to my values and perspective, shame and anxiety, and difficulty in sustaining competency and integrity. At times I experienced a sense of being an impostor, within a community where values, ideology and practice were tightly interwoven and defended. Similar experiences are reported in research on uses of splitting and projection as defences against difference (Foster 2004). In this research group defences 'one-ness' and 'me-ness' identified by Turquet (1974) and Lawrence et al (1996) are identified and function alternately and indifferently, much as fight and flight do… where fantasies of total union or total independence take the place of achieving realistic inter-dependence (Cano 1998: 92, quoted in Foster p.18).

In response to challenge and with support from a colleague I adopted a stance of inquiry in my teaching practice. Drawing from cooperative inquiry as a method and practice I offered students a framework within which to critically engage with their experience of community on the programme (Reason 1988; Reason and Marshall 2001). My purpose was to offer a basis from which they could build bridges between their learning on the programme and the business environments in which they made a living and sought to change.

While welcomed by some students, others continued to raise serious questions about my credibility as a staff member. Was I sufficiently 'humanistic' or was my attempt to introduce difference and psychoanalytically informed practices evidence of being a member of communities of practice historically identified with enemy camps? I found myself internalising some of these questions: did I indeed have a right to be a staff member in this

community of practice? How could I engage with the challenges of teaching and learning inquiry in a community that felt it had staked so maintaining its current practice and culture? Would I apply for citizenship, or remain a visitor, sojourner?

Traveller, sojourner or new citizen?

Heron, one of the founders of the humanistic psychology movement, asserts that the facilitator in humanistic peer learning communities will be working with a series of dynamic creative tensions (Heron 1991:26-9). He suggests that one of these tensions will be between the focus on personal growth through experiential learning, and the capacity to apply this learning for the purpose of external social and political change. Individual growth and development, according to this formulation, is not proposed as an end in itself, but a basis for social and political change agency. Similarly, proponents of critical management education propose experiential learning, engaging with individual experience, as a point of entry rather than as an alternative to engaging with systemic and political issues (Grey 2004:184). Making the link however presupposes that students are willing and able to move between personal development and social and political change agency.

Heron considers the development of conceptual analytical tools to be pivotal to capacity to make the link between individual development and change to change agency in the external world (26-9). In his extended epistemology, quality and validity are construed as congruence between different forms of knowing: experiential, practical, imaginal and propositional knowing (Heron 1988). This epistemology was introduced to students as a basis for their learning on the programme. A key challenge to staff and students was to achieve congruence between these forms of knowing on the programme, when in practice students seemed to revel in experiential learning but to find it difficult to move into propositional knowing. Frequently they told me that while they had signed up to gain theoretical tools, they found themselves engaged in a journey of powerful personal development that was transformational and life changing. In the course of this journey propositional knowledge seemed to acquire an abstract quality for them, required by the academy but not useful for themselves. Moreover invitations to explore the qualities of their experience as a group and to relate this to organisational settings seemed to surface divisions and dysfunctional dynamics that they had attributed to external environments. This threatened the consensus based notion of community that they had constructed, and raised anxiety to levels that some students found intolerable.

A major student anxiety concerned how to apply learning on the programme within their work contexts. Students who worked in corporate settings wanted reassurance that their learning could be applied in business contexts, and to be given tools to do it. My invitations to them to draw from their own experience and expertise in order to develop their own practice seemed to trigger crises of in my credibility, described as my being unable or unwilling to 'meet their needs'. A struggle then ensued that seemed to arise from a paradox. The course culture had been constructed as an 'alternative' to external organisations, and this

had enabled individual development. Thus the programme was associated with 'authenticity' and 'holistic' and 'good', while organisations were associated rationalist, managerial cultures and 'bad'; experiential learning was developmental, propositional learning 'abstract', frightening, belonging to the requirements of the academy. However in order to sustain these splits, aspects of experience on the programme that threatened this view had to be suppressed. Construction of my position as 'outsider' enabled students to lodge in me unwanted aspects of their own experience and attributes which they did not feel were compatible with programme culture. Thus I was identified by some students with frightening standards that they felt unable to live up to, and by others as 'rigorous and 'exciting'.

In their adaptation of Revan's action learning cycle, Vince and Martin draw from Bion's theory of group defences against anxiety to demonstrate that in order to learn from experience, individuals have to work through the anxiety of not knowing (Bion 1961; Vince and Martin 1993). The capacity to successfully work through this anxiety is not a foregone conclusion. Vince argues that in experiential groups this is a necessarily political process, involving contact between different systems of meaning and emotional realities (1996:46). Experiential groups can develop self limiting characteristics to avoid risk associated with the intense emotion stimulated by clashes associated with power and difference. Groups have a strategic choice to move in a direction that promotes or a direction that discourages learning (1996:47).

In a development of this research, Simpson et al assert that good enough containment can reduce anxiety sufficiently for learning to take place (Simpson et al 2000:462). Anxiety may trigger defensive behaviours such as fight, flight or dependency, and these in turn may lead to avoidance of the work necessary in order to learn in relation to what is not known. They illustrate ways that facilitators of experiential learning might engage with these dynamics in order to ease anxiety in order to allow learning to grow (463). They identify three different levels of engagement with these defensive dynamics, and conclude with a caution that the creative implications of paying more attention to defensive dynamics must be tempered by awareness of the learning context. There are some situations they suggest in which it may be extremely hard, if not impossible, for staff and learners to hold in creative tension the dynamics that may be evoked if in an attempt to work the defensive dynamics within the group itself, existing power relations are challenged (469).

As a new arrival in this community of practice, I sought to steer a course between engaging with the culture as I found it, and offering opportunities for inquiry into student experiences of the community created. With hindsight I ask myself: where in this context did the balance lie between the responsibility of staff to contain anxiety and student responsibility for their learning? What methods do we have to offer a sufficiently robust container to enable learning in contexts that may be anxiety provoking for staff and students? What was my responsibility in relation to colleagues committed to the programme as it was? What are the gendered aspects of the dance between the players and how can these be offered as opportunities for learning to take place?

Alien invites terrestrials to play

In this section I tell the story of what happened when I invited students to inquire into their experiences of gender difference on the programme. The student inquiry is the play within the play to which I referred in my introduction; as a narrative I will suggest that it illumines and runs in parallel to my experience of taking up a place as a new arrival on the programme. While gender was the topic of inquiry, I offered it as a form through which other splits and dynamics might be explored. In telling it I offer a case study for further reflection on the questions raised in the first part of this paper.

The story is told in my voice, and makes no claim to consensus with the views of students or colleagues; it is situated in my experience of being the facilitator of learning, in the specific context of my arrival on the faculty of the programme. It begins in the second of three teaching blocks of a module entitled 'understanding organisational change'. The module, in sequence the third and final one of the first year, was designed as an inquiry into how to 'read' organisational change processes, using lenses offered to students during the module. During this teaching block, I aimed to introduce students to 'power' and 'gender' as lenses for 'reading 'organisations. The programme had been agreed with students.

Lost in translation: - from imaginary to propositional knowing

I had invited students to consider the group as a temporary organisation, so that we could draw parallels between their experiences on the programme and their experiences in organisations. I aimed to introduce them to methods for 'reading' their experience of being members of the programme, that would illumine for them how whole group defences come into play in organisations (Hirschhorn 1997; Huffington 2004; Obholzer 1994). The concept of the 'organisation in the mind' seemed to offer a useful bridge into organisational focus from their previous experiential work on individual development and group process and individual experience (Hutton and Bazalgette 1997).

With this in mind I asked them to reflect on the images and themes that emerged during their check in session at the beginning of each day. Students drew a variety of images and key words on flip chart paper and I invited them to free associate to these images to see what might be illuminated about current organisational preoccupations and issues. This exercise generated a lively discussion about the difficulty in moving from non verbal to verbal expression; one student spoke of her reluctance to put words to her picture as she felt so much got lost in the translation from non verbal to verbal communication. This theme seemed to resonate powerfully with others who agreed that images were a powerful tool to express issues that could not be 'spoken' in words. Some of the images and anecdotes that emerged from the check in were powerfully suggestive of emotions 'below the surface' that might be present within the group, and that were inconsistent with the consensual and homogeneous group culture that had been verbalised. They evoked emotions of anger, conflict, frustration, unease, loss and separation; from a psychodynamic perspective, these offered opportunities to

explore aspects of experience that were present but had not been verbalised on the programme. In the following days we practised a variety of different methods for surfacing the unspoken in organisations, as a means of 'reading' current live organisation issues (Morgan 1986).

One of these methods was introduced by visiting lecturer Ann Rippin. In a presentation on quilting as a methodology for reading organisational dynamics she illustrated how she had brought hidden knowledge about aspects of organisational life into the awareness of members of organisations[2]. Students passed her collection of quilts round, enjoying the sensory experience of colour, images and texture, and her use of fairy stories and popular heroes and heroines to evoke hidden aspects of organisational life. At her invitation they then used the associations triggered by her quilts to do a reading of their organisations.

This worked well until the session ended and she had gone. At this point frustration exploded, voiced by some male students who stated they could not see how such a method could be used in their organisational settings in the corporate sector. It was as if the work done during the day was 'disappeared', rendered inaccessible by anxiety. Other students made attempts to initiate discussion, others to change the subject, and demands were made to 'move on'. There was a quality of aggression and then deadness to these verbal exchanges, manifested in lack of energy and flat tones of voice. I felt heavy pressure to demonstrate the value of the session, but noticed that my own voice was also going 'dead' and that it was difficult to speak.

I reflected to students that I had noticed a repeated pattern in which initiatives for discussion were stifled; students reflected that they had observed a pattern of drawing back just as they felt they were on the brink of naming an important and difficult issue. They expressed a desire to explore this further, to 'break through'. I intuited that the pattern might relate to the themes of Ann's presentation, organisational violence, gender and sexuality which had been introduced the previous day and not fully explored or processed. Acting on this intuition I invited students to move into subgroups to explore their experience of 'what it was like to be a man or woman in this group'. To my surprise there was a rush to action; students leapt to their feet and after some confusion took up a proposal from a female student to work in two single sex groups. I asked each to record their discussion and to prepare to feed back key points in a plenary session. In the following I summarise and reflect on the inquiry process and outcomes.

Doing gender - being women and men for each other

Each group spent about forty minutes working separately, and then met in plenary session to exchange findings. All sessions were self facilitated; I took on the role of rapporteur during the plenary session. I spent most of the first part of the session with the group of women students, listening and occasionally offering suggestions designed to draw out different voices in the group[3]. Visiting the group of male students I was forcibly struck by contrasts between

two groups. While engagement with the topic in the group of women was tentative, ambivalent and exploratory, in the group of male students it was full on high energy. This contrast was became a somewhat painful discussion point in the plenary session.

The account that follows draws mainly from discussion between the two groups at the plenary session. At the plenary session the group of male students were eager to present first; they spoke to a chart. The chart displayed a series of contrasting ways of being men on the programme. The first set, 'ways of being', are behaviours for which they were rewarded on the programme; the second set, 'ways of not being', were behaviours for which they were told off. Each of these is linked to a 'quality of affect'. In their presentation each of this series of contrasting positive and negative experiences were also associated to specific attributes associated to being men or women. Thus they said they valued and enjoyed being 'intuitive' 'touchy feely, 'nurturing', 'held', and 'flirtatious' and associated these positive qualities with being with women'. However they disliked not being intellectual, not being allowed to compete or to lead, being criticised (by women) for being aggressive or 'imperfect men', and associated all these qualities with aspects of suppressed masculinity.

In this construction women were experienced as the arbiters on what behaviours men could adopt on the programme. This brought benefits but also losses, and injustices. The men stated that they had learned more and even changed the way that they related to each other. Women were they stated more emotionally competent but also exacting and somewhat punishing in their standards:

Eagle eyed around the flaws that we might have

Moreover male students felt they were punished for being 'too intellectual / analytical' and as a result felt cut off, blocked, and drained, confused. 'Extreme behaviour' such as 'storming out' or 'being aggressive' was frowned on for men but seen as healthy for women. Men were held back, not allowed to be themselves in the classroom, although the rules did not seem to apply in the coffee breaks:

We leave our bollocks at the [classroom] door - and flirt in the coffee breaks

In contrast discussion between men outside the group felt 'really buzzy'. As one of them put it:

It's unclear what is reality or fantasy; I feel it's a no win situation- I feel just like Mohammed Ali, I don't know how to break out!

This was illustrated in the exuberance of their presentation which expressed the release and 'quality of energy' they experienced in their group together:

Like a cork off a bottle!
We didn't sit down, moved around the room!
We were swearing! Joking! Laughing!
Our masculinity had been suppressed!

It seemed to me that the male students had been able to use their single sex group to recover the very qualities that had been lost in the whole group discussion preceding the gender inquiry. However they seemed to have done this at the expense of the women; and concluded that the lost qualities were associated with positive male attributes that had been suppressed by women on the programme.

Their presentation was a hard act to follow and there was a long pause before members of the group of female students spoke or moved to display their flipchart. The exuberant energy evoked in the male students' presentation generated a tentative response from some of the women, who moved immediately to contrast their own experience. Referring to their group experience as 'quite different', they spoke of their ambivalence at being asked to speak as 'women' rather than 'ourselves'. While male students had felt freed up by speaking from an explicitly male identity female students had felt constrained.

Two female students expressed sadness that the 'lost qualities' of being intellectual had been attributed to a culture that they had allegedly created, and a longing for the exuberance displayed by the men:

I desperately want to have those qualities…
We wish we'd been in your group… laughter and swearing...

Silences grew longer and there was a palpable sense of tension in the air, the chart drawn up by women students went up onto the wall but no one made a move to speak to it.

After an expression of impatience from one of the men there was an outburst of anger from female students who felt they were being unfairly criticised by the men for not doing things their way. In the language they used to express their anger, they seemed to challenge an implied criticism of being 'lacking' and to assert the value of their own way of approaching the inquiry task:

You were looking smug and superior.
..have got your little charts and thought we were being fluffy!

In the discussion that developed women continued to contrast the quality of their discussion with the men's and to defend its specific qualities:

Our feedback was complicated and subtle,
the men's bold and straightforward, re enacting a stereotype

They contrasted the problematic quality of their experience of identifying as women with the apparent bonding of the male students on the basis of masculinity; in response, one of the men interjected that it was once they stopped being 'for the other' they had felt freed up:

A lot of our energy was on defining ourselves as men in relation to women,
but when we stopped it was freeing!'

The sense of tension continued to build and men expressed impatience to hear more of what had actually been discussed by the group of women. One of them volunteered that he saw '*a huge amount of insecurity in these charts*' and asked: '*what's that about?*' Interaction suddenly became explosive as some women responded with anger and others moved to protect him. A chorus of women seemed to make efforts to protect the man who had been attacked while another woman asserted:

I was angry and its ok!'

Meanwhile I noticed some of the men were exchanging knowing looks, exclaiming:

Yes it's ok and we like it!
In the other group we spoke all over each other and it was alright!

In speaking to their chart different women came forward and spoke to points on their chart. Each point seemed to make a statement followed by a qualifier. As one of the points on the chart suggested, the form of their presentation effectively evoked their ambivalence, illustrating that 'being a woman in this group is an ongoing balance':

It's better to be a woman in this group than in the male dominated environments we work
in.
However my feeling is that we make ourselves genderless in this group
It's OK to show feminine emotions - but not ok to be stroppy;
Its fun to be in this group and ok to be feminine

When I was in a line of men and not seen by women in the group, I felt I had to defend my femininity [to the women in the group]
I had real problems with the question [what is it like to be a woman in this group] until we explored 'being one of the boys. I really liked 'being with the boy's - we talked about trophies, having a harem, envy when I went off into a men only learning set
Flirtiness is enjoyed by some, others not registering it; it's an invisible vibratory level in which there is a hierarchy
I am continuously striving, beating myself up for not being better, the voice of competition manifesting this way. Not about insecurity - more about striving for something elusive, I can never attain
We feel nurtured by men in the group [with emphasis and appreciation]
We are unsure whether we are valued or not when we are doing the nurturing

In subsequent discussion, students began to explore what aspects of their earlier frustration in the whole group could be attributed to gender difference, and what might be common to men and women's experience. A female student suggested:

We don't step into our own power easily - and this resonates with something you [men] said earlier- It's really hard for anyone to take a lead in this group
It seems like the bottom list (from the chart presented by the men's group) is missing and wanted from each of our groups .. this is not about gender (woman student)

And was countered by a man

Male leadership is not ok here - I hold back from speaking
In the men's group there was no difficulty vying for leadership

Discussion seemed to move away from attributing gender to problematic experiences and to return to the issues with which the session had begun:

Not to be getting on with but continuing to be 'talking about' is immensely frustrating

Finally, as the session was drawing to close, male and female members seemed to achieve a synthesis by reworking an interaction that took place during the separate group discussion, now recounted with great hilarity by one of the male students. He told his story of arriving at the door of the room where the group of female students were working in order to get some

flip chart paper. He had been so caught up in his group's 'testosterone fuelled' exchange that he had 'forgotten' there would be 'another group' in the room until he arrived at the closed door. He knocked loudly; it was he insisted a 'big knock'. At this point in his story women interrupted to protest that they had not heard - and opened the door. He saw what looked like 'people bending over papers, reverential', and thought defiantly 'I live here too!' At this point there was a chorus of women describing his entrance as 'feeling tentative' or 'a burst of testosterone through the door'; associations were made between the 'reverential figures' and 'nuns in a convent'. The exchange between the male story teller and female audience seemed to go back and forth several times and become a joint performance; as hilarity rose, the story was told again and again with zest and gusto, as men and women narrators seemed to take up exaggerated roles with enthusiasm and irony. It was as if the men and women in the room had reclaimed some of the lost qualities of sexual energy that had been 'repressed' in previous interactions and that some of the capacity to play and to engage in dialogue had been restored to the room. However this game had its own risks and costs; not all were players and there were not parts for all to play; not all the female students wanted to take part in 'flirting' with men, and I noticed that the sense of being criticised by women had been expressed by the one openly gay man. One of the women them stated that it had been too dangerous for her to participate in the plenary discussion, and claimed that one of the other female students had 'skilfully protected' her and 'managed the presentation'. This seemed to confirm the point made in their discussion that being a woman in this context might 'better than other environments' but still 'an ongoing balance'. Moreover that only certain forms of masculinity and femininity were being expressed, and that these excluded those who did not play heterosexual games.

Reflections on the struggle for learning

Did the gender inquiry enable students to work through some of their defences and to recover their capacity to learn? In events that followed, student learning seemed to have a 'now you see it, now you don't' quality:

Now you see it

I had invited students to do an inquiry into gender as a way of working through some of the defences against learning that they had enacted earlier. These defences seemed related to insistence on homogeneity and consensus in the group and to be related to difficulty in developing discussion or sustaining initiative. Students had expressed frustration at not seeing the relevance of opportunities for learning that I had offered and yet seemed unable to take up opportunities to make the links that were being offered.

In the gender inquiry frustrations were explored, and something of the lost capacity for creative interaction recovered. Aspects of experience relating to gender difference that had

not been voiced in the group previously were expressed. Both male and female students expressed a sense of not being able to be fully themselves on the programme, of being in some sense 'genderless'. Each felt negatively judged by the other. Through interactions between the two groups during the inquiry, these contrasts were enacted and to a limited extent explored. Each in some sense seemed to have lodged qualities they had lost in the other group, and in the interaction that took place, to recover them. However in the exchange between the two groups at the end of the inquiry, traditional heterosexual gender roles were the medium of exchange, and while this was ironic and playful in tone, it also rendered invisible other ways of being women and men that were carried by other members of each group.

The final teaching block took place several weeks later. At the beginning of it student anxiety levels were high and they seemed distanced and disengaged. Mid way through the block a male student insisted on renegotiating the programme for the final two days. While the programme that resulted was identical to that previously agreed, students now seemed to take ownership of it and engaged fully in applications of learning on the module.

During these days students identified specific positive learning outcomes and as far as I could tell the module had ended on an affirmative and positive note. I felt as if through a gargantuan struggle students and I had arrived together at a working alliance and as if from this new place both were able to work and to think. I also had a strong sense of significance in the assertion of masculine leadership for the final days of the module. While student facilitation was entirely consistent with the course culture, in this context the nature of our working alliance felt highly ambiguous. We embodied a potentially creative pairing between student and staff member, male and female, corporate and inquiry culture. But was it a partnership or a take over?

The precariousness of this alliance was expressed by students who described how they had felt identified with the vulnerability of the facilitator as consultant:

You were courageous…You kept on coming back

In a round of verbal feedback offered at the end of the module some students spoke of a shift in their expectations of learning from expecting answers to engaging in inquiry.

Now I understand that transformation is a journey, not a point of arrival

Now you don't

However, a different story was told when evaluation forms were returned after the summer break. Out of an exceptionally high return rate, all were highly critical of the module and made suggestions for more a more instrumental and expert led approach. The inquiry led approach, biased agendas (gender and power lens), and lack of expert consultant teaching inputs were among these criticisms.

At this moment it seemed that students had used the evaluation forms to express anxiety and ambivalence about what they had learned, even though they had identified and recorded positive learning outcomes during the final sessions. In their assignments several students had made creative use of gender, as well as other lenses offered during the module, as a lens for their readings of organisational change. Students had demonstrated that they had learned and been able to make practical applications of their learning from experience on the programme; yet they had not sustained a sense of the value of their learning after the event. Had the course culture and pressures from within their organisational contexts combined to devalue their learning and undermined their capacity to go on learning from their experience? Had I been ill judged in offering learning opportunities that were not supported by the programme culture? What might be generalisable from this specific experience to the challenges of offering experiential learning from difference in other academic contexts?

The Politics and Risks of Inquiry

Psychodynamically informed approaches to learning from experience suggest anxiety is inevitably triggered by not knowing. Learning takes place when this anxiety can be worked through, and this in turn requires an act of will as well as conditions favourable for learning to take place (Simpson et al 2000; Vince 1996; Vince and Martin 1993).

I have suggested that in this case several over determining factors made it difficult to learn from experience and for inquiry based thinking to be sustained. A struggle for integration of experiential and propositional knowing was enacted in conflicts between facilitator of learning and students. In this struggle students projected anxieties about learning into the facilitator who became in their minds the disembodied 'brain on a stick' in contrast to the nurturing rounded bodies that they desired. For the facilitator this struggle felt visceral, passionate, violent, and gendered; a struggle to sustain inquiry and to this end to establish sufficient authority and trust to enable students to engage in the work of integrating these different dimensions of their learning,

Specific challenges were articulated and experienced by students. Some of these concerned perceived threats to the culture that had been established, in which values of the community seemed to be the challenged by the invitation to focus on power and difference. Thus in evaluative discussion one student referred to the shock of no longer having a common language or perspective, in contrast to previously established communality. Related to this

was the shift from individual development in previous learning to the focus on organisational change required in this module. This shift was experienced as both an opportunity for integration and a potential loss; the opportunity for integration was threatened by anxiety that this would not be possible. Thus the invitation to re-engage with the world of organisations outside the programme triggered a crisis of confidence in their ability to sustain the selves they had become in external work roles and contexts. In this state of mind, they looked to the facilitator to embody and enact the integration that they did not experience themselves.

I have suggested that a series of splits that were already present in the programme culture were mobilised to defend against this anxiety. They took the form of values and attributes constructed as binary opposites, embodied in interactions between the facilitator and students. In the gender inquiry, these were identified by the group of male students: academic v business values; inquiry vs. bottom line; male vs. female attributes; gendered vs. genderless; emotion vs. intellect; competitive vs. consensus; leadership vs. consensus, etc.. In their presentation, they suggested that the price of learning on the programme was suppression of qualities that they associated with masculinity and which were not allowed in this community culture. In subsequent discussion female students reclaimed some of these qualities and momentary integration seemed to have been achieved. Gender difference had been creatively used as a vehicle though which some of these splits were identified, momentarily integrated, but ultimately affirmed.

The opportunity to explore different ways of being women and men did become a temporary container to enable some of these issues to be explored, but then dissolved. In subsequent evaluations, the learning that had been named and generated could not be 'remembered'. Moreover in these evaluations this work was explicitly attacked and disowned, and despite creative use of it that was made in individual assignments, referred to as the facilitator's agenda. Nor were connections made between the work on gender, power and organisational violence and what was now being enacted. Invitations to engage in inquiry was experienced as a cruel withholding of knowledge no the one hand, and on the other as an act of extreme courage in the face of mounting hostility.

The construction of the facilitator as a withholding, or failed, saviour/nurturer/protector defended students against the pain of not knowing how to bridge the gap between their experience of the programme, and the realities of organisational contexts in which they worked. Related to this was not knowing the part they played in enacting collective defences and not begin able to recognise their contribution to the defences that might stand in the way of change.

The politics and ethics of teaching inquiry: current reflections

What questions arise and what might now be learned about the risks and opportunities of inviting students to learn from their experiences of differences on programmes of experiential learning? Such programmes inevitably invite a clash of different voices, in contexts that are

poorly equipped to sustain facilitators or students of learning through the turmoil that must inevitably result. My story is intended to illumine the powerful pressures to conform that are enacted in communities of peer learning, and illustrates how these are enacted across staff/student divisions. Gender alongside other differences is an axis of power that cross student / staff boundaries and cannot be separated from questions of authority and credibility for staff or students (Stanley 1997). However strategies adopted by students are likely to mirror those adopted in organisational cultures where to acknowledge gender difference risks reproducing gender hierarchies in certain forms of masculinity are privileged, and women may seek to get by being 'genderless' (Gherardi 1995; Marshall 1995; Sinclair 2004, 2000).

The context and processes of interaction of the student inquiry evoked many of the qualities of gendered power explored by research on gendered power in organisations (Collinson and Hearn 1996; Gherardi 1995; Marshall 1995; Sinclair 1998; Wajman 1998). A key theme familiar to me was the female students' reluctance to explore gender difference, and perception that revealing their difference would risk being interpreted as evidence of being in some way lacking. This was enacted during the plenary session, and mirrored in my experience of my interactions with male and female students.

I began with a paradox, if experiential learning is intended to invite students to draw parallels between their experience of learning on the programme and in organisational contexts, then power and differences between them will have to be surfaced. But to do so is likely to call into question the culture that they have created and value of learning on the programme.   Methodologies will be needed that take into account the defences against anxiety that will be triggered by this process, and that will act as blocks to learning. Yet the context may not be favourable to support staff or students in this process.

As suggested by Reynolds, in participative designs the authority of the tutor is particularly ambiguous (Reynolds and Trehan 2003: 176). I found that in my struggle to take up a role as a new arrival in this community of practice, my outsider status was construed as difference that added ambiguity to my authority and undermined my capacity to work with these tensions. Gendered power was at the core but not the only dimension of power in the struggle that ensued: academic v business; inquiry v instrumental approaches to teaching and learning; affect v intellect; experiential v propositional learning were all over-determining factors.

In bridging the gap between business and academic environments for learning and change, teaching and learning methodologies are needed that understand and acknowledge the power of group defences, and their gendered and raced dimensions. In order to support the creative work group from this perspective, attention needs to be paid to creating institutional mechanisms that recognise the difficulty of sustaining learning from experience in environments that favour instrumental approaches and outcomes.

But what of the ethics of taking up citizenship in a country that does not recognise the opportunities for learning that one is offering? When is it legitimate to take up residence but not to join? What choices remain? These questions have no definitive answer, and are offered for ongoing inquiry, and exploration.

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Endnotes

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[2]   Dr. Ann Rippin's quilts are available electronically by request from A. Rippin @bris.ac.uk

[3]   Data for this part of the story was taken from my notes of discussion in this group, and of the feedback session between groups, and the flipchart poster produced by the group of male students as a resume of their discussion. In this sense I had a privileged 'insider' view of the female students' discussion that I did not have for the male students' discussion.

The passion for inquiry:
The contribution of abduction for research
on organizational knowledge and learning[1]

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What do Sherlock Holmes, Arquimedes, Newton, medical doctors, New York Stock Exchange traders, or Just In Time factory managers have in common? Abduction. Abduction is the mode of reasoning which allows invention, the process leading to hypothesis formulation. It is a critical step in detective, scientific, medical, managerial or whatsoever inquiry. According to C.S. Peirce, it is "the only logical operation which introduces any new idea" (Peirce, 5.171[4]), the "essence of pragmatic inquiry" (Peirce, 5.196). Like a detective, the abductive researcher tries to understand a complex and surprising situation. To make explanations emerge through the interpretation of facts and discourses, he must explore new explanatory models and connect elements that seemed unrelated. This searching phase of inquiry requires strong commitment to the situation. Passion must turn it into a thrilling process: explorers are not bored.

In the first part of the paper, we shall present the principles of abduction. In the second part, we shall analyze the consequences of abductive reasoning for research methods. Abductive methods seem particularly relevant for research about knowledge and learning, because the abductive frame concerns the creation of any new knowledge. Therefore it applies to the dynamics of knowing in organizations as well as to exploratory approaches of research. In the last part of the paper, we shall develop some examples of abductive research about learning and knowing.

Abduction as a key step in inquiry

Abduction was defined by Charles Sanders Peirce at the end of the nineteenth century. As a philosopher, logician, semiotician, mathematician, Peirce was interested in knowledge creation and hypothesis formulation. Considering that the two classical forms of inference (the way to build causalities), induction and deduction, do not account for the creation of new knowledge, he focused on abduction, "the only logical operation which introduces any new idea" (Peirce, 5.171). It is the process of interpreting unexplained facts in order to build a plausible and testable explanation.

Peirce's definition of abduction

As highlighted by Fann (1970), there are two main periods in Peirce's theory of abduction. In an early stage, he considered abduction as the third logical inference. He differentiated it from the two traditional inferences, deduction and induction, whereas in a later period (from 1901), he asserted that abduction, deduction and induction were three steps of a complete inquiry and moved from a logical to an epistemological view of abduction.

In his early work, Peirce considered that any reasoning would lead to one of the three distinct and independent types of inference: deduction, induction or abduction (often called "hypothesis"). Each form of reasoning is autonomous. In this perspective, abduction appears as an alternative to deduction or induction. Peirce summarized these three inferences in the "Barbara" syllogism (Peirce, 2.623) presented in Table 1 below.

Deduction consists in inferring a consequence, or "result", from a general rule. It starts with the rule as premises ("all beans from this bag are white"); it considers a specific case ("these beans are from the bag") to which the rule is applicable; the "result" is: "these beans are white". Deduction is an explicative inference, based on *a priori* reasoning; it infers an effect from its cause. It predicts the practical consequences of a theory for a particular case.

Classically opposed to deduction, induction is a synthetic inference that connects several effects with one cause. In the syllogism used by Peirce, we start with a case: "these beans are from this bag" and the result of the observation of a sample: "these beans are white"; inductive reasoning then infers a rule: "all the beans from this bag are white". Inductive reasoning is based on various observations of the same phenomenon, in order to confirm the theory. It consists in the generalization of cases to corroborate the rule.

Peirce proposed abduction as an alternative to deduction and induction, to explain how we introduce new perspectives and knowledge. We start with an existing rule "all the beans from this bag are white". We then observe that "these beans (on the table) are white"; we propose as a hypothesis that "these beans are from this bag". Abduction is an *a posteriori* reasoning which looks for an explanation. The observer faces a puzzling situation and tries to find a rule to understand the case. Contrary to deduction (from general to particular) or induction (from particular to general), the conclusion of abductive reasoning tells us more than what was already known in the premises. It goes "beyond the given"; it is ampliative. Abduction is also opposed to deduction because its logic is non-monotonic, it is "the logic of belief, revision and hypothesis withdrawal" (Josephson & Josephson 2002). In deduction, if the premises are true, the conclusion must be true, while abduction reasoning is fallible. In the Barbara syllogism, we propose that the beans come from this bag, but we may be wrong, they could come from another bag. However, we consider that our proposition is the most plausible one. The result of abduction is belief, and new data or inconsistencies may cause to re-examine that belief and replace it with a new belief.

Deduction	Induction	Abduction
Analytical inference	Synthetic inference	Ampliative inference
A priori reasoning: infers an effect from its cause	A posteriori reasoning: infers a cause from its effect	A posteriori reasoning: infers a mutual connection between several effects of one cause
Rule $\Rightarrow$ Case $\Rightarrow$ Result	Case $\Rightarrow$ Result $\Rightarrow$ Rule	Rule $\Rightarrow$ Result $\Rightarrow$ Case
Rule – All the beans from this bag are white Case – These beans are from the bag Result – These beans are white	Case – These beans are from this bag Result – These beans are white Rule – All the beans from this bag are white	Rule – All the beans from this bag are white Result – These beans are white Case – These beans are from this bag
Explains the consequences of a theory	Tests a hypothesis	Generates new knowledge by creating hypothesis
Predicts	Generalizes from a sample to the population	Explains

Table 1. *Differences Between Abduction, Induction And Deduction*

In a later theory, Peirce widens his work from a purely logical perspective to a methodological and evidencing process. He finally believed that the three forms of reasoning actually are the three steps of an inquiry and, as such, are complementary. The first inquiry stage is abduction, i.e. the process of building a hypothesis to justify the facts (see Figure 1). At this stage of inquiry, the hypothesis remains on probation. Deduction explains the consequences of the hypothesis and provides the necessary attributes to be tested. Induction tests the hypothesis: "abduction is the process of forming an explanatory hypothesis. It is the logical operation which introduces new ideas; for induction does nothing but determine a value, and deduction merely evolves the necessary consequences of a pure hypothesis. Deduction proves that something must be; induction shows that something actually is operative; abduction merely suggests that something may be." (Peirce, 5.171).
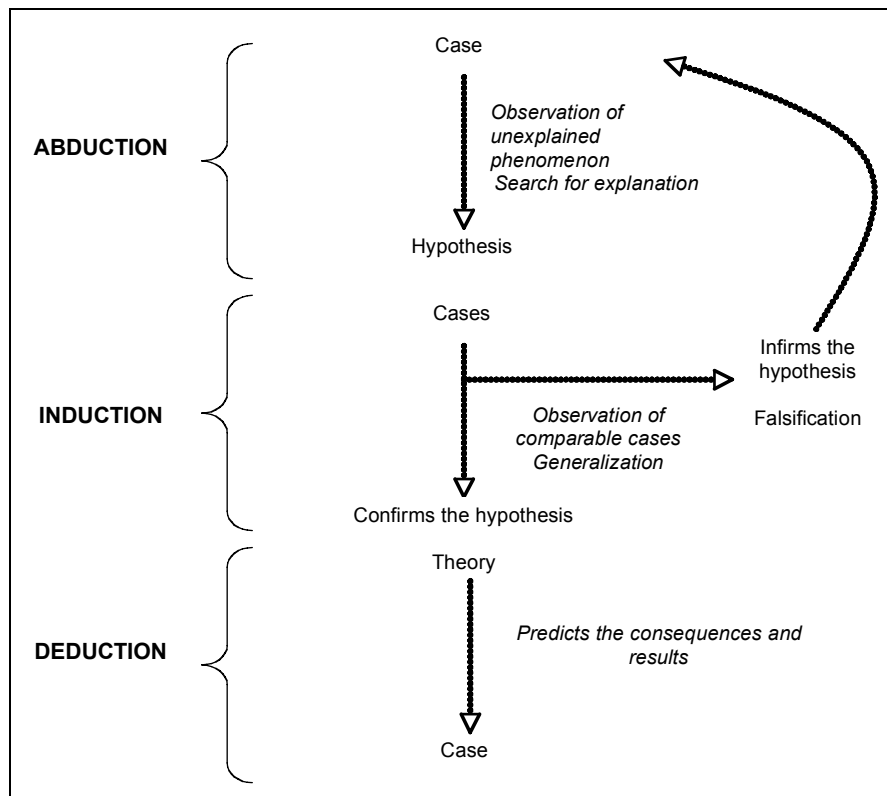
Figure 1. *Three phases of the inquiry*

In Peirce's perspective, abduction holds the prime role. It covers "all the operations by which theories and concepts are engendered" (Peirce, 5.590).

Two phases in the abductive reasoning

Peirce describes abductive process as follows: "its occasion is a surprise. That is, some belief, active or passive, formulated or unformulated, has just been broken up. The mind seeks to bring the facts, as modified by the new discovery, into order; that is, it tries to form a general conception embracing them. This synthesis (*reductio ad unum*), suggesting a new conception or hypothesis, is the Abduction.[…] The conclusion is drawn in the interrogative mode" (Peirce, 2.287).

1. Observing a surprising fact.

Abductive reasoning begins when the observer faces a surprising fact, an unexpected consequence or a situation that does not fit with her/his current schemes. "x is extraordinary ; however if y would be true, x would not be extraordinary anymore": Peirce's famous formula about abduction seems very simple, but it has important consequences.

First, as Lorenzo Magnani (2001) notices, abduction appears as the "logic of discovery": "philosophers of science in the twentieth century have traditionally distinguished between the

logic of discovery and the logic of justification. Most have concluded that no logic of discovery exists and, moreover, that a *rational* model of discovery is impossible. In short, […] there is no reasoning to hypotheses. […] Selective abduction is the making of a preliminary guess that introduces a set of plausible diagnostic hypotheses, followed by deduction to explore their consequences, and by induction to test them" (Magnani, 2001: 15-16).

Second, although abduction may seem triggered by chance, in fact it always requires some form of willing exploration. There is no abduction if there is no doubt raised by some surprising fact. But reciprocally, there can be no surprising fact if there is no existing coherent and somehow predictive model of the present situation, bound to be at a loss in front of the observed events, and some openness to challenge it. Surprising facts, singularities and variances must be chased. Sherlock Holmes says to Watson: "you did not know where to look, and so you missed all that was important" (Doyle, 1952).

2. Searching for satisfying explanation.

At facing a surprising fact, the observer searches for a satisfactory explanation, i.e. the most plausible and the most credible explanation, taking into account the available information. Abduction is inferential, because it is adopted for some reason that gives plausibility to the hypothesis: "The surprising fact C is observed, but if A were true, C would be a matter of course; hence, there is a reason to suspect that A is true." (Peirce, 5.189). In abductive reasoning, the observer tries to make sense of a situation that does not make sense with her/his current references. She/he builds different possible scenarios in order to reconstruct the story that could have led to the surprising situation. She/he eliminates some scenarios, she/he may look again at the situation to choose between various scenarios. This process may be more or less complex: the surprising situation may be far from the current schemes and theories; the scenario to be built may be a short story or a long causal relation chain; it may be rapid and easy to make it emerge or it may require metaphors and analogies with other fields, abstraction and reflexivity. As a matter of fact, abductive reasoning is not a linear causal chain. It is rather chaotic, in order to make new regularities emerge and become hypotheses.

Then the question is: where does the new theoretical model, the "plausible story", come from? In organizations, as well as in individual thinking, the assimilation of new situations to previous situations and existing interpretive schemes is the most spontaneous – and economic – attitude. To keep an exploratory mind and to give attention to potential signs, specific mechanisms are needed, at the psychological and individual level as well as at the social and organizational level. Such requirements to make abduction possible do not significantly differ from what James March (1971) calls "the technology of foolishness" or Karl Weick (2001) the "heedful mind". But this "exploration for (surprise generation and) explanation" attitude needs external territories where to find new types of hypothetical proposals, in a lateral move (from here to somewhere else) that deduction and induction do not allow. Josephson &

Josephson (2002) consider various ways in this search: (a) to discriminate among plausible hypotheses (i.e. perform a "crucial experiment", which is especially important in testing the causal ordering among observationally correlated variable); (b) to gather more data to help to define the explanatory problem more clearly; (c) to stimulate the generation of hypotheses.

The characteristics of abduction

The abductive inquiry must appear as a thrilling process and requires commitment. The inquiry looks exciting because we face something unexpected that arouses our attention because something substantial is at stakes. The perspective of new findings and new ways of knowing is a source of motivation. It goes beyond problem solving: maybe there is no specific problem to solve but the will to undertake and to open new territories. Some passion is needed to complete the inquiry and ensure the quality of the process. First, the observer must be curious enough to notice (or even to build) the "surprising fact" and to launch an explanatory process. In so doing, the passive observer turns into an active inquirer. Second, the search for an explanation involves energy and enthusiasm to obtain the best conjecture possible. As the conclusions are not given by the premises, the inquirer needs to mobilize more resources and make lateral moves in her/his reasoning by changing her/his interpretive framework. Third, the inquirer must select a story amongst numerous possibilities. For this task, at the abductive stage, he can generally not use rational evaluation systems, which are not available: it will be a matter of what common language calls "intuition", which is often very similar to aesthetic judgment (somehow the inquirer chooses the hypothesis because he/she likes it, in it he/she finds some harmony with facts).

An interpretative process

Abduction is an interpretative process: it tries to make sense of a confused reality. However, it is not only an *ex post* and final rationalization of situations, but it is also the gateway to new forms of reasoning and action. Abduction restores the structure of thought, whereas, in induction-deduction, the structure of thought is given and stable. Building a hypothesis makes it possible to keep the interpreted concrete situation at a distance and to move to more reflexive and abstract thought. Abduction transforms chaotic, scattered, numberless and meaningless facts into meaningful signs. In this perspective, it is very close to the concept of sense-making as used by Karl Weick (2001).

To interpret a new situation requires to identify (to "carve", to enact) and to read meaningful signs in it. Such a reading is never naive. It involves what Peirce calls "an interpretant", a third element (close to what some authors call an "interpretive scheme" or a "concept") which completes objects interpreted and representations to make interpretation possible. The interpretant connects the situation with some category of meaning. In many cases interpretants can be directly derived from previous experience and the new situation can be referred to a class of already met situations by strong and usual links. In that case, the

couple induction-deduction works quite well: the new situation is labeled as belonging to a well known class of situations (induction) and inherits from this label all the attributes of the class (deduction).

But when the interpretants are not obvious, it may prove necessary to build them, no longer by a "vertical move", from general to particular and vice versa, but rather by a "lateral" move, by "borrowing" interpretants from classes of quite different meanings and situations. The new hypothesis is created through a transfer, a deviation. The hypothesis is linked to the actor's experience, no longer by extension or inclusion links, but by exogenous and unusual links. In the word "abduction", the prefix "ab" precisely indicates this lateral move.

From perception to logics

In order to make sense of the observed reality, abductive reasoning mobilizes perceptual judgments that are partly unconscious or rather "preconscious". It introduces emotion and creativity into learning. The different elements are often present in our mind before we are conscious of their link with the problem we face. To orientate the search for new types of equivalence in the infinite range of possibilities, abduction involves some kind of inspiration, some "instinct which relies upon unconscious perceptions of connections between aspects of the world" (Sebeok & Umeiker-Sebeok, 1983: 18). This inspiration aspect of abduction likens it to poetic or artistic inspiration, whereas its initial definition presented it as something quite similar to logical thinking. It is also close to the free imagination deployed in games. As we saw before, the inquirer mobilizes aesthetic judgment, as engaging and developing experience with a sense of meaning (Dewey 1934). Abduction consists in transferring these aesthetic judgments into logical propositions, the abductive inference being subject to subsequent logical analysis.

The importance of metaphors and analogies

From a rhetorical point of view, abduction can be likened to metaphor, insofar as abduction evokes a situation by representing it in an exotic repertory of signs and meanings, whereas induction and deduction are more closely related to metonymy, in which the part represents the whole and vice-versa. Abductive reasoning, through analogy and metaphor, is the moment when we link observations and rules that have not been linked previously. Peirce describes this as "an act of insight", the "abductive suggestion" coming to us "like a flash" (5.181). The "flash" that characterizes the abductive reasoning does not come from nowhere, but from some kind of experience apparently unrelated but actually suddenly related. This is the "Eureka!" of Arquimedes solving the law of density by relating it to his bath. Abduction is deeply rooted in the experience of the subject and his knowledge, but this is a form of reasoning that allows one to understand a current experience through experience or knowledge of a different domain. As Bateson detailed: "Metaphor, dream, parable, allegory, the whole of art, the whole of science, the whole of religion, the whole of poetry, totemism [...] the organization of facts in comparative anatomy-all these are instances of abduction,

within the human mental sphere. But obviously, the possibility of abduction extends to the very roots also of physical science, Newton's analysis of the solar system and the periodic table of the elements being historic examples." (Bateson, 1979).

Towards an abductive approach of research processes

According to Peirce, most of scientific reasoning combines the three forms of inference. A complete scientific inquiry consists in various abduction-deduction-induction loops, even if the loops are completed at a collective or community level. One individual researcher might be limited to abductive steps in the process, and another one can capitalize on her/his hypothesis to test it empirically and generalize it through an inductive phase. As a consequence, we must consider that conjectures obtained through an abductive reasoning are scientific results and scientifically valid. Conjectures may respect some validity properties, but their properties are different from those in use for hypothetical-deductive process. In this part, we discuss the requisite and conditions of an abductive approach in research.

A Specific Status for Knowledge: With What Epistemologies Is Abduction Congruent?

Abduction is obviously coherent with the pragmatist epistemology since it was built by Peirce within this frame of thinking. Nonetheless, it also appears compatible with constructivist epistemologies, whereas it seems difficult to combine it with positivist approaches.

1. Contradictions with positivism. The logic of abduction does not fit with the positivist view of science. Indeed, when he defined abduction, Peirce planned to rebuild logic by criticizing René Descartes' idealistic view of knowledge as independent from empirical context and practical experience. Descartes had proposed "clear and obvious ideas" (Descartes, 1637-1995) as the starting point to build knowledge through logical methods of thinking, particularly deduction. He saw the process of logically reasoning from obvious assertions as the guarantee to reach a true representation of the world. In contrast, Peirce claimed that knowledge is based on the generation of action through the interpretation of experience. For him thought transforms experience into new experience and is rooted in action.

Positivists, such as Comte and Poincaré, adopted a descriptive theory of science, according to which the scientific propositions should properly describe the perceived world. This is contradictory to the abduction goal of providing explanations, not descriptions. Moreover, for Comte, a hypothesis is admissible only if it may be verified by direct observation, whereas, for Peirce, the surprising fact launching the scientific inquiry may be observed, but the hypothesis generated by the abductive process may result from unobservable conjectures.

2. Abduction and cognitivism. The relationship of abduction with cognitivism is ambiguous. On one side, research in artificial intelligence makes broad use of the abduction

concept as a theoretical basis for the exploratory search of possible logical rules. But this "cognitivist-compatible" view of abduction only applies to a specific type of abduction: selective abduction, which limits abduction to the choice of an explanatory hypothesis in some pre-existing stock of potential hypotheses. The semioticians, when they use the Peircian abduction concept, stress the creative, non logical side. If thought were only logical, it would limit itself to a sequence of inductions-deductions. There is a radical contradiction between the basic assumption of cognitivism: "thought is logical and can be described as computable modeling", and the Peircian description of abduction as a creative way of thinking, which re-frames hypotheses and opens the way to logical thinking on the basis of a renewed mental scheme.

3. Abduction and constructivism. Abduction is easier to integrate in a constructivist perspective (Morin, 1986). As opposed to positivism, which focuses on the object of knowledge, constructivism focuses on the process of knowing. In the large range of constructivist philosophies (Schwandt, 1994), knowledge does not exist before the interaction between the subject and the object takes place. It is built through this interaction. The knower does not access ontological reality but rather his or her own understanding of reality. Knowledge is contingent to the knower. This implies that knowledge about the world and action upon the world are intertwined and inseparable. Therefore constructivism emphasizes the role of practice. This perspective is quite compatible with the concept of abduction. As we shall see later, those approaches can be synthesized in the concept of inquiry.

4. Abduction and pragmatism. Of course, since it is a core concept of pragmatism, it is no surprise that abduction finds an appropriate match with pragmatist epistemologies. Peirce insists on the fact that hypotheses must have observable consequences and should be verified through deduction and induction. In pragmatism, logical thinking appears, not as the absolute guarantee of truth, as Descartes proposed, but as a powerful tool to multiply the scope of interpretation and to produce new action possibilities from hypothetical but plausible interpretations of experience. The only accessible validation of hypothesis is practical: the abducted hypothesis paves the way for experimenting or framing new experience. The selected interpretation will be temporarily and contextually confirmed, "for the time being", "in this class of situations". "Truth lives on credit", as the pragmatist philosopher William James used to say.

The Need for Comprehensive and Interpretive Methods

As most research methods have been designed in a hypothetico-deductive framework, abduction hardly finds a space within established methodologies.

Research objective

The deductive approach aims at extending theories and applying them to particular cases. The inductive approach aims at generalizing explanatory schemes from singular cases to general laws. The abductive approach aims at explaining unclear phenomena and understanding new aspects of reality. The result of abductive research is neither the validation nor the refutation of a tested hypothesis, nor a final judgment, nor an established law. It is a hypothesis that needs to be subsequently tested (Yin, 1990: 8).

Research process

The abductive research process differs from the hypothetico-deductive one. It does not begin with a theory to test, but with a surprising fact that needs to be explained. It also requires specific competences from the researcher. Critical thinking is necessary to identify the "surprising fact" that triggers abductive reasoning. The process is basically exploratory, since the researcher faces unknown phenomena and tries to explain them by using a broad range of research orientations. As explained by Yu (1994), **"abduction plays a role of explorer of viable paths to further inquiry. Thus, the logic of abduction fits well into exploratory data analysis."** (Yu, 1994: 1).

Classification may play a central role in the generation of a hypothesis, since it is one of the major mechanisms for the comparison of different experiences. The more diverse the experience, the more a researcher uses metaphors and analogies to fill the gap between them. However, even if their mechanisms are different, abduction, deduction and induction are all of three subordinated to the rigorous rules of logic to be considered as valid, and abductive research must obey specific rules of validity.

Research validity

In abductive reasoning, theory expresses a specific viewpoint oriented by an intention. Even if its proposition is fallible, it would be erroneous to consider abduction as the possibility for unlimited intuition. Abduction is not hasty judgment but proper reasoning, based on the confrontation of potential frameworks with reality. By definition, the hypothesis which is abductively generated must be validated.

Models and theories do not have the same status in abductive approaches as in rationalist approaches. The model defined by cognitivism and positivism is a logical, computable and symbolic structure which reproduces a given problem in a given situation. It is a perfect (substantive rationality) or an imperfect (bounded rationality) but always objective artifact. In an abductive approach, the model is a risky explanation in whose selection the actor expresses his personality and his specific viewpoint. Abduction has a speculative status. Abductive thought attempts to build a plausible story: not a true story, since abduction does not by itself replace logical (deduction) or empirical (induction) validation. The relevant epistemological value for abduction is not *truth*, but rather *meaning*. It is not *the* true account of reality, but *a* meaningful account of reality. The orientation given by the specific viewpoint changes

perspectives in the way the situation is looked at and provides an exit from existing theory. The problem is not limited access to information or limited capacity to process information, as in cognitivism, but rather the question of angle: how things are looked at. The specific angle is linked with a concrete person, a specific experience of life, a body, feelings and values. The criteria formulated for conventional research based on deductive-inductive loop are not appropriate to the abductive approach. However, the question of validation still remains.

We can distinguish between two sorts of questions, one about the abductive phase *per se*, another one about the global aspect of inquiry.

First, the quality of the abductive step must be reviewed, with several conditions to be fulfilled:

- As an ampliative reasoning, abduction must be launched to fill a real lack of understanding. Its aim is not to confirm or to generalize assertions already known. The result of the abductive process must be a new proposal.
- Abduction must be submitted to some methodological controls to guarantee the quality of data collection and to avoid distortion in interpretation. When using metaphors and perceptual elements, the abductive inquirer must be aware of the risk of mixing elements of different nature and heterogeneous epistemological level. The use of analogies between different disciplines must be cautious.
- Abduction must provide a satisfactory explanation: the proposition must be plausible, and even elegant, in the sense that it must be as simple as possible and it must seem obvious once established. According to Peirce, the best hypothesis is the simplest and most natural, the easiest and cheapest to test, and it will contribute to our understanding of the widest possible range of facts.

Second, the validity of an abductive step must take into account the global inquiry. Abduction is the first step in a more complex process. Deductive and inductive stages are needed to build complete theories. These steps may not be achieved in the same research or by the same researchers, but at the level of the community of researchers. In this perspective, the abductive step needs to ensure the pursuit of the inquiry by:

- rising fruitful propositions, that will arouse possible developments and multiply their outputs;
- providing the conditions for generalization of the observed phenomena in an inductive step. The abductive researcher must make her/his process of data collection and exploration explicit and traceable, in order to help the replication of the observations or the critique of the hypothesis.

Abduction Imposes a Specific Relationship between Theory and Practice.

Taking abduction into account specifies the relationship between theory and practice. First, by inserting an abductive step in the deduction-induction model, we modify the theorization process. Second, abduction in itself implies a specific relation between theory and practice, because it is an iterative movement between both and it links practice of one domain to theories of other domains.

In the inquiry conceived by Peirce as an abduction – deduction – induction loop, the process is not linear. As we build a hypothesis, we have to examine its consequences by deduction and to compare them with the results of experimentation by induction. This means that the researcher is permanently involved in a loop from case to law and from theory to practice. As soon as a hypothesis has been refuted, it is modified or another one, completely different, must be tested. "We must not make hypotheses that will absolutely stop inquiry", Peirce comments (7.480). Abduction must provide a hypothesis that not only explains the facts but can also be experimentally verified. The proposed hypothesis should have some empirically testable effects. Indeed, abduction is the first phase of an inquiry that clearly appears as a form of action: observ*ing*; conjectur*ing*; check*ing*; theoriz*ing*; are not passive and purely logical operations. In practice, these operations require both the involvement of the researcher and his action on the observed reality. Observation and the search for explanation occur simultaneously, in a non linear process. The observer faces a surprising fact, tries to understand it, and at the same time experiences something, notices a discrepancy between his or her perception and current models of interpretation, checks the various possible explanations, weighs their plausibility against his or her acquired experience. As noted by Koenig, "abduction allows to escape from a chaotic perception of reality by conjectures on the relationships things effectively have" (Koenig, 1993: 8).

Middle-range Theorizing and Grounded Theory

The hypothetico-deductive framework remains the basis for research process, methods and validation. Nevertheless, taking into account the role of abduction in reasoning and theorizing, how can we concretely integrate abduction in the methodological discussion?

25 years ago, in the Academy of Management Review, Bourgeois claimed for a new theory building perspective in management research: "most of the current generation of organizational researchers attempt to either extend or verify existent theory through empirical investigation; in contrast, few undertake new theory construction" (Bourgeois, 1979: 443). He pointed out the parallel between the induction / deduction dilemma and the theory building versus theory testing divergence in academia. He highlighted one problem: researchers remain blocked in a false deduction / induction dilemma. "The dilemma arises not out of the question of *how does one arrive at 'knowing'?* but *how does one begin the search?* The question finds its origin in the fact that there is no pure induction or deduction" (Bourgeois 1979: 446).

Bourgeois proposed to solve this problem by reconciling Merton's middle-range theorizing and grounded theory, by mixing inductive and deductive phases. He proposed a methodology which integrates Grounded Theory as developed by Glaser and Strauss in a larger process, with deductive phases completing the inductive grounded theory phase. However, Bourgeois ignored the role that abduction plays as the third part of knowledge creation. The "false deduction / induction dilemma" would be easier to solve with a triadic cycle including abduction.

Grounded theory fits particularly well in an abductive framework, as argued by Rennie (2000). Both require exploratory and iterative processes, rooted in experience. Both seek a deep understanding of phenomena and try to make relationships between different objects emerge. They can recur to the comparison of different practices, the practice currently studied, and past direct or indirect experiences of the researcher.

Strauss and Corbin (1994) acknowledge their relationship with the pragmatist position. Even if Glaser and Strauss (1985) do not deal explicitly with abduction, they highlight the differences between their method and the theory generated by logical deduction from a priori assumptions. They assert that, in their view, this form of theorizing does not produce theory, but verification. In an attempt to close the gap between theory and research practice, grounded theory focuses on the discovery of theory generated by data from observations. It allows iterative movements between observations and hypothesis, it combines reflection from researcher's framework and past experience and interpretation of facts.

Abduction does not cover the complete process involved in grounded theory. Glaser and Strauss (1985) distinguish various phases in theory generation: substantive theory discovery, empirical generalization and theory verification. Abductive reasoning is more particularly involved in theory discovery. Grounded theory relies on comparisons between observations, called incidents, to build generic categories. The emergence of categories and their integration in a relational system involves abductive reasoning. It is the moment when the researcher tries to make sense of a complex reality by understanding what he is observing and identifying possible relations and explanations. The constant comparative method, based on systematic case comparisons, achieves a loop between induction and deduction inferences when it tries to apply the categories previously established to new cases and to generalize the findings.

Cross-Fertilization and Cross-Disciplinary Research Processes

Abductive thinking means exploring and establishing new comparisons, which highlights the need for multiple influences in research. Diversity is synonym to richness and a springboard for the emergence of new ideas. New theory development calls for numerous sources of reflection. First, triangulation or collective research teams may not be considered only as a way to enforce validity but as a way to widen reflection and multiply potential new explanations. Second, an abductive framework may call for the development of cross-disciplinary research. Facing unexplained phenomena, organization researchers may find

sources of understanding in other disciplines, such as sociology, psychology, education science, but also outside social science, in mathematics, medicine, physics, philosophy. This extension into other fields of course does not aim at entirely resolving research problems but rather at findings sources of inspiration. Many major developments in organization theory came from different perspectives and metaphors between organization and other research areas: ecology of population of firms was drawn directly from biology (Hannan & Freeman, 1977), chaos theory and complexity from mathematics and systemics (Thietart & Forgues, 1997), major organizational learning models from psychology (Huber 1991, Levitt & March 1988) or sociology (Lave & Wenger, 1991; Brown & Duguid, 1991).

Empirical research within an abductive framework

Organizational knowledge dynamics studied through an abductive research process

In a research about organizational knowledge dynamics linked with planning practices, we adopted an abductive approach. The research problematic was to explore the dynamics of knowledge during planning practices (strategic planning, planning in project management, budgeting), with two main goals: first, to analyze the nature of learning which take place among planning teams, at individual and collective levels, and between planning teams and the rest of the company; second, to establish how differences in planning practices (organization, time, planning range, team composition) may affect learning. The research was based on a longitudinal case study. The main methodological references at the beginning of the research were Yin (Yin 1990) and Miles & Huberman. Collecting the data by direct observations and interviews, it appeared that the observations did not fit with the theoretical framework (mainly based on Argyris & Schön 1978, Argyris 1993): in group learning, something was happening that was not verbalized by members; the importance of tacit knowledge appeared obvious; the nature of knowledge was complex; the link between individual and collective learning did not fit with the models; learning process was not as straightforward as described in current literature. We then looked for other theoretical frameworks that could better account for the observations. We built another framework which emphasized the nature of knowledge, and its social and tacit aspects (Spender 1996; Nonaka & Takeuchi 1995; Cook & Brown 1998). Confronting this framework with further observations in the same context, the distinction between tacit and explicit knowledge appeared problematic and oversimplified. At this stage in research, we entered a reflexive phase: how did the initial problematic itself evolve during the research process? What are the goals of the research? More precisely, what is our conception of knowledge, not only the knowledge acquired by the people observed in our case study, but also the knowledge we were trying to create? What was its validity? This epistemological inquiry led to question what was really at stake. Concerning the research, we realized that the key point was not the *nature* of organizational knowledge but the *way it was used for action*: the aim of the research

was not to describe knowledge, but to qualify the link between knowledge and action, at a collective and practical level.

Then we compared our observations with the dialectic frame between "habitus" and "practice" proposed by Pierre Bourdieu (1980). We previously knew Bourdieu's study of Kabyle population in Algeria, the reproduction of elites and scientific world in France, and those works had little to do with our own observations. Nevertheless the concept of habitus in Bourdieu's research seemed to fit our own conception of knowledge dynamics. His definition of practice and the link between habitus and practice appeared as a good tool to build our theoretical model. Pierre Bourdieu did not think about organizations and organizational learning when he developed his analysis of habitus. However, the comparison between habitus and knowledge proved to be helpful. It had been made previously. For instance, Mary (1988), Lahire (1996) and Bronkart & Schurmans (1999) compared knowledge construction in Piaget's approach and habitus in Bourdieu's framework. Recurring to analogies with Bourdieu's study of societies, we built propositions to characterize organizational knowledge dynamics as it appeared in our field observations and to link this dynamics with planning practices. These propositions are not laws, since they have a speculative status. To be generalized they need other research steps, such as an inductive phase based upon other case studies to confirm or infirm our propositions and to enrich them, or a deductive phase to test our propositions as hypotheses. This research was abductive because it tried to understand an observation that did not fit with the current framework. The discrepancy between models and observation was the "surprising fact". We then entered the process of searching how to explain the observations, trying to find plausible explanations in different frameworks. We had to reject most of them because they did not fit with our conception of reality. We found a "satisfactory explanation" of our empirical questions by building analogies with Bourdieu's sociology. We used his framework as a toolkit to build our own propositions and to link knowledge dynamics and practice.
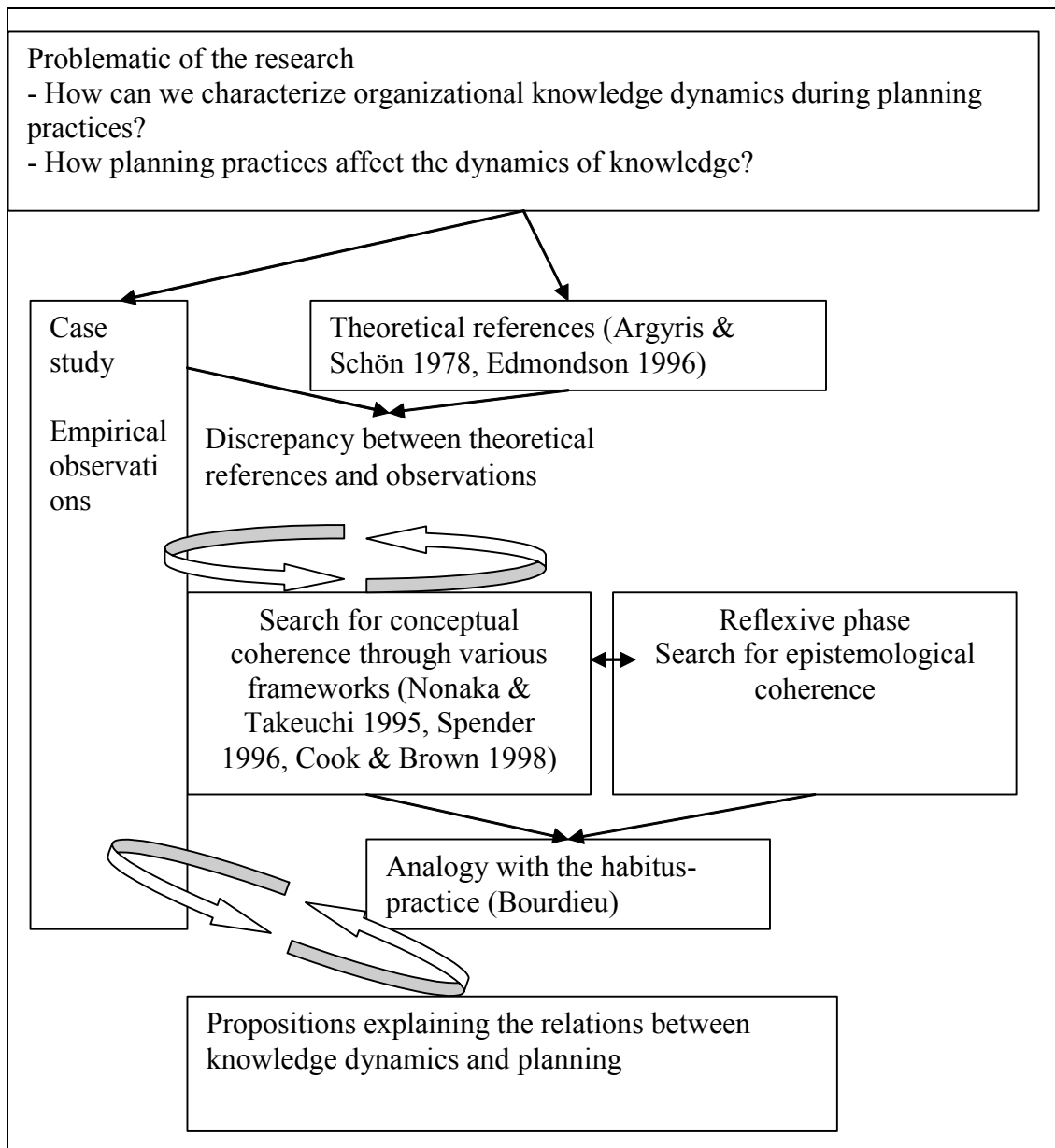
Figure 2. *An abductive research approach to organizational knowledge dynamics*

Three steps to understand innovation and group learning.

David (1988, 2001) used a three-step research process to explore innovation and group learning in the context of an automotive company. In that company, new product development is managed by two project teams, composed by managers from different departments, but at the same hierarchical level in every group. The first team was composed by top managers, the second team by middle-level operational managers. David observed different behaviors in these teams regarding the way they share information and they collectively create knowledge: at the higher hierarchical level, there was a process of hard negotiation. The meetings were rather formal, participants expressed their viewpoints with

strength and self-confidence; the team members determined precise and clear objectives for the product to be developed, without making all the underlying issues explicit. At the lower hierarchical level, the process was cooperative. The meetings were less formal, the points of view seemed weaker, people worked together to express common objectives.

David formulated three possible interpretations to explain the discrepancies between the two groups:

1. The discrepancy is only due to personality differences, not to the hierarchical level.
2. Top managers are more synthetic in their reasoning. They all know the strategy of the company and derive their propositions from it. They have a stronger expertise that allows them to go fast, and have little time to spend in meetings.
3. In the cultural context of this company, top managers do not have stronger expertise but, because of their hierarchical level, they can assert unexplained objectives that nobody will dare to criticize.

David collected more data to test these three possible explanations, and selected the third one because:

- A and B were contradicted by new data, whereas C seemed more plausible;
- C was coherent with other observations in the same company, but in other contexts;
- C was the proposition that allowed the richest inductions and generalizations, with more promising abductive-deductive-inductive loops.

The proposition C was retained as a middle-range theory, that is, a theory which is valid only in the particular context where it was built. Then, David proposed a generalization of this hypothesis. After other case studies, he proposed a more generic theory asserting that the modes of information sharing and knowledge creation vary with the hierarchical level of individuals.

Abductive reasoning took place with the observation of an unexplained discrepancy between the two groups studied. It led to organize the facts in order to propose explanations. Explanations were tested through a deductive phase. The proposition that emerged was then generalized through an inductive phase including other observations.

Abduction as a model for knowledge creation

For the researchers who investigate learning and knowledge creation in organizations, knowledge is both the "external" object and the intrinsic substance of their research. When they study learning processes in organizations, they try to describe, understand and predict what organizational knowledge is, how learning occurs, how it can be developed. But, as researchers, they are themselves knowledge workers who produce knowledge and wish to ensure its robustness and enhance its diffusion. These two perspectives about knowledge and

learning can enrich each other: the abductive framework can apply to knowledge and knowing in organizations as well as to research methodology.

First, the abductive model can explain the creation of knowledge in organizations. Actually it is often used in education science, in information science and in economics, where abductive reasoning is commonly presented as a model for knowledge development. For instance, in information science and artificial intelligence, the concept of abduction is used as a model for human reasoning. Yu (1994) compares abduction to exploratory data analysis. Shank and Cunningham (1996) detail six forms of abduction to build a model for informal learning and to learn navigation on the World Wide Web. Tagard (2004) and Chiampolloni and Torroni (2004) use abduction to model human reasoning in a judicial context. In decision sciences, Lundberg (2000, 2004) has developed an abductive model to explain and to predict the emergence of inference-based decisions in complex and ambiguous environments. Lundberg (2000) shows the abductive features of financial traders' learning in their search to explain market phenomena. In an economic perspective, Noteboom (1999) uses "the logic of abduction" to analyze the changes of industrial structures and innovation. He sees abduction as a heuristic to explain learning and competence building.

Second, we can use the classification of abductive processes as generic interpretation processes to classify the modes of knowing in organizations. The initial "surprise" raised by a new situation can lead to two abductive strategies. In the first strategy, an explanatory model must be sought within an existing repertory of models. Most authors qualify this search as "selective abduction", which expands existing theories by giving them new areas of application. In the second abductive strategy, a new explanatory model must be built because none of the available models provides a satisfactory account of the situation. Most authors label this invention as "creative – or inventive – abduction", which radically redesigns theories. In the case of creative abductions, a "meta-abduction" is necessary, to filter the creation of new models by asking the question "does the new proposed law belong to the universe of our experience, is it acceptable in this perspective?" and to ensure the acceptability of the invention.

Eco (1983) goes further by distinguishing three levels of abduction, according to the incremental or radical aspect of the process. He divides selective abduction into two classes. "Overcoded abduction" occurs when the abnormal situation can be linked to a rather obvious, existing explanatory model. "Undercoded abduction" occurs when the selection of an existing model implies a fairly high level of risk – here we can speak of "elucidation," as the search in repertories is more complex and more uncertain. "Creative abduction", more frequent in exploratory research, occurs when it seems inevitable to change the existing paradigm in order to build a new hypothesis.

The Just In Time manufacturing strategy can provide good examples of abduction. In a rational and deductive way, Just In Time strategies are often described as 1/ seeking improvement plans which will make it possible to drastically reduce inventory levels, 2/ as a consequence of 1/, reducing inventories. But this theory can be reversed in a way which many

practitioners will find better matched to their experience: actually, Just In Time often happens to be a process in which the gradual reduction of inventories imposes performance improvement plans – because the reduction of inventories gradually reveals the performance problems of the organizations which were hidden by the high level of inventory (for instance, unreliable suppliers do not visibly impact the performance because the high level of inventory decouples the normal production cycle from the suppliers' deliveries). The result of the deductive theory (reducing inventories) becomes the trigger of the abductive approach. Just In Time strategy can be reformulated: 1/ reduce inventories, 2/ seek improvement plans which will make it possible to solve the performance problems revealed by lower inventories. Just In Time appears then as a knowledge creating strategy, a permanent abductive search (generally selective abduction oriented towards incremental changes) for new organizational solutions to face lower inventories and to shorten lead times. The "surprising fact" (lower inventory) comes first, the obligation to find some new models comes as a consequence.

Furthermore, there are threshold effects: for instance, if production lead time becomes shorter than the generally accepted commercial delivery time, the need for any product inventory vanishes. A new type of strategy must then be invented, based upon production-to-order instead of production-to-inventory, making it possible, for example, to move from Fordian standardized product strategies to customerized product strategies. Such a radical change can then be analyzed as creative abduction. Problem-solving in abnormal situations (in our example, abnormal situations artificially and willingly created by human decision to reduce inventory) tends to respond to selective abduction schemes, whereas basic scientific research, radical strategic change or breakthrough innovation all tend to respond to creative abduction schemes. In no way do innovation and new hypothesis creation follow deductive / inductive schemes of reasoning.

Conclusion

Analyzing the role of abduction in research processes is not just a matter of words, of re-labelling practices with some unusual term. If the theoretical frame of abduction is neglected and knowledge creation is modelled through a dyadic deduction-induction theory, research and practices are based upon a view of knowledge creation that may induce severe backlashes upon research and managerial practices. Learning processes are understood in a truncated way, which limits the possibilities to act upon them. The focus upon abduction imposes the view of knowledge creation as an active, collective and engaged inquiry. It reintroduces emotions and passion into research, expressed in the imaginative building of new hypotheses, the use of metaphors and analogies, the aesthetical evaluation of competing hypotheses.

Abduction also modifies our conception of knowledge creation and innovation as a triadic process –abduction -deduction-induction instead of the traditional dyadic model –deduction-induction. It can lead to the critical reappraisal of some existing theories. For instance, the generation of new theories is sometimes described as a chain of conversions of knowledge

from tacit to explicit to tacit again (Nonaka & Takeuchi 1995), the conversion from tacit to explicit appearing as the archetypical way to transform individual into collective knowledge. Those spirals of knowledge are quite similar to the generalization/application-appropriation movement that characterizes dyadic induction-deduction loops. The triadic abductive cycles stress the creation of new stories and new models, on the basis of interpretation, perception, and aesthetic judgment.

Last, the study of triadic abductive cycles may allow building coherence between methodological issues as exposed here and theoretical issues about organizational knowledge and learning.

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Endnotes

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[4]   All numerical references refer to the *Collected Papers* of Charles Sanders Peirce (1958), the first number corresponds to the volume, the second to the paragraph.

Big talk, Small talk.
A crucial but neglected knowledge management activity

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Introduction

Knowledge, whatever knowledge is, is a concept too loose, ambiguous, rich, and pointing in too many directions simultaneously to be neatly organized, coordinated, and controlled (Alvesson & Kärreman, 2001). It thus comes as no surprise that knowledge management (KM) is seen as a problematic (Swan & Scarbrough, 2001), oxymoronic (Alvesson & Kärreman, 2001), conflictual (Scarbrough, 1999), and fashionable concept (Scarbrough & Swan, 2001). Two different management models have gained special popularity in KM discussions, that of a community approach based on mutual coordination and that of a cognitive model based on normative control (Alvesson & Kärreman, 2001; Newell et al., 2002). Each model involves a different appreciation and establishment of KM practices. KM proponents embracing a community model appear more inclined to the adoption of HRM practices whereas the heralds of a cognitive model typically favour ICT practices. Overall, KM is conceived as an interwoven set of policies, strategies and techniques aimed at supporting the organization's competitiveness by optimising the conditions for knowledge exploitation and knowledge exploration via collaboration among employees (Davenport & Prusak, 1998). This broad definition, so we believe, is based on wishful thinking and grand rhetoric. More colloquially, it appears to be 'more easily said than done'. We argue that the adoption of a knowledge perspective on organizations is more fruitful for *understanding* organizations and their management in a critical sense than for *managing* them. From this point of view, the community approach appears as the most prolific. This approach has been largely developed as a critical assessment of the cognitive model, criticizing it for its mostly implicit, black-boxed and naïve notions of organizational knowledge. In this paper, we argue that, when a community approach to the management of knowledge is prevalent, the organizational conditions for inter-personal collaboration are enacted, or at least promoted, through *talk*. Yet, to date, the apologists of a community approach largely neglect this crucial mechanism. We contend that the prospects and constraints surrounding the problematic relationship between management and knowledge cannot be fully understood if we fail to recognise the role of talk as a powerful instrument managers use to make sense of organizational realities and to recreate these (e.g., Mintzberg, 1973; Mangham, 1986; Eccles & Nohria, 1992).

Ordinary talk is not only the most pervasive form of behaviour (Boden, 1997, p. 14), but also constitutes the primary medium through which human beings make sense of their world (Boden, 1994). Talk is central for understanding the inscrutable nature of organizational life even if its evanescent qualities make talk itself and its constituent effect on organizations hard to grasp. When failing to consider its value for organizational life, we allow a vital layer of knowing to escape from our grasp (King, 2003). Few can dispute its power, as organizations are created, sustained and changed through talk (Mangham, 1986, p. 82). To put it differently, organizations are made to 'tick' through talk (Boden, 1997).

While most organizational actions are conveyed through different, recursive and relational layers of talk, it appears particularly intriguing that its significance is utterly absent from the KM debates. This is particularly problematic when a community approach to KM is adopted, because the social mechanisms shaping communities derive their form and existence from talk. We understand this as an outstanding opportunity critically to examine the role of talk for enacting and framing working agendas within knowledge-intensive domains. Therefore, we believe that it is particularly interesting to explore the ways through which talk becomes a valuable instrument for the management of knowledge. We focus on management perceptions and practices in one particular knowledge-intensive domain, viz. the management of academic research. Broadly defined, academic research management is an activity aimed at improving the effectiveness and quality of research. Academic research is a timeless and innate type of knowledge intensive work. When compared to knowledge-intensive activities that have typically received much attention in KM studies, such as management consultancy (e.g. Alvesson, 1995; Werr & Stjernberg, 2003) and research and development in business environments (e.g. Armbrecht et al., 2001; Farris & Cordero, 2002), academic work and its management appears as particularly interesting. Academic research develops in what Creplet et al. (, 2001 #83, p. 1530) label as an epistemic community, characterized by "the objective of knowledge creation for the sake of knowledge creation". Academic research involves knowledge creation in perhaps its purest sense. Therefore, the management of academic research constitutes an outstanding example of the management of a knowledge-intensive activity that allows unravelling the fundamental intricacies involved in imposing management purposes on a potentially 'purposeless' activity {cf. Fuller, 2002).

In this paper, we pose ourselves the question as to whether, and if so, how the dominant conversational mechanisms are related with the organization of knowledge work as exemplified by the management of academic research. In order to answer this question, we examine first the two competing KM models addressed above. Then, we discuss the role of talk within organizations. Next, we present the findings of an empirical research of academic research managers operating within the domain of business administration and management studies in The Netherlands. Analyzing these findings with the principles of the Grounded Theory Approach (Glaser & Strauss, 1967), we explore the ways through which talk emerged from the grounded accounts as an aspect that pervades a variety of managerial actions. The objective of this analysis is to explain how the activity of research managers, which is inspired by the drive to enhance the quality and quantity of warranted knowledge, revolves around various forms of talk. We conclude by arguing that talk can be a powerful instrument to convey the need for reforms in a knowledge management sense, to legitimise choices and approaches chosen by knowledge managers, and collectively to reconstruct their work agendas.

Knowledge Management: roots and ramifications

Interest in the Knowledge-Based View of organizations (KBV) (e.g., Grant, 1996; Eisenhardt & Santos, 2002) and associated notions of Knowledge Management (KM) (e.g., Davenport & Prusak, 1998; Alvesson & Kärreman, 2001) boomed in the second half of the 90s, both as a managerial discourse and as an academic field of inquiry (Swan & Scarbrough, 2001). The KBV combines ideas developed in the resource-based view of organizations (Wernerfelt, 1984; Barney, 1991; Penrose, 1995) with ideas stemming from the organizational learning literatures (Argyris & Schön, 1978; Fiol & Lyles, 1985; Levitt & March, 1988). As a result, the KBV pays much attention to the competitive importance of the knowledge resources, labelling these as valuable, rare, and hardly imitable and substitutable. These qualities make them particularly amenable to management interest, but also vulnerable to managerial maltreatment.

The KM adds the management dimension to the developing KBV picture, as it concerns policies, strategies and techniques, tools or practices aimed at supporting an organization's competitiveness by optimizing the conditions for knowledge exploitation and knowledge exploration via collaboration among employees (e.g., Nonaka & Takeuchi, 1995; Davenport & Prusak, 1998; Zack, 1999). Perhaps owing to its highly ideational character (c.f., Donaldson, 2001), the concept proved to be so successful that it became a hype, stirring the attention of researchers from diverse areas, such as economics, philosophy, psychology, computer science and sociology (c.f., Earl, 2001).

To date, KM debates have mostly looked at management as a set of technological and organizational interventions, inspired by a management model. Two management models and their confrontation have gained specific popularity in KM discussions, that of a cognitive model based on normative control and that of a community approach based on mutual coordination (e.g., Alvesson & Kärreman, 2001; Newell et al., 2002). Each model rests on a different appreciation of knowledge as the object of management and involves a different assessment of KM interventions. Overall, knowledge came to be seen mostly as an *asset* or as a *process* (c.f., Empson, 2001, emphasis added). Researchers who adopt a 'knowledge as an asset' perspective appear mostly inspired by economics and computer science. They view knowledge as an objectively definable commodity with an exchange value determined by an internal market (e.g., Griffiths et al., 1998; Teece, 1998). Researchers who espouse the view of 'knowledge as a process' typically find their main sources of inspiration in sociology. They see knowledge as a subjective, multidimensional and multifaceted activity that can be contested, situated, socially constructed, distributed, provisional, political, pragmatic, purposive, etc. (e.g., Blackler, 1995; Tsoukas & Mylonopoulos, 2004).

These different beliefs as regards the ontological and epistemological status of knowledge lead their adherents to embrace different management models. The cognitive KM model is based on the premise that knowledge equals objectively defined concepts and facts. It also builds on the assumption that knowledge can be codified and transferred, which clearly relates to the perspective of 'knowledge as an asset'. This model relies on the contention that

knowledge resides in the brains and bodies of individuals and groups who possess knowledge, i.e., on what Cook & Brown (1999) define as an epistemology of possession. As a result, KM defined along the lines of a cognitive model aims at codifying, capturing and commodifying knowledge. It reserves a crucial role for ICT technologies (Newell et al., 2002). Differently, the community model of KM builds on the 'knowledge as process' standpoint. This model is based on the premise that knowledge is socially constructed, experiential, at least partly tacit, and transferred through participation in social networks. It implies the adoption of what Cook and Brown label as an epistemology of practice (1999). This epistemological stance relates to an activity theory of knowing (Blackler, 1995), which stresses that a separation of knowledge from the processes that produce it fails to acknowledge its situated, contested and mediated character. Consequently, this KM approach stresses the socialization practices underlying knowledge sharing, as these determine the proclivity of organizational members to trust and cooperate (Newell et al., 2002).

While these two competing KM models may not entirely account for the diversity of standpoints and practices with regard to how organizational knowledge is to be understood and handled, their distinction is certainly instructive and conceptually useful. In addition, they clearly reflect the divide that exists between the partisans of the KM debate, viz. those who are interested in the 'technology' side versus those who emphasise the 'people' side. In the social science wing of KM, the latter group seems to dominate (c.f., Alvesson & Kärreman, 2001). Therefore, the community approach to KM appears as a good candidate to represent the main concerns of this 'social wing', as it draws attention to socialization as a means to promote cooperation and trust between co-workers. We should make clear here that we concur with the belief that without trust KM initiatives are bound to fail, regardless of how thoroughly they are supported by technology and rhetoric (c.f., Davenport & Prusak, 1998, p. 34). Cooperation, for example, is unlikely to occur productively and enthusiastically if not infused by genuine trust. The dynamics of cooperation may reinforce or undermine prior levels of trust. The promotion of socialization practices, which is meant to engender trust, may result from a strategy to promote a collective consciousness of being 'in-the-same-boat', in which an understanding of individual problems is built on an understanding of the problems faced by all members of the group (Van Maanen, 1978, p. 24). In a group context, people appraise a shared problematic situation by *talking* in stylised language, and the appraisal talk lasts until participants agree on a cure (Hewitt & Hall, 1973, emphasis added). Since everyday talk is the primary medium through which human beings make sense of their world (Boden, 1994), talk informs and shapes relationships, problem solving, and learning (Donnellon, 1996). To put it bluntly, talk drives action within organizations (King, 2003), as it is through language that individuals seek to justify themselves, legitimise their actions and persuade others (Davis & Luthans, 1980). The contention that talk informs and enacts coordinated action is almost self-evident. Surprisingly enough, however, this discussion is virtually absent from the broad KM debates, apart from a few notable exceptions (e.g., Alvesson & Sveningsson, 2003). The objective of this paper is to contribute to this debate,

developing the argument that when a community orientation to KM is prevailing, *talk* should be seen as a powerful tool to convey and shape reforms, organizing work, legitimising choices, approaches, etc. Below, we will consider whether and how empirical data support this contention in the case of academic research management. Before presenting these findings, we will discuss how talk has been framed within the domain of organization studies.

Talk at work as work

Organizations can be seen as networks of intersubjectively shared meanings that are sustained through the development and use of a common language in everyday social interaction (Burrell & Morgan, 1979). Social interaction is conceived as a process in which people orient and align their conduct toward one another, and toward a common set of objectives (Blumer, 1998, p. 7-10). Language is the channel through which most of the social interaction is accomplished, since it has the capacity of infusing and structuring actions in the context of perceived realities (c.f., King, 2003). Language is, after all, one of the key tools of social influence (Pondy, 1978, p. 91). The most vivid point of convergence between language and social organization is to be found at the level of the speech acts, making these central to the analysis of all forms of interaction (Drew & Heritage, 1992). To put it differently, social phenomena exist only because the capacity for speech has made complex social organization possible (Boden, 1997, p. 5). Everyday talk, which is rooted in language and speech, thus becomes the primary medium through which humans make sense of their world (Boden, 1994).

Few can dispute the power of talk within organizations, as this is inherent to almost every part of the practice of organizing (King, 2003). Through multiple layers of everyday talk, people in organizations manage, form coalitions, compete for resources, negotiate their environment, discuss agendas, discover or create shared goals and interests, uncertainties, and potential coalitions, conflicts, and generally muddle their way through the maze of organizational life (Drew & Heritage, 1992; Boden, 1994; King, 2003). Because talk portrays and recreates the heterogeneity and complexity of the organizational life while ensuring that the everyday business of organizations is accomplished, talk drives action within organizations (c.f., King, 2003). Therefore, talk is central to what organizations are (Boden, 1994, p.9). Talk-in-interaction enables professionals to pursue most of their working activities and practical goals (Drew & Heritage, 1992). Therefore, it is likely to surface in and pervade across strategies, inferences, judgments, routines, promises, procedures, norms, values, frameworks, codes, choices, routines, selections, and the like. Talk is necessary and powerful in at least two senses. First, it does things for the speaker, as it discloses his or her version of something to others. Second, talk gets others to do things both mechanically and by means of influence (Gronn, 1983). Through talk, people not only reproduce the dominant and perceived institutionalised arrangements, but they also significantly create and recreate fine distinctions that make the organization come alive (Boden, 1994). For instance, it is in the social context

of talk that problematic situations are defined, because talking about problems structures their nature (Hewitt & Hall, 1973, p. 369). In most organizations, people mix work tasks with social interaction and they do so largely through talk. Since the organising and structuring of organizations is a primarily talk-based process, talk and task tend to intertwine in finely-tuned ways (Boden, 1994; King, 2003). By means of talk, people reconcile and align their own beliefs and actions, enabling organized action to occur (Donnellon et al., 1986).

Surprisingly enough, models of management and organizational behaviour often fail to acknowledge that managers' work is interactive in its essence (Davis & Luthans, 1980). The interactive nature of management indicates that most management work is conversational. When managers are in action, they are talking and listening (Eccles & Nohria, 1992, p. 47), which draws attention to the inherently relational character of their role. The managers' world is a verbal and oral one, as much time is spent in persuading, justifying, and legitimising past, present, and future courses of action (Davis & Luthans, 1980, p. 65). Observing managers in action shows that even though they may describe their work in rational terms, they spend very little of their time explicitly engaged in planning, organizing, staffing, directing, coordinating, reporting, and budgeting (Eccles & Nohria, 1992, p.47). Most of the managers' time is spent in verbal interaction with others, for instance, in scheduled or unscheduled meetings, phone calls, personal visits, etc. (Davis & Luthans, 1980; Eccles & Nohria, 1992). As Mintzberg (1973, p. 38) puts it, virtually every empirical work of management time allocation draws the attention to the great proportion of time spent in verbal communication. Managers spend between 70 and 90 percent of their time engaged in some form of talk (e.g., Mintzberg, 1973; Gronn, 1983; Eccles & Nohria, 1992). This is not just an attribute of top managers or executives, as middle managers were also found to spend most of their time talking and listening to other persons, exchanging information, advice, and instructions, mostly face-to-face, or informally in small groups (Horne & Lupton, 1964). These authors conclude that the managers' talk is mainly about problems of organizing, regulating and unifying, i.e., about how to get things done. They emphasize that this pattern shows no marked relationship to the size and technology of the organization.

Consequently, the claim that managing concerns talk should come as no surprise (e.g., Boden, 1997; King, 2003). Talk *is* the work, as it not only consumes most of manager's time and energy, but it is also a powerful instrument or tool for performing actions like influencing, persuading, or manipulating (Gronn, 1983, emphasis in the original). Several studies stress that talk infuses and informs the managerial activity. For instance, Gronn (1983) shows that talk not only accomplishes administration work but is also used to do the work of tightening and loosening administrative control. Donnellon (1996) argues that teams do their work through language and that talk is the medium through which teamwork is done. Forray & Woodilla (2002) contend that human resource managers construct and sustain notions of 'fairness' and 'consistency' through talk. King (2003) holds that talk is the 'glue' that draws together the vital liaison between doctors, nurses, ancillary staff and patients. And, Alvesson & Sveningsson (2003) draw attention to the relational character of talk, arguing that talking

and listening informally create feelings of participation, confirmation engagement, interest, visibility, and respect.

Method

The goal of this paper is to contribute to the theoretical debate on the role of talk in defining and shaping the legitimised work agendas of groups in knowledge-intensive contexts. More specifically, we pose ourselves the question as to whether, and if so, how the dominant conversational mechanisms in a knowledge-intensive organization can be related to the organization of knowledge work. We argue that academic research management qualifies as knowledge management, as it broadly aims at improving the effectiveness and quality of the knowledge production process that defines what academic research is all about. A valuable source of theorizing lies, so we argue, in the perceptions and practices of academic research managers. We strongly believe that the relevant knowledge regarding the intricacies of academic research management is engrained in their experience and perspectives. Since research managers are the privileged bearers of this knowledge, the relevance of their contribution to theory development becomes indisputably central.

The grounded theory approach (Glaser & Strauss, 1967) appears particularly useful here, as it highlights the relevancy of the participant's experience, opinions, actions, etc. Grounded theory is a highly systematic and inductive methodology used for the collection, analysis and continuous comparison of any sort of data, both qualitative and quantitative. This point is worth making, because GTA is mostly portrayed as a class member of qualitative research methodologies (e.g. Denzin & Lincoln, 2000; Patton, 2001). However, Glaser has repeatedly stressed that this equation involves a confusion because the method is defined by its aim of conceptualization and in that quest is by no means restricted to the use of qualitative data alone (e.g. Glaser, 2001, 2003). It is worth noting that Glaser himself has contributed to the confusion that he contests, by the subtitle of his and Strauss' seminal book on GTA – 'The discovery of grounded theory: Strategies for *qualitative* research' – and by the arguments the authors give in the book for doing qualitative research. Ironically enough also, the application of the very principles of GTA to the practices in which it has been used by researchers, which overwhelmingly concern investigations of a qualitative nature, would undoubtedly reinforce the strong association between GTA and qualitative methodologies.

As an inductive method, GTA seeks to discover theoretically relevant concepts from data, rather than from existing theories. The purpose is the generation – not the verification – of theory used in describing and explaining basic common patterns in social life (Glaser & Strauss, 1967). A guiding maxim of GTA is that symbolic meaning is embedded in social interactions. This shows that the birthplace of the method is symbolic interactionism, represented in the person of Anselm Strauss who was a pupil of Herbert Blumer, one of the great names in the history of symbolic interactionism (cf. Alvesson & Sköldberg, 2000). As the title of Glaser and Strauss' book – 'The *discovery* of grounded theory' – points out, the

method is not only the heritage of symbolic interactionism but also shows positivistic traits, mostly brought in by Barney Glaser. GTA shares with positivism its contention that data are mostly theory-free and that theories are 'out there' for researchers to be scooped up. This much-criticized side to GTA is at odds with the argument, which is generally acknowledged by theorists of science, that it is never possible to distil theories of deep structures from data alone (cf. Alvesson & Sköldberg, 2000). However, these criticisms do not undermine the value of postponing theoretical choices and putting empirical data in the front seats of conceptualization and theory development, as GTA advocates.

The GTA method has been largely developed in studies of professional work carried out in complex organizational settings, making it particularly appropriate for researching managerial and organizational behaviour (Locke, 2001). Moreover, Locke offers several other characteristics of research situations in which adopting a GTA has proven appropriate. She maintains that the method is useful for capturing the complexity of the context in which the action unfolds. She argues that it links well to aspects of practice, enabling the participants to gain a perspective on their work situation. She shows that it is helpful for enlivening mature theorizing, as it brings new insights to established theoretical areas. GTA shares with ethnomethodology its focus on the actor perspective. In the present research, working along the lines of a GTA approach was chosen as the preferred option over an ethnomethodological approach. Within ethnomethodology, the established research tradition of conversation analysis shows the closest connection to the research topic of this paper, as it also allows unravelling elements of talk in management descriptions (e.g., Heritage, 1984; Drew & Heritage, 1992). As we do not seek either to track down the ordinary and everyday conversation of actors involved in particular forms of social interaction or to unpack the dynamics of language-in-interaction (for example, speech acts or talk), we chose not to rely on that research tradition.

Empirical research setting and interview structure

Two fundamental choices were made in the research design. First, we examined only publicly funded research, i.e. research not financially dependent from or commissioned by commercial sources. This allowed us to focus on the management practices aimed at promoting knowledge creation in a pure sense. Second, the research was conducted in the domain of business administration and management studies in the Netherlands. Within this academic domain, research is predominantly organized by research institutes whose management structure involves a director and programme coordinators. The former delineates the overall research strategy and policy, while the latter are responsible for organizing the research at the group level. Hereafter, the term 'research manager' will be used as an aggregate term referring to both research directors and programme coordinators. Data collection took place between March 2003 and August 2004 and included institutes whose

research programmes were explicitly organized around that research domain: the universities at Eindhoven, Enschede, Groningen, Maastricht, Nijmegen, Rotterdam and Tilburg.

An analysis of research-related documentation (for example, descriptions of policies, themes, and goals) proved useful for understanding how research is generally structured, both at the research institute and at the research group levels. One of the researchers conducted twenty-nine in-depth semi-structured face-to-face interviews with respondents formally responsible for research coordination tasks. The interviews covered two general questions. Firstly, respondents were asked how they conceived research management. Secondly, they were invited to reflect on how they conduct research management. The interviews took about two hours and were all tape-recorded. The respondents were sent a concise transcription of their accounts for assessment.

Data analysis

The data from the interviews were analyzed using the constant comparative method of grounded theory (Glaser & Strauss, 1967). Inspired by the maxim that social interactions are imbued with symbolic meaning, the method of grounded theory aims at surfacing the latent patterns that account for the main concern of participants. This objective is based on the premise that the continual processing and resolving of that concern is the prime mover of their behaviour (Glaser, 1998). Since grounded theory aims to transcend the data in order to explain the theoretical preponderance of behaviour in a substantive area, the GTA claims that an appropriate application of its principles leads to products that are abstract from time, place and people. According to Glaser (1978), the result is a theoretical contribution that fits (the concepts express patterns in data), that works (the concepts and their relationships account for the participants' main concern), that is relevant (the theory deals with participants' main concern), and that is modifiable (as new data is analyzed).

GTA offers many principles, methods and techniques for analyzing data for 'discovering' the theory that they convey. The tactics GTA proposes to move from categories to theory include writing of memos, finding core categories and drawing diagrams. An essential method in the discovery process is the method of constant comparison. This method promotes the ongoing comparison of codes, patterns, properties, associations, and exploration of possible relationships between concepts to be backed by a permanent openness to emerging concepts. The processes of both coding and memoing are dynamic. This means that, since new data findings are to be constantly compared with similar ones from previous interviews, codes and memos are recursively reinterpreted and rewritten.

In the research, the respondents' accounts were coded immediately after the interviews and one after the other, to raise the theoretical sensitivity to emerging concepts. In addition to the codes, an analytical elaboration of their meaning and possible relationships with other codes was explored in memos.

Findings

The analysis of the interviews showed that the work of academic research managers can be understood as a subtle blend of structured and informal activities. How successful individual managers prove in brewing a digestible blend, accounts for their aptitude in achieving a productive balance between their mission and the researchers' leeway for self-development. The answers to interview question one ('How do you conceive research management?') and two ('How do you conduct research management?'), provided a rich account of the intricacies surrounding their work. In this paper, we only focus on the aspects of conversational practices that are connected to the effective or tentative organization of the research work. These include meetings, negotiation, influencing, advice, etc. The analysis of the results shows that the talk of the research managers included in the sample can be understood as a multilayered, multifaceted, and multipurpose activity. It also shows that this talk can assume three different, though interrelated forms. These we label as institutional talk, big talk, and small talk respectively. These three forms act as sensitizing concepts that are instrumental in making sense of academic research management. *Institutional talk* stands for the strategic debate with regard to the fundamental organizational choices, for instance, as regards strategic orientations, pay-per-performance criteria, etc. *Big talk* refers to the programmed discussions going on mostly at the group level, aimed at defining legitimised courses of action within the group. *Small talk* pertains to the more subtle ad-hoc, spontaneous corridor talk that may have inspirational or motivational impact. Table 1 shows a summary of the categorization of the proposed talk forms, according to three dimensions of their purpose (what is the talk aimed at?), the process that carries them (how does it happen?), and the by-products they engender (the expected outcome of the talk action). Next, we will discuss in some detail each of these forms of talk and explore how these were addressed in the interviews.

Institutional Talk

The concept of 'institutional talk' stands for the scheduled and structured forums of discussion that represent and enable the bureaucratic mechanisms of organizational maintenance. In these forums, participants' talk focuses on key strategic discussions that involve, for instance, fundamental choices and decisions on the positioning and structure of the research groups, as well as the sort of warranted research output these are expected to deliver. The content of these discussions may surface in themes such as the definition of criteria for resource allocation and research-performance evaluation, the appropriateness and urgency of self-assessment exercises, the recruitment of researchers, and the like. As one research programme coordinator explained:

> '[…] we have regular meetings in which we review the performance of the different subgroups. We try to assess the quality of their research, their productivity, the funding opportunities, and the like. We cannot afford to let things go their own way, looking at

them from a distance and only intervening when something is getting out of hand. We need clear directions and guidelines, which can be changed occasionally.'

Or, as a research director associate argued:

'[…] heads of departments are, for instance, responsible for appointing researchers and conducting the annual performance appraisal. In order to ensure that there is a coherent idea as regard to where we are going, we have regular contacts with the research coordinators. The devolution of responsibilities to coordinators is not a one-time event, since they always revisit us with lots of questions (for example, whether we can facilitate a particular activity). It is a back and forth process.'

	Institutional talk	**Big talk**	**Small talk**
Purpose	• Policy making • Strategy definition • Maintenance • Legitimization	• Prioritization • Specialization • Legitimization • Evaluation	• Sense making • Meaning making • Social bonding • Coaching
Process	• Programmed • Formal • Negotiation • Relational/dynamic	• Programmed • Formal • Social • Relational/dynamic	• Ad-hoc • Casual • Personal • Relational/dynamic
By-product	• Norms and values • Negotiation space • Guidance • Regulation	• Cooperation and trust • Awareness • Profiling • Collective learning	• Motivation • Learning • Development • Nursing

Table 1. *Types of talk*

Institutional talk can be understood as aimed at defining and inculcating a sense of direction and purpose that serves to select appropriate courses of action. The underlying process is dynamic and relational, rather than rigid. This finding suggests that the conversational mechanisms aimed at defining the institutional normative framework in which academic research is to take place are open to reinterpretations, concessions and adjustments. In other words, these mechanisms entail considerable room for negotiation and bargaining over the appropriateness and validity of research means and ends. This allows for managers and researchers to take the relevant research contexts into consideration, for instance, the tradition of the academic community or the particular characteristics of the local research groups. As one programme manager claimed:

' […] we have to bargain to get time for those kinds of activities. We have been discussing this with the research institute and, although we are not as free as we would like to, there is some room for manoeuvre.'

Or, as a research director associate maintained:

'There is a lot of room of manoeuvre for the heads of department to deviate from the institute's guidelines. Everything depends on their personal experience with the researchers and on the negotiations between them.'

While institutional talk may have a share in the bureaucratic machinery aimed at guiding and regulating research work behaviour, it does not seem to preclude participants from

bargaining for the recognition of exceptions or subtleties. On the contrary, it appears to be tacitly accepted by those involved in the negotiation as a part of the game. Overall, institutional talk deals infuse the development of the official standpoint on what qualifies as warranted knowledge, its recognition, grading, and rewarding, and the discussions on how to organize these processes at the organizational and group levels. This pattern of *negotiated regulation* also emerged across and within the group level, where forms of big talk dominate.

Big Talk

The second sensitizing concept of talk, that of big talk, is also part of the organizational maintenance apparatus but it suits different purposes. It points to the conversational activities, mostly taking place at the group level, that aim at matching the interests and expectations of the researchers with those of the research institute. These activities are best characterized as explorations, definitions, and legitimizations of possible approaches to this matching process, rather than as directive or forcing activities. For instance, the concept of big talk may inform the discussions regarding the profile of the research group. As one research director associate explained:

> 'Our current research focus did not exist a couple of years ago. It evolved through negotiation and we have selected the themes that could epitomise our best research to date.'

Or, as a research programme coordinator maintained:

> 'The development of a research program in which researchers will focus their attention in the coming years has to be performed together with the researchers. It is crucial that researchers agree upon the research focus, for the lack of consensus may have a negative impact on their motivation.'

The notion of big talk is in line with the classical collegial decision-making processes, as the formal group meetings and the discussions are used collectively to craft legitimised courses of action. The absence of consensus, or of legitimacy, involves the risk of fractionating the undertakings of the research group, to say the least. Big talk is therefore to be found across the discussions on which practices are best suited for the development of the group. As one research programme coordinator argued:

> 'The department meets every 4 weeks and there is always someone presenting a paper. In these meetings we discuss, for instance, what sort of structural changes are needed to ensure that both quality and quantity of research output increases. The question that pervades these fevered discussions is how we can ensure that people do research and publish.'

Or, as another research programme coordinator mentioned:

> 'Internally, we discuss which conferences we should attend, what contacts we should make at an institute level, and who should go on a sabbatical and where. (We need to evaluate the relevance and suitability of the targeted sabbatical research group and to develop the contacts). We have to come up with these questions. Do we want to have our

knowledge there, or do we want to get something from them? How do we position ourselves in the global research community? This is something to manage, i.e., managing in terms of ensuring that the group has the right position. This happens by stimulating people to taking certain steps.'

Big talk does not only inform the mechanisms aimed at stimulating the development of an intellectually inspiring work context, but it is also expected to enhance the social climate of the research group. Content-related discussions are seen to increase the social bonding. As a research programme coordinator argued:

'Group meetings should be stimulated because they allow discussions around research products, next to that of more ordinary problems. These meetings can also enhance cooperation across researchers.'

Or, as another research programme coordinator explained:

'The only thing I do is asking questions. For instance, at the end of the year everyone has to produce a list of conference plans for the next year. With the overview, we can see whether there are misrepresented or burdened participations. By doing this and discussing this, we create a shared attitude in the group.'

Big talk also plays a supportive role. This means that the formal and programmed discussions that take place at the group level also involve coaching elements. This reinforces the notion that improving the research content cannot be dissociated from the social context in which research takes place. As a research programme coordinator argued:

'We have, as well, periodical discussions in which people talk about new research ideas or projects they might be involved in. We can then discuss and give comments, criticism and suggestions to the emergent ideas. Most of the rest is related with the content side of research and is divided into 2 major activities. First, I provide ad-hoc support to the people who, for instance, got stuck in the process of writing or are digesting a rejection and who seek to discuss these matters with me. Second, I participate in the discussions of PhD projects, which reflects an indirect collaboration between me and the other researchers.'

Or, as a research director explained:

'What I do most is talking to people. Research management implies talking, discussing and negotiating with the board as well as talking to researchers. Research management is all about communication. The role of a director and what s/he can accomplish is to quite some extent determined not only by the ambition s/he has, but also by his/her skills as regard to dealing with people. Ambitious goals are easily hampered if one lacks communication skills. For instance, I have to guarantee that those who have a fellow status have a minimum amount of hours per week to do research. It is a responsibility of the researchers to object pressures for teaching. However, if this pressure becomes structural and the researchers do not get the research time they are entitled to, I intervene talking to the Dean, explaining that this is an unacceptable situation.'

This suggests that within the realm of the big talk, research managers may also find motives and room for ad-hoc and personalized support. We then slide into the third layer of

talk. This layer concerns managers talking to researchers to help them make sense of opportunities and cope with these, to lay out alternative courses of action, or to discuss their difficulties while motivating them at the same time. This important layer of talk is dubbed here as small talk.

Small talk

The deeper layer of small talk pertains to the more subtle, spontaneous, informal, but by no means less useful sort of corridor talk. This type of talk is likely to inspire research behaviour in different ways and magnitudes. It involves a subtle combination of professional advice, counselling, and nursing with personal support. As one research programme coordinator argued:

> 'At the end of the day, the practice of research management boils down to communication. Communication is the most important element in managing research or managing whatever activity, anyway. It is important to listen to what people have to say, to be receptive to their ideas and to try to understand the sensitivities of the different subgroups and researchers.'

Or, as another research programme coordinator suggested:

> 'I can help researchers finding a way to make a better use of their knowledge, capabilities and networks. Since we have a small group, this sort of assessment, support and advice is done on an individual basis.'

At the level of small talk, participants do privilege informal, ad-hoc, and personalised contacts as opposed to the formal mechanisms of both the institutional and big talk forms. This form of interaction is perceived as valuable in terms of assisting participants with the soft sides to their work. As a research coordinator argued:

> 'This is why trust, transparency, open-mindedness and cooperative attitudes are so crucial. Therefore, research managers need to understand researchers' sensitivities. If they take too many things for granted, problems are bound to arise. This is perhaps the most acute challenge that research managers face. They have to look at the other side and understand researchers' problems. A research manager needs to communicate with researchers and understand their sensitivities, rather than being dogmatic about things.'

The facilitation work is promoted via closer and informal channels. Therefore, at the level of small talk, informality clearly dominates the talk agenda. As a research programme coordinator explained:

> 'Research management should facilitate and stimulate exchange of information and knowledge in a low profile way. Intranet or other sophisticated tools do not really work. People can do it on a daily basis, on an informal basis, walking around, looking at each other's bookshelves.'

Or, as another research programme coordinator argued:

> 'I try to keep the number of meetings as low as possible. I consider the informal interpersonal contact a privileged way of interaction. I always keep my door open; if

something has to be done, discussed, or decided, we can easily walk into each other's rooms.'

'I also try to stimulate people to work together in small groups. This is done on a regular and informal basis: I walk around, people come to me, I listen, and I advise. I work with the people with whom I have research topics and research strategies' affinities.'

Eventually, this delicate form of talk is also seen to have a motivational impact. As one research programme coordinator argued:

'It is much easier to start things than to finish them, and the thing in-between is the hardest. There is a tremendous challenge to bridge the temporal gat between the excitement about an idea and the stage of writing it down. It is thus motivating to ask and to remind people how are they doing and if they need some sort of help.'

Therefore, small talk represents the casual, soft, sensible and supportive side of research management, which is likely to help researchers re-framing, re-assessing, re-positioning their goals, approaches or expectations, so that a legitimate compromise with stricter guidelines defined by the institutional talk is achieved.

Discussion and conclusion

The systematic comparative analysis of the data, based on the grounded theory approach adopted in this research, indicates that three intertwined layers of talk characterise the activity of research management. These are the levels of institutional talk, big talk, and small talk (see Table 1 for an overview of these forms of talk and their characteristics). Particularly the dynamic combination of these types of talk determines how research managers earn their sphere of influence. Conceptions of how forms of talk are interweaved offer powerful stepping-stones for understanding organizations as knowledge-intensive firms and for developing notions of knowledge management.

In the introduction we have stressed that particularly the community approach to KM justifies paying attention to talk mechanisms. In this research, that because of its focus on academic research most clearly links to such an approach in the notion of research communities, a specification of what makes communities tick predominantly shows at the levels of small talk and big talk. *Small talk* surfaces in the individual and group discussions between researchers who do research and researchers who manage research. Academic researchers are members of combined local and global communities. Individual researchers and research groups are typically involved in overlapping and conflicting work relationships. Individual researchers can be members of multiple research groups and – e.g. as affiliated research fellows – even of several research institutions. Their status as successful scientist depends on the status of the institute that employs them, on their research group, but also on their individual and collective research output and its outlets (status of journal, publisher etc). When the opportunity arises, they engage in ad-hoc cooperation with individuals they may have never met. Establishing joint projects within their own research group may sometimes

even prove harder than with outsiders because of conflicting personalities or lacking overlap in thematic interests. The duality of a local-cosmopolitan status of scientists is therefore as informative as it is disguising because of the fact that under the umbrella term of the 'international academic community' hides a myriad of overlapping and conflicting communities of academic and pseudo-academic communities. All these communities come with their own sensemaking and knowing practices, with their own goals and objectives, that may support each other or may counteract. Small talk appears as a main constituent of knowledge production when these communities take shape and in situations when they provide the context for actual research work.

Big talk pervades the activities aimed at developing the profile of the research group, enacting a collectively legitimised sense of direction. At this level, the talk aims at encouraging the development of a community of knowing. The side effect is that of attempts to stimulate the proclivity of researchers to cooperate and trust. Big talk appears as a connecting mechanism between the levels of small talk, where the 'real' work gets done, and institutional talk, that concerns itself with the viability of the organizational setting. Big talk plays an important role in handling the conflicts and overlaps between the various goals of science, e.g. those between science as a cosmopolitan institution and the research organization as its local constituent. Understanding the workings of big talk also sheds light on the alleged notion that transitions in science are uni-directional, for instance from a mode-1 to a mode-2 knowledge production (Gibbons et al., 1994). Looking at academic research via notions of talk makes it stand out clearly that this notion is overly simplistic. Lave and Wenger (1991) stress that participation in communities is always based on situated negotiation and renegotiation of meaning in the world. Communities thrive on mechanisms for dealing with outside pressures, such as the call for accountability of science, pressures of increased managerialism and science getting subjected to market forces. Cohen et al. (1999) show that an increase in internal and external pressures on academic research is dealt with through a renegotiation of researchers' personal and professional interests (c.f. also Prichard & Willmott, 1997). If indeed the renegotiating process appears crucial for how both management knowledge and knowledge as the object of management evolve, a perspective on the talk components of renegotiation is indispensable. In conjunction with small talk, big talk establishes the 'knowledge infrastructure' or the intra- organizational and extra-organizational context for the development of knowledge domains through their constituent knowledge processes

The third form of talk, the *institutional talk*, is found across the formal and programmed conversational activities aimed at defining and refining the strategic orientation of the research organization. At this level, the talk focus on the strategic discussions aimed at defining the fundamental choices and decisions as to what sort of knowledge is privileged (prioritization), how this is to be recognised (discrimination), and rewarded (evaluation). Knowledge production in these discussions almost automatically takes on a black-box character. As the focus is on recognizing the competitive value of the organization's

knowledge resources, this clearly resonates with the notion of a knowledge strategy (e.g., Zack, 1999). At this level, the analysis of knowledge management in terms of talk shows the clearest connections to the cognitive approach in KM, treating knowledge as an asset and as stock. The content of institutional talk appears partially as a representation of this perspective and re-establishes it.

In this paper, we have focused on understanding the knowledge-intensive organization as an activity system, which stresses the close link between knowledge and knowing. Organizations as knowledge-driven activity systems are more than communities, as they appear rather as quasi-objects made up of a dynamic combination of individuals, relationships, physical objects, concepts etc. (cf. Latour & Porter, 1993). Even if – as we do – one endorses this view, the community approach in KM remains central for understanding organizations as knowledge systems. Key in the development of this approach is searching for the critical mechanisms that create and recreate communities and that link these to the other aspects that make up organizations. Talk appears as such a crucial mechanism. In this paper we have only studied the role of talk in one particular knowledge intensive domain, that of academic research. In that domain we have not done much more than scratched the surface of the epistemological connotations that go along with the various forms of talk. Notwithstanding these limitations of the present paper, we feel that the case for the KBV and KM debates embracing and developing notions of talk as constituting mechanisms of organizations as knowledge-based activity systems stands firm. Paraphrasing the received notion of "management by walking around", we feel that there is every cause to start studying knowledge management as an activity that is to be understood as "management by *talking* around", if we mean to develop the notions of a community approach to KM.

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Sustaining the Passion for Knowledge.
The Siemens Brazil Case Study

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Abstract

The purpose of this paper is to understand how organizations deal with the conditions required for sustaining a knowledge sharing culture. We present here a specific perspective which shows where a global network of knowledge can be built upon passion and cooperation rther than possession.

This paper presents a case study developed at Siemens, in Brazil. It seeks to investigate the main tools, which can help knowledge management in a Brazilian context. One of the main elements analyzed is the organizational culture. We believe that culture elements can contribute to build a share culture based on specific values, practices, and the history of the company.

When Siemens started ShareNet in the 90's years, in Germany, their challenge was to become a company based on knowledge. They believed that in this way, they could offer faster and effective solutions not only to accompany the changes of the market, but also to lead these changes. *"Our priority is to manage and to create a net knowledge [...], in this way we become more efficient and we provide larger benefits to our customers"* (Heinrich Von Pierer, Siemens, CEO).

They believe people are the key to the success of the organization. Based on this belief, they work together, as a global net of knowledge and learning. They respect the diversity; it maintains the open dialogue and mutual respect, as well as clear objectives and effective leadership. But how can a company promote a place that can make all these conditions possible? That is the main question of this paper. It aims on the identification of how a company can sustain the passion for knowledge and learning, and also keeps on trying to build something different and special based on share knowledge and continuous learning.

Many initiatives of knowledge management are based on the different tool, for instance the communities of practice. Today it is not necessary to promise rewards (trips, financial incentive) or create programs to stimulate employees' commitment. We can not compromise people or sustain the passion for knowledge based on financial resources. The cooperation and the mental attitude moved by emotional elements in company promote this passion.

What Siemens found was more than an innovation way based on what other companies use to do. They found a way to keep this process as a continuous learning experience. That is the key to be better than yesterday. Today, to share information, to search integrating solutions is more than a formal program of the company. It is part of the way the company works. But how do they arrive at that level?

More than 150 years after the foundation, Siemens is a global company, with more than 420 thousand collaborators in more than 190 countries. The company works to develop and to manufacture top products, to plan and to install systems and complex projects, as well as to elaborate several solutions that assist the demands of the customers. Recognized by their

quality products that are placed at the market in several segments, Siemens is also a reference as an example of good practice in knowledge management.

The politics of knowledge management is the consequence of a world corporate model, which allows local initiatives. Considering the size of Siemens, distributed across the world with very different cultures, it would be naive to believe that the knowledge management can be unrolled exactly the same way in every place. In one hand, we have the politics of the company, as well as the macro-processes and the communities' of knowledge share tools, which are the same in all the countries. But in the other hand, each place must adapt these common politics and create specific local actions that are framed in the general politics. To sum up, one important issue to share knowledge is to balance a global politics and main orientation with a local actions and specific situations in order to keep the innovative culture, and at the same time promote a continuous learning. The diversity is the key element in this context.

This paper describes some learning practices based on share knowledge and analyses the Brazilian experience in balancing the global and local issues.

Introduction

This article intends to investigate a mature Community of Practice, its stages and tools to compromise people, and aims to investigate if all those elements are tuned with the strategies of the company.

Therefore, we do not intend to discuss the varied concepts related to the Knowledge Management, nor to question the importance that Information Technology (IT) represents in this context. Despite the unquestionable importance of that discussion we will not focus on it.

We believe that knowledge is a strategic asset that can be stimulated and the Communities of Practice is one of the tools to promote a social context for this knowledge development. No matter how much technology is used and settles down efficient processes, if people who are involved in the routine of the organization do not participate actively, the search for better and effective resources and results is not going to happen. In other words, the technological structure is not able, by itself, to reach effective results. In this sense, we detached the importance of the construction of a social base that is able to make sense to the strategies and organizational practices.

Thus, considering that social context, we introduced the Communities of Practice as the social base for the strategies and the Knowledge Management and construction of the organizational social dimension.

This paper is structured in the following way: initially we introduce some ideas and concepts of the Communities of Practice; then, we discuss the methodological procedures; after that, we present Siemens and the Communities of Practice as well as ShareNet, the global net of knowledge sharing in the company; then we detached the Brazilian branch and we introduced some information about Brazil, its complexity and diversity and the effect of

this context and history in the company; finally, we presented the main conclusions of the study.

The Communities of Practice: some ideas and concepts

We develop the theoretical issue based on Wenger's communities of practice conceptual approach (1998), defined as "learning groups in which new insights can be transformed into knowledge through mutual engagement around a joint enterprise". This approach is based on three characteristics established, that are exactly what it differentiates them of other collective arrangements: domain, community and practice. According to the author, "the domain creates common ground and a sense of common identity. A well-defined domain legitimizes the community by affirming its purpose and value to member and other stakeholders" (Wenger et al, 2002). The domain refers to the knowledge area that gathers the community, it represents the identity and it defines the fundamental subjects that will be discussed by the group. A Community of Practice is not just a personal net. The identity is defined by a knowledge area that represents a challenge to be explored and increased. Community, then, is "a way of talking about the social configurations in which our enterprises are defined as worth pursuing and our participation is recognizable as competence" (Wenger, 1998). More than that, it is sustained by the idea of the diversity and complementarity: "we all have our own theories and ways of understanding the world, and our communities of practice are places where we develop, negotiate, and share them" (Wenger, 1998).

See in a wider way, the Communities of Practice are a tool for the construction of the knowledge that happens in a natural way, in the social relationships established in the work environment. Therefore, one of the basic characteristics of the Communities of Practice is the origin in the informal relationships (Wenger & Snyder, 2000). However, a great amount of organizations notice the potential of these relationships to increase results, they begin to formalize some organizational practices to stimulate the development of the Communities of Practice.

The informal practices can become efficient tools in the consolidation of the strategic choices and core competences when properly stimulated and appropriate by the organizations. It happens due to the potential to foment improvements in the organizational processes and to enjoy the benefits of the tacit knowledge sharing. People competences are also stimulated, once a collective effort of construction of the knowledge exists, generating benefits for the organization and for the members of the Communities of Practice. The paradox resides in formalizing the informal, so that it is possible for the company to benefit from the informality.

Methodological Procedures

The presented case study is a qualitative investigation based on reports of members that integrate the ShareNet, as employees and leaders. These interviewees belong to the Siemens

Unit, in São Paulo (Brazil). People involved in the ShareNet management and users from sails, marketing, planning, and supply chain were interviewed, during January and February, 2005.

The interviews were recorded and transcribed, and those information were analyzed based on the content analysis.

In this paper, we presented some the interviewees' contributions illustrating some of their speeches.

Siemens and the Communities of Practice

Considering Siemens, we can say that to the Communities of Practice are inserted in a larger context, the Knowledge Management. Siemens is grounded on the social technical school that looks for the balance between the technologies without losing the view of the social context in the organization. Therefore, people's recognition is the central point for the consolidation of practices developed by the communities that compose the Siemens environment.

The company is grounded on: knowledge environment; knowledge marketplace; knowledge process and communities of knowledge. Another point that favors the communities' development at Siemens is the own nature of the businesses. Therefore, we detached the technology and the social environment, people's recognition, the own business of the company returned to the knowledge, as factors that conspire in favor of the investments in the Knowledge Management and Communities of Practice.

Siemens in Brazil

Globally Siemens has about 430.000 employees and can be found in 190 countries[2]. The history of Siemens and the other mature companies is full of moments in which the company knew how to innovate and renovate itself. In 90's the company made its more radical change in search of a more flexible and agile model, prioritizing the most competitive capital: the knowledge.

In Brazil, Siemens was the first electronic multinational company to settle in the country and to participate on the development of the national infrastructure, supplying technological solutions, since the end of the XIX century. Today, the company acts in several segments: automation and control; medical solutions; information and communications; power; lighting and, transportation. The Siemens group in Brazil has twelve factories, four research and development centers, twelve sales offices and service, and three representatives overseas - two in Paraguay and one in Bolivia. The company has 8.372 collaborators at the Amazonian plant, one of the three world competence centers of Siemens for the production of the cellular telephones GSM[3].

ShareNet - the Siemens Community of Practice

ShareNet is a developed technological platform and trademark for the German company, The Agiliance Group. More than a simple technology, it is a net of information and knowledge source.

In the definition of its creators, ShareNet is a global net of knowledge sharing for the areas of Sales, Marketing, Service and Research and Development. The basic premise of this tool is that knowledge created somewhere in the world it should be available for a global using. ShareNet is a tool that allows the change of information among all the collaborators of Siemens in the whole world. It is an international virtual community that "has for objective to create an organizational knowledge that is understood as a process that enlarges, for the whole company, the knowledge created by the individuals, turning it into organizational knowledge"[4]. By the collaborators' point of view, the ShareNet logic was very well assimilated in Brazil as a collaborator of the planning area demonstrated: "the proposal of ShareNet when it was announced for the first time, it had a call that was more or less like this: If I give you a coin and you give me a coin, each one of us will have a coin. If I give you an idea and you give me an idea each one of us will have two ideas. Then, that proposal of the company as a whole is totally aligned besides with ShareNet".

Siemens has created their Communities of Practice based on the pioneers' authors Wenger and Snyder proposal following three basic steps:
1) To identify potential Communities of Practice;
2) To promote the necessary infrastructure to give support and;
3) To create non-traditional methods for measurement of the Communities of Practice.

In the company, the notion of Communities follows these authors' definitions: "a group of people 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). In this context, the key proposition is:

"Promoting the exchange of information across hierarchical and group borders; create sub-communities with special topical matters and are able to elaborate solutions at short notice and share; be a central form or organization, such as CRM office; understand that existing informal communities of practice and make use of this informal network; communities should be supported through the provision of a knowledge marketplace; openness to new organization and challenges plays a significant role in establishing successful communities of practice; and using organizational form like the communities of practice, and a central organizational unit, such as the CRK office, to implement Knowledge Management will assist in the transformation of a company into a knowledge-base enterprise" (Davenport & Probst, 2000).

ShareNet in Brazil

In the beginning of 1999, Siemens preliminary experiment with some countries in Europe and soon after, in July of the same year, the company involved Brazil and more 7 other countries. It was when it had beginning ShareNet Siemens in Brazil.

The ShareNet was not a natural movement and a lot of difficulties were lived, mainly in the first years. Some employees talked about this difficulties: "We had some difficulties in the beginning and, as for instance, we didn't have a lot of alternatives but to standardize the language as being English. Here in Brazil we already have some limitations with that. In Europe, the ordinary level of English's knowledge is very superior to the Brazil. Here in São Paulo, we still got to take very well but we had difficulty of taking for our regional ones like Recife, Brasília, and Belo Horizonte. It was not easy and it still being difficult. Our English's ordinary level is still insufficient, very insufficient for the person to navigate calmly in this tool".

Besides the language, other demands related to the wanted professional profile are known. "The current moment requests a professional that thinks about the company globally, see new opportunities of businesses and, above all, share his/her experience and knowledge"[5].

More than technical requirements, the matter of the attitude is the central point in the development of competences. Thus, the corporate beginnings: customers, business success, innovations, corporate citizenship, leadership, learning and cooperation are treated as fundamental values, preached and practiced by the company and they also are the essential elements in the Community's dynamic, because they are the backdrop of the learning scenery and the synergy that the company looks for, offering conditions for the organizational culture sense making in different contexts and countries.

Another beginning of the company: "We granted autonomy to our collaborators - to reach acting of world class. Our collaborators are the key of our success. They work together, as a global net of knowledge and learning. Our culture is defined by the diversity, for the open dialogue and the mutual respect, as well as for clear objectives and effective leadership"[6]. This beginning focused on the collaborators, is one of the more effectively worked by the human resource area in Brazil.

Brazil: Understanding the Complexity and the Diversity

Brazil is a huge continental country; alone it represents about 50% of South America population, economical, geographically. The Brazilian population originates from three basic racial types. To the native inhabitants (Indians), the Europeans were added (mainly Portuguese) and African (most original of the western coast to the south of Sahara). The Portuguese is the official language of Brazil. Except for the indigenous languages spoken by small groups in located reservations in remote areas, the Portuguese constitutes the only day by day language. Regional dialects do not exist. Brazil is the only country of Portuguese language in South America. Located in your largest part in intertropical zone (between the

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Ecuador line that goes by Macapá and the tropic of Capricorn that goes by São Paulo) the hottest of the Earth. With prevalence of low altitudes, they are verified in Brazil, hot climatic varieties, with superior averages to 20th. There are six types of climatic variation in the whole extension of the Brazilian territory: equatorial, tropical, tropical of altitude, tropical Atlantic, semi-arid and subtropical. Just in a small portion of the territory, the south area below the Capricorn tropic locates the subtropical climate that determines low temperatures during the winter. In that area it is observed with larger clearness the passage of the seasons. (IBGE, 2000)[7]. Divided in five different areas it is possible to find climates and cultures equally different.

Proportional the Brazil size is its consuming market. There are a large number of labor as well as the needs to be done, built and modernized; all this is translated in opportunities for the companies. Since 1994, the "Real Plan[8]" brought an era of economical stability, with the control of the inflation and valorization of the Brazilian coin front to the dollar and the euro. Even so, Brazil still raisin for a phase of legislative reforms to lessen to strong suffered tax burden for the companies. These difficulties, for a lot of companies, are synonym of opportunities. Sull & Escobari (2004), in their study on success in turbulent environment like Brazil point out the success factors of some companies as: to identify and to explore opportunities; to work with great threats fast and decisively; and to maintain flexible organizations able of reallocate human resources and financial according to the scenery change. Even more important, those companies knew how to use the intervals between the moments of crisis and opportunity and prepare themselves for the future" (2004).

Returning to the context of the analyzed company, the president of the general advice of Siemens, Hermann H. Wever, reveals how the scenery is in the last years for the organization: "The productive section answers from a positive way to the improvement of the economical conditions, initially through a strong performance in the export markets, especially in the agribusiness, and, in the last months, in a progressive way, in the attendance to the internal market, strengthened with the employment increase and income. Some industrial sectors are close of the full use of our production capacities, and an increase of investments is already observed in those sections"[9]. He proceeds, speaking as these changes affect the organization, "Siemens participates in this and adapts favorable, in all its areas of performance, expanding its sales in the intern and external markets, enlarging its production capacity, stimulating its collaborators' innovative force, contributing to the development of the country and to the improvement of the quality of life of the society".

National and Organizational Culture

The culture concept receives glances and cuttings of several disciplines. In this work, it is composed for presupposed basic, visible workmanships and other symbolic groups that create values in the daily of the modern societies. In the organizations, these values contribute to

create conducts, faiths and patterns of behavior. The more complex the organizations, the more complex their cultures are.

Oliveira (2002) reminds that "it is very large the variety of focuses related to the culture and to its relationship with the society, as well as the studies on the different cultural aspects of the organizational life. It brings some difficulties to accept only one choice or only one concept for a compatible investigation method, pushing the organizational analyst to have a quite differentiated attitude, and to be attentive to the regional cultures, in a time that the cultures has been globalized. The culture concepts and the methodological perspectives are very diversified, as well as the current conception of the organizations and uniqueness of the companies".

At Siemens Brazil the values of the company are constantly worked by the several channels of open communication in the company (internal newspapers, banners, campaigns, lectures, etc.). The collaborators, in Brazil, got used to them and they even like the rhythm of organizational change that the company implanted. An employee, who has been working for 15 years in the company, and today works in the planning area, says: "I like the changes, because it is pleasant, it gives us a motivation when we have a new work for doing, we want to look for the best way of presenting our work and everything else, then I particularly adore. I feel very comfortable with the change. I don't have any resistance and I am quite flexible".

This flexibility is the result of adaptability and creativity, both recognized, even by foreigners, as elements of Brazilian culture (Motta and Caldas, 1997).

The results of the research point out that one of the factors that more attracts the Brazilian collaborators it is the opportunity of feeling the challenge that is embedded in the company's structure. For instance, the company promotes a lot of job rotation that creates so much opportunity to act in another unit of the company in the whole world as in a new position that we provided different challenges. The manager of Human Resources at Siemens Communication affirms that: "There is a great amount of people that look for a job rotation in another country, for a short period of two or three months or for longer periods as two years. The fact of ShareNet to contribute for the visibility increase and eventually to provide an opportunity such as this is very important". One of the interviewed employees, graduated in chemical engineering, had already gone by the logistics areas, marketing, human resources in the units of Brazil besides some to have worked time in the United States and Germany. The people face these opportunities as new challenges, to learn something new, to be in constant development.

Conclusions

This article aimed to investigate a mature Community of Practice, its stages and tools to compromise people, and also investigate if there is a balance of those elements with the strategies of the company.

The basic presupposition of this article resides in the fact that knowledge is a strategic asset that can be stimulated and the Communities of Practice is one of the tools to promote a social context for this knowledge development. In other words, in the presented case study, we observed that the Communities of Practice, represented by a ShareNet, is an effective tool by the perspective of the Knowledge Management as well as the collaborators' of the company involvement, contributing for settles down the passion for the work.

Although ShareNet has reached the proposal objectives, it constantly works one of the organizational beginnings of Siemens most difficult of being implanted: the collaboration. Among many goals and periods that surround the daily of the employees of big companies, to make people stop what they are doing to collaborate with somebody that they even know, without winning anything in change, it requests an unit spirit, of very strong institutional identity. It represents the collaborative culture itself.

After investing for more than one decade in a learning environment, the search of Siemens now bed in the search for synergy. The German giant wants to move with agility and intelligence.

The position of the company about a participative culture is very clear. This kind of culture means employees' recognition and the knowledge sharing, which is the basis of the strategies of the company. Among all the possible tools to promote this kind of environment, we point out the Communities of Practice. Thus, people are stimulated to look for the continuous development of the organizational practices increasing the passion for what they do and looking for new challenges to improve their work every day. Basically, the knowledge can be sustained by the cooperation and the mental attitude moved by emotional elements in company which promote the passion.

One of the main challenges for a multinational like Siemens is to balance the global politics with the local actions. In one hand we have the politics of the company, the macro-process and the communities' of knowledge share tools, which plows the same in all the countries. But in the other hand, each place must adapt these common politics and create specific local actions that plows framed in the general politics. One important issue to share knowledge is to balance the global politics and the main orientation with to place actions and specifics situation in order to keep the innovative culture and, at the same time promote the continuous learning. The diversity is the key element in this context. In the Brazilian context, these aspects are still more valued due to the history and culture of the country. So, we can say that Brazilian culture contributes to improve Communities of Practices due to elements like diversity, flexibility, complexity, velocity to change.

Concluding, we point out Wenger (1998) ;Wenger & Snyder (2000); Wenger,McDermott e Snyder (2002) and Brown & Duguid (2001) that like us believes that the Communities of Practice help to stimulate "passion", enthusiasm for the work among professionals and this feeling is the invisible and base part of the knowledge construction, the social capital inside of the organization. The Siemens of Brazil case study is one example of that passion that sustains so many movements generated by the humanity.

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Virtual Communities of practice:
an organizational form that can support and foster knowledge ?

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Over the last decades, there has been much interest in various forms of participation in the workplace and in its impacts on learning from work for individuals and organizations. Teamwork has been the object of much attention in labour economics, in sociology of work as well as in human resources management (Tremblay, Rolland, Davel, 2000; Davel et al., 2001). Collaborative work and learning have also been the object of much attention in HRM and organizational learning debates (Tebourbi, 2000), as well as in education circles (Deschênes; Henri and Lundgren, 2000; Foucher, 2000). Much of this interest stems from gains that organizations can expect to obtain from interaction between workers in terms of quality of products, innovation, productivity and the like. Knowledge management has also spurred interest in recent years, partly on the basis of these expected gains from a better management of the knowledge hidden within organizations. More recently, the concept of communities of practice has been put forward as a form of knowledge management which paves the way to attainment of the various organizational objectives : productivity, quality, innovation, etc.

In this paper, we will present a case study of community of practice[2], but before,we would like to recall some of the research done on teamwork and fostering of interaction and collective responsibility, in order to set the table for the analysis of the case study. We will then present a few elements on communities of practice, before we go on to study the individual and organizational impacts of interaction within a community of practice in the health sector. Let us therefore start with a review of teamwork and interaction issues, to lead us into the analysis of communities of practice.

Teamwork and learning through interaction at work

Teamwork is a flexible configuration that can be adapted to many production and organizational contexts. Its diversity and conceptual polysemy (Durand *et al.,* 1999; Salerno, 1999) are due to the different theoretical approaches to groups in organizations, but also to the different societal contexts that are, to some extent, transforming the theoretical model (Tremblay and Rolland, 1998). Moreover, it should be recognized that its polysemy stems from the fact that this expression is used to describe diverse realities and, in particular, teams functioning at different hierarchical levels. Management teams, production teams, support staff teams, project teams, continuous improvement groups and client service teams are but a few illustrations of the variety of groups that firms use in their day-to-day operation (Hackman, 1990; Cohen and Bailey, 1997), and we could add to this list communities of practice, since their objectives are often similar.

Forms of teamwork

In the late 1970s, interest in teams became identified with the *quality of worklife* movement which favoured the transformation of the work place through labour-management cooperation as well as the development of knowledge through interactions at work facilitated by the creation of semi-autonomous groups of production workers. Individual satisfaction as well as organizational advantages were the objective of this configuration of work, as is sometimes the case with communities of practice.

It should be pointed out that even if the establishment, operation and social relations within the work team are far from homogeneous and uniform (Lévesque and Côté, 1999), many authors are in agreement about the core of team-based work organization and in our view, this can be adapted to the communities of practice context.

Thus, to make up a team, members must have a minimum of (a) task interdependency among members; (b) shared responsibilities; (c) team identity; and (d) power to manage the relationship between the team and the organization (Hackman, 1987; Guzzo and Dickson, 1996; Sundstrom, De Meuse and Futrell, 1990; Cohen and Bailey, 1997; Savoie and Mendes, 1993). These elements appear interesting, and in our view, they could be transposed to CoP experiments and other forms of collaborative work and learning through interacting.

This vision can be used to distinguish teamwork from the Taylorist and Fordist systems of work organization. Teamwork allows members to achieve a level of multiskilling, to share information and to be more responsible for quality and productivity (Marx, 1998) as well as providing less rigid and disciplinary supervision. Even when supervisors tend to change their hierarchical role in order to become facilitators, coordinators or even resource persons, firms do not always eliminate certain forms of control such as performance indicators (Salerno, 1999).

The new distribution of responsibilities in the context of teamwork

The involvement expected of workers in firms that are structured into teams goes far beyond the simple execution of predetermined tasks, which was the norm in the Taylorist and Fordist systems. Workers grouped into teams are, in principle, given the incentive to manage their unit in addition to accomplishing their work. In other words, teams (usually referred to as autonomous and semi-autonomous) should determine not only when and how to accomplish the work assigned to them but sometimes also the work pace.

According to Marchington (1992), teamwork is the most advanced form of the reconfiguration of tasks and responsibilities since it allows for an extension of responsibilities that is both horizontal (workers execute more tasks at the same level) and vertical (workers are made responsible for more tasks that previously came under other hierarchical levels, that is, under foremen and supervisors) and leads to learning on the job that is more complete than in traditional contexts of work. Thus, teamwork includes not only the delegation of tasks but sometimes also the transfer of part of the control over tasks within the team.

Unions often maintain that responsibilities are assumed in various ways and at different stages when carrying out tasks. According to them, in any teamwork, there are two types of tasks that are absolutely essential and inextricably linked, that is, technical tasks and social tasks. Technical tasks are those directly related to work execution and production. They concern the definition of production goals, planning activities and establishment of deadlines, the choice and examination of material means, assessment of staffing needs, the definition and allocation of tasks between team members, the development of work schedules, the evaluation of costs and preparation of budgets, and evaluation of results.

Social tasks include the exercise of leadership, training of members, health and safety, specific programs, the definition of communication channels and team meetings. They have a decisive influence on the quality of life within the team and make the concrete expression of the values shared by its members possible. They also make trust possible between members as well as with the team leader. Autonomy will increase over time, depending on the evolution and maturity of the team, the dynamics of the relationships between teams and the agreed-upon rules in the collective agreement. (Tremblay, Rolland and Davel, 2000).

All this can surely be considered useful for the analysis of CoPs, but it is the process of fostering team responsibility or interaction which interests us most.

The process of fostering team responsibilityand interaction

Even though teamwork obviously requires the transfer of responsibilities to teams, this transfer alone does not explain the involvement and interaction between team members. According to a number of authors, the effectiveness of teams and their willingness to interact with each other and undertake new responsibilities are influenced by a whole set of factors. Savoie and Beaudin (1995) link the effectiveness of team interaction to functional components such as (a) interdependency in terms of the environment (feedback from clients, supervisors, team mission, inter-team coordination, management support), (b) task interdependency of team members (skills development) and consequences (sanctions based on results) and (c) the quality of transactions between team members (interpersonal relations, production energy, shared effectiveness and group cohesion).

Some authors underline that the process of fostering team interaction will achieve the objectives of increased productivity, flexibility and effectiveness as soon as teams enjoy conditions that are conducive to decision-making and collective learning (Edmondson, 1999). These conditions will allow teams to become truly committed to the new responsibilities or activities that they have been given.

Indeed, for some authors (Guzzo and Shea, 1992; Grant, Bélanger and Lévesque, 1997), the level of team interaction and responsibilitly varies according to the degree of autonomy that they have been given. More traditional structures will give work teams powers that are less extensive and interaction will thus be limited. Thus, for many authors, the degree of autonomy and types of responsibilities given to teams appear to evolve according to their

maturity (Roy, 1999; Roy *et al.,* 1998), since learning the team decision-making process requires time, experience of life as a team and a degree of social cohesion (McGrath, 1991). According to this vision, the decision-making autonomy of teams follows an evolutionary process that develops in parallel with group maturity. This process is also seen as characteristic of the life of communities of practice, as is presented in the work of Wenger et al. (2002).

The most detailed model of the evolution of communities of practice was presented by Wenger et al. (2002). Wenger et al. (2002) define five stages (see figure 1). At the beginning, the community is an informal network, a potential community. It then unites itself and acquires maturity, and then momentum, and becomes productive (Gongla et Rizzuto, 2001; Mitchell, 2002) until at some point, an event makes it essential for the community to change or renew itself.

Figure 1. *Stages of development of a community*
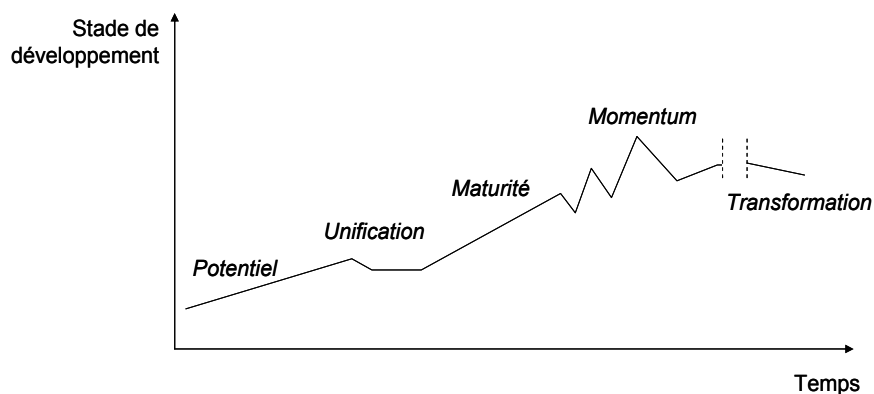
Source: Adapted from Wenger et al. (2002), p. 69 and Bourhis and Tremblay (2004).

According to Savoie and Beaudin (1995), the process of increasing team responsibilities is directly related to the interpersonal relationships between team members. It is presumed that effectiveness and involvement are supported more when team members help each other or have appropriate and enriching social interactions. This process of interaction refers to behaviours and reactions of team members regarding the exchange of information, expression of feelings and formation of coalitions (Guzzo and Shea, 1992).

Thus, in addition to being a source of solidarity and social cohesion (Hodson, 1997), the quality of interaction within the team is fundamental to understanding the affective and behavioural consequences of forming a team or community. All these elements are surely important in the implementation of a CoP and this is why we paid attention to the social relations between participants in the CoP.

In brief, in this first part, we have seen that the process of fostering collective responsibility in a community or group, like all processes of organizational innovation, is not

a simple linear process of transferring responsibilities or tasks. On the contrary, it refers to a set of dimensions such as task interdependency, interdependency with regard to the organizational environment, type of supervision, interpersonal relations between members, degree of autonomy, availability of resources, management support, organizational structure, and a whole set of variables related to the context in which the team or community evolves. It was not possible to study in full detail all of these elements in our case studies of CoPs since observant participation was excluded, but the methodology does permit to dwell on some of these elements, as we will see further on. But let us now turn to the concept of Communities of practice, to see to what extent bridges may be built between CoPs, teamwork and learning through interaction.

Communities of practice

Communites of practice have raised more and more interest over recent years. We will first present the definition of the concept, recall a few elements highlighted by other researchers as impacts or benefits expected from these communities of practice (CoP), before we present results from a Canadian experience in the health sector, highlighting the benefits as well as individual and organizational adavantages and disadavantages of this experiment of community of practice, and linking these to the context or conditions which appear to favour such benefits or advantages.

As concerns the term « communities of practice », it was first used by Wenger and Lave (1991). Many different views and definitions have been presented since, but most refer to the importance of sharing information within a small group, as well as the value of informal learning for a group and for an organization as a whole, bearing in this some similarity with the teamwork litterature. A few definitions of communities of practice are presented in Mitchell (2002) :
  - -communities of practice are groups of people 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, McDermott & Snyder, 2002, p. 4, quoted in Mitchell, 2002 p. 12)
  - -a group whose members regularly engage in sharing and learning, based on their common interests (Lesser & stork, 2001, p. 831, quoted in Mitchell, 2002 p. 12)

The main elements stressed here are the sharing of a concern, a set of problems, the ongoing interaction between the group, the ongoing sharing and learning, bearing again some similarity with the teamwork litterature. As we will see later, these definitions correspond to the type of community we studied, while other definitions insist on an informal dimension, which was absent from our case study.

Indeed, more conventional definitions of communities of practice, which refer to a more informal group, whereas the communities we studied, and the one presented here, are

structured by an organization and much more formal. Here are a few other definitions, centered on the informal dimension :

- -groups of people informally bound together by shared expertise and passion for a joint enterprise (Wenger and Snyder, 2000, p. 139);
- -informal clusters and networks of employees who work together –sharing knowledge, solving common problems and exchanging insights, stories and frustrations. ..(Lesser & Prusak, in Lesser et al., 2000, p. 831, quoted in Mitchell, 2002, pp. 11-12).

It must be mentioned that the community we present here was not based on a previously existing informal group, nor was it composed of people who worked in the same workplace. However, over recent years more and more interest has been placed in communities that work from a distance, although sharing a project, and it is this type of community that caught our interest. It must be stressed that these communities of practice are more than simple teams working from a distance. They are seen as a group that has a common mission, that has a common task and must deliver a product based on the regular exchanges and information sharing within the group, as defined in McDermott (1999). Work teams usuallly have a predetermined goal and schedule, often very clearly defined tasks and their activity is usually centered on their work tasks, and done during working hours; often, work teams disintegrate once the objective is attained, but in the manufacturing sector, they often remain to assume general work tasks collectively (Tremblay and Rolland, 1998). Also, work teams are often characterized by a strong division of labour, whereas communities theoretically imply more direct cooperation between the members (Tremblay, Rolland and Davel, 2000). Communities of practice are seen as having wider and less defined objectives, as not having a specific schedule and dates for attaining the various objectives (contrarily to work tasks), and usually go on for quite some time (indeterminate often), although this is not always the case.

As indicated in much of the litterature on work teams as well as communities of practice, working « together » as a group usually requires some preconditions , the main one appearing to be trust in other members of the group. This is all the more important in a context of communities of practice, since members of the community are expected to share tacit knowledge, to construct collectively new knowledge and possibly new products or services (McDermott, 1999, 2001, Wenger and Snyder, 2000; Adams and Freeman, 2000; Deloitte Research, 2001). It is precisely because of this trust element that many authors recommend that virtual communities of practice be developed on the basis of existing informal groups, groups that share values and already trust each other. This is however often not possible in firms and it is why many virtual communities of practice are designed without taking this element into account, as we will see. This of course represents an additional challenge for CoPs, that is when previous acquaintance and trust of members has to be developed within the CoP.

Amongts the other main prerequisites often mentioned in the Communities of practice litterature (as well as in much of the teamwork litterature – Tremblay, Rolland and Davel, 2000; Tremblay and Rolland, 2000), are the importance of the leader or animator of the

community, the interest and motivation of individuals to work together as a group, and the support received from the organization : support and legitimization of the group on the part of the immediate superior or higher levels of hierarchy, financial or non monetary rewards for the participants and the like (Wenger, McDermott & Snyder, 2002). Available technology and technological support are sometimes mentioned, but most research seems to indicate that the human resources and organizational challenges are more important and that technology plays a more limited role in the success or failure of Communities of practice.

Since this paper will stress the impacts and the individual and organizational benefits identified, let us mention the following benefits derived from a litterature review by Mitchell (2002). The CoPs are seen as ways of delivering the following benefits, according to Mitchell (2002): the informal dissemination of valuable information; improvements in productivity; fostering of innovation and the reinforcement of strategic direction of the organization that is responsible for the CoP and supports it. The latter distinction is important, since CoPs were usually seen as groups developed within firms, but our own case study is in a professional organization and thus was not developed within one employer organization; on the contrary, participants came from different organizations, although they shared a professional identity, being part of the same professional order.

Having summarized the essence of the litterature on communities of practice which is pertinent for this paper, let us go on to the case study of a community of practice in the health sector.

A case study of a community of practice in the health sector

The case study we will present here is one of about a dozen communities that were fostered by the Centre francophone d'informatisation des organisations (CEFRIO), a Canadian (Québec) innovation and transfer research center that has developed a project to foster and support such communities; the health sector community is the first to be finished and evaluated (although communities should not be considered as « finished » , it is the case here, as we will explain further).

The research project started in 2000 and some 10 communities were considered active, although many only became so in 2002. The objective was to create communities in organizations that wanted to develop such a form of knowledge management, but also to do research on the implementation, conditions of success, positive or negative impacts of the communities, as well as on interests in participation, interaction and levels of satisfaction of participants, amongst other elements.

In order for this research to go forward, participant organizations had to accept that the participants respond to various questionnaires, designed to be completed on the web and guaranteeing anonymity to all respondents. The questionnaires cover various dimensions but we concentrate here on the organizational dimensions, i.e. the following : objectives of the

organization in setting up a community, as perceived by participants; past work experience and past experiences of cooperation; perception of participants as regards the community experience; objectives attained; satisfaction and general evaluation. There were two questionnaires on organizational dimensions : one at the beginning and another at the end of the experience, in this case after 6 months of participation. Besides the questionnaires, some focus groups were conducted with animators of the communities and some « critical incidents reports » were drawn up in order to have a better follow-up on all cases.

The case we present here is particularly interesting because contrarily to many communities of practice, the majority of those documented at least, it does not rest on participants from one employer organization, as mentioned previously. It is based on a group of health workers specialized in heart diseases and health, living in different cities of Canada, that have contacts only through the internet and email. The organization responsible for the project is a professional association in the health sector.

Let us add that 21 female health workers participated in this community of practice. Their ojective was to develop a website that was to be filled with information on heart health and heart diseases. Let us now turn to the more detailed analysis of this case and the results we collected through the web survey.

We will first look at the evaluation of the participants concerning the attainment of objectives of the community, then at results on general satisfaction of participants and causes of satisfaction or dissatisfaction, most of which has to do with experience of interaction, of learning and of sharing information within the community.

Attainment of objectives

The main objective of the community was, as mentioned, to create a website which would contain information on heart diseases and heart health. All 21 participants agree that this objective was attained. However, as various more precise objectives of communities of practice were identified in the litterature (McDermott, 1999, 2000, 2002, Mitchell, 2002, etc.), we wanted to know to what extent these objectives might have been attained.

It is interesting to note that the sharing of information and knowledge comes first, followed by the experimentation of a new mode of resolution of problems and a better utilisation of delocalized resources. On a more general note, respondents also consider that the virtual community project favours excellence, and stimulates creativity and innovation.

Table 1. *Level of attainment of objectives*

	Average score[1]
Foster innovation (ex : knowledge sharing in order to develop new ideas for better products, services, practices, processes)	4,14
Better relation with client (ex : reduce response time)	3,64
Better quality (ex : better reliability in service)	3,78
Foster excellence (ex : list of best pratices)	4,19
Rationalization (reduce costs)	3,33
Foster competencies development (ex :)	3,75
Efficiency (ex : do more with less ressources)	3,80
Facilitate exchange and sharing of information and knowledge	4,48
Experiment a new approach of problem	4,24
Better use of delocalized resources (ex : other city, other region)	4,15
Reduce number of workers	2,83
Maximize working time (ex : increase productivity, reduce waste of time)	3,19
Reduce duplication (ex : not reinvent the wheel, no repetition)	3,94
Stimulate creativity	4,20
Foster leaning	4,33

Question: Indicate to what extent, in your opinion, these objectives were attained in your community of practice. Scores are from 1 to 5 , where 5 indicates the objective was fully attained.

Interactions in the Community of practice

Individual participation

The health workers have a very positive view on their interaction with others in the community of practice. We wanted to know whether this interaction was beneficial from a personnal or professional point of view and we wanted to know if they felt they had learned from others and to what extend they had themselves contributed to the community. This is important since litterature on teamwork and group activities often indicates that a few leaders participate in the project (a hardcore of a few participants) while many others remain in the periphery. In the case of a virtual community, where participants are not face to face, it is all the more easy to just sit in or read messages, without fully participating in the community. The data does indicate a higher level of learning from the community (5,24 on a scale of 7) and of professional and personal enrichment (5,95 and 6,10), than a level of contribution to the community (4,29). In the focus group, it was mentioned that these health workers do not have computers accessible easily in their work environment, they don't use computers frequently, and the data do indicate that their participation was usually outside of working

hours. This made it more difficult for some to interact with others and feel comfortable in contributing to the group's project.

Table 2. *Evaluation of various dimensions of interaction*

	Average [1]
I found my participation in the CoP enriching personally	6,10
I found my participation in the CoP enriching professionally	5,95
I personally **contributed** a lot to the CoP	4,29
I personally **learnt** a lot from the CoP	5,24
I am personally very **satisfied** of my participation in the CoP	4,57
I would be **interested to continue** to participate in a CoP	5,62

(1) Question: What is your global evaluation of your participation in the CoP? Scores from 1 to 7 where 7 indicates that the respondent is totally in agreement with the proposition.

Nevertheless, there was a relatively high level of interaction in this group in comparison with the others and our survey reveals a high interest in continuing to participate in such a project (5,62), which is interesting, since to our knowledge, there has been no study of virtual communities in professional associations. Clearly, the participants feel they learnt a lot from the experience on a professional and personal level and this can surely be interesting from the point of view of competence and knowledge development in professional associations or orders. Figure 1 indicates that only 3 respondents would not be interested in pursuing such an experience. The data on disadvantages of participation presented further on will help us understand this fact.

Figure 1. *Interest in continuing to participate in a community of practice*

"I would be interested in participating again in a Community of practice"
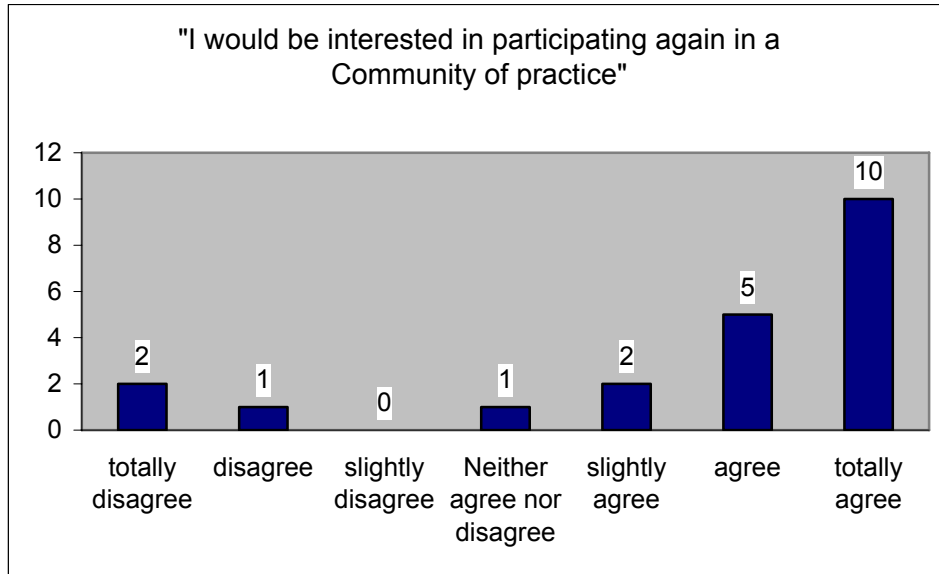
Dynamics of the group

Having worked previously on teamwork (Tremblay and Rolland, 1998, 2000), and having observed in the litterature on teamwork as well as on communities of practice (Mitchell, 2002, Wenger, 1999) that trust is essential in participation in group tasks or activities, it appeared important to evaluate the relations within the group to understand if this contextual dimension is as important in a virtual community and how things play out in such a context. Respondents indicate that a positive relation and interaction within the group was maintained throughout the project, which lasted 6 months. Information sharing increased, which is important, since it is one of the main objectives, if not the main objective of the communities (Mitchell, 2002, Wenger, 1999, 2000). To a slightly lesser extent, participants indicate that cohesion of the group and complicity also increased over time ; since communities do not usually have a fixed end, as this group did, this observation is interesting. However, we would probably need a longer time span to evaluate whether the interest might diminish over time and impact negatively on information sharing and cohesion. There is however a small indication of rivalries and tensions developing over time, although the participants majoritarily hold a different view.

Table 3. *Evolution of group dynamics*

	Average [1]
Information sharing increased over the months	5,81
Complicity between participants increased over the months	5,47
Group cohesion increased over the months	5,79
Rivalries increased over the months	2,06
Tension increased over the months	2,11

(1) Question : What is your global evaluation of your participation in the CoP? Scores from 1 to 7 where 7 indicates that the respondent is totally in agreement with the proposition.

Sources of satisfaction and dissatisfaction

The great majority of participants hold a very positive (43 %) or positive (52 %) view of the community; only 5 % having a neutral vision and none having a negative view. This is a very general statement, but the following table gives more detailed information on the elements which contribute to satisfaction and dissatisfaction. There is little in the litterature concerning sources of satisfaction and dissatisfaction with communities of practice specifically, and this is why we referred to previous work on teamwork (Tremblay and Rolland, 2000) and collaboration in general (Henri and Lundgren, 2001), to develop a series of statements concerning elements of satisfaction and dissatisfaction with communities of practice.

It is clear that most of the activities related to the community of practice were sources of satisfaction and most satisfaction seems to be related to groupwork and learning (quality of interaction, consensus-building, team spirit, etc.), although some participants express a slightly negative view on the learning dimensions (learning new methods or knowledge seems to be a dissatisfaction to some). Peer pressure and stress are sometimes highlighted as negative impacts of teamwork, but it seems to have been rather infrequent in this case.

Table 4. *Main sources of satisfaction and dissatisfaction*

	Source of satisfaction [1]	Source of dissatisfaction [2]
Collaboration between members of the CoP	4,15	1,65
Usefulness of subjets for my daily work	4,10	1,80
Quality of interaction between members of the CoP	4,10	1,90
Acquisition of new knowledge	4,05	2,10
Groupwork, team spirit	4,00	1,95
Capacity to develop consensus in teamwork	3,95	1,45
Learning new methods of work	3,90	2,24
Valuation of my competencies	3,90	1,90
Recognition of my participation by my employer	3,00	2,26
Recognition by peers of my employer organization	2,85	2,05
Recognition by peers elsewhere (not my employer)	2,89	2,00
Time I invested in CoP activities	2,86	2,52
Capacity of the group in specific problem resolution	3,67	1,90
Level of stress	2,81	1,67
Competition between members of the CoP	2,81	1,59

(1) Scores from 1 to 5 where 5 indicates a high level of satisfaction.
(2) Scores from 1 to 5 where 5 indicates a high level of dissatisfaction.

The particpants were also asked to evaluate specific elements of interest that they might have found in the interaction with members of their community of practice. Here again, learning and exchange of information and knowledge are highlighted as a main interest; creativity and innovation as well as problem resolution come close behing.

Table 5. *Elements of interest of participation in the community*

	Average [1]
Innovation and creativity that we could exercise	**4,10**
Exchange and sharing of information and knowledge	**4,24**
Experimentation of new approaches in problem resolution	**4,00**
Learning from others	**4,35**

(1) Question: For you, personally, indicate to what extent each of the elements below was interesting in the CoP? Scores from 1 to 5 where 5 indicates that the element was very interesting.

As concerns sources of dissatisfaction in the community, there were very few and they generally are under the 2,5 median mark. However, the reduction in personal time is the most frequent complaint, although relatively infrequent (4 out of 21), an element which can be

explained by the fact that all participated outside of working hours, many doing so in the evening (13 out of 21, or 62 %), and others on weekends (7 out of 21 ,or 33 %). It must also be mentioned that most (19 out of 21) had to participate from home, which is not always easy or convenient, as some writings on working at home indicate (Felstead and Jewson, 2000).

Table 6. *Drawbacks related to the CoP*

Inconvenience	Frequency
Reduction in time affected to other professional tasks	2
Reduction in personal time	4
Overload in work or lack of time	2

Impact and usefulness of the community

The community is of course seen as being useful to the professional health order, since this was the organization responsible for the implementation of the community, not so much for the employer, since the knowledge developed in the community is not yet used in the working environment. It is also considered that the community had a positive impact on the work climate within the Order, but less in the work environement per se, since the employers were not involved in the project.

Table 7. *Impact and usefulness of the community*

	Average [1]
Teamwork in the CoP had a positive effect on the working climate within the organization responsible for the CoP	5,07
Teamwork within the CoPP had a positive effect on the working climate at my employer's	3,29
The CoP was very useful for the organization responsible for the CoP	5,69
The CoP was very useful for my employer	3,61
The CoP was a success	6,19

(1) Question : What is your global evaluation of the CoP ? Scores from 1 to 7 where 7 indicates that the respondent totally agrees with the proposition.

Conclusion

Let us now get back to a few elements which we wanted to consider in more detail, on the basis of elements presented in the first section of the paper.

As mentioned in the first section, we can conclude that our case study is not of the traditional informal group that gets together in a workplace, but rather a group of people, in

this case a group of professionals, « 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, McDermott & Snyder, 2002, p. 4, quoted in Mitchell, 2002 p. 12). As we saw, most participated in the community quite actively, but some learnt more than they contributed, indicating that there was a certain periphery of participants somewhat less engaged than others. The fact that most do not work with computers and that they had to learn a new software surely explains part of this, although level of participation and motivation was nevertheless quite high.

As is indicated in the litterature, the data do show that participants did share a common concern (sharing knowledge on heart diseases and health), they collectively resolved a set of problems (getting the information on the web, etc.). There was quite constant interaction, which led to personal and professional enrichment and learning. The data do indicate however that participants feel there was a regular sharing of information and learning from one another and in comparison with all respondents, women tend to be more satisfied and evaluate more highly the degree of learning they did within the community.

The informality found in many definitions is of course not characteristic of our case study or of the other communities implemented by Cefrio, since this was a voluntary process for creating such communities, generally from scratch, although some communities do rest on previons relations or informal groups, but not exclusively on these. We will later try to compare the cases where participants had previous knowledge of each other and those who did not, since this would also be of interest.

Although workgroups that work from a distance have been the object of some attention over recent years, these were generally much more loosely related than a community of practice, which shares a common task and participates directly in the same task. Some specialists of cooperation and collaboration actually make a distinction between the two concepts in the sense that in one case there is a strong division of labour, which can also apply to international workgroups working from a distance, while in the other, none of the participants can go ahead without the others, implying a more direct participation in tasks by participants, as is the case in this community of practice.

Our group did see itself as having a common mission, a common task and it did deliver a product (website on heart issues) after having had quite regular exchanges within the group, as defined in McDermott (1999). In this sense, our community was close to a work team, since these usuallly have a predetermined goal and schedule, as did our participants. Their tasks were maybe not precisely defined, but the goal was quite clear and the time limit was determined. Another similarity with the usual definition of work teams is the fact that this community did disintegrate once the objective was attained, although other CoP projects were planned for later on, with some of the same participants. Communities of practice are usually seen as having wider and less defined objectives, as not having a specific schedule and dates for attaining the various objectives (contrarily to work tasks), and usually go on for quite some time (indeterminate often); this was not the case here, but it seems that the first

community project has led the way to a new project, based on the same community of practice concept, but with some new participants. It must be recalled that the participants all worked on the community of practice project outside of their working hours, which may make it difficult to continue on for a long time.

As indicated in much of the litterature on work teams as well as communities of practice, working « together » as a group usually requires some preconditions, the main one appearing to be trust in other participants. It is precisely because of this trust element that many authors recommend that virtual communities of practice be developed on the basis of existing informal groups, groups that share values and trust each other. Here, the participants did not know each other, but it can be hypothesized from the information on the case study that the sharing of professional values created sufficient trust and motivation for the projetc to go forward very smoothly.

Amongst the organizational benefits identified as impacts of communities of practice, let us mention the following (Mitchell, 2002) : the informal dissemination of valuable information; improvements in productivity; fostering of innovation and the reinforcement of strategic direction. Our results clearly indicate success in terms of dissemination of information and fostering of innovation, as was clearly seen in many tables; in our view, this is largely due to the professional nature of the group, since other intra-organizational CoPs did not reach such success, apparently because there was less motivation and professional engagement. Learning, and sharing information and knowledge appear important and have been attained in this case study largely because of professional involvement of the health workers as well as trust that apparently existed between them, something which was lacking or less developed in other CoPs studied.

The issues of motivation and commitment in the community will require more research, since we consider they can partly explain the success observed in this community and the relatively less successful other cases, which we also studied but did not present in detail here. Future research should dwell on this issue.

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Endnotes

Smothering the Burning Desire for Knowledge with the Best Practice Blanket

Introduction

The mainstream organization and management studies tend to treat knowledge in organizations in a reductionist manner. Knowledge is often seen as *the* factor of production that can and should be placed at the service of the company's profits (a "business case" for knowledge). It is described as a resource that can be stored, transferred, owned and traded. This commodification of knowledge has been influential in suggesting a causal link between the knowledge of an organization and its competitive performance, an idea that is deeply rooted in engineering and management thought and can be traced all the way back to Taylor's Scientific Management (see Taylor, 1911; Farquhar, 1919).

Within this framework, knowledge management is understood as a *panaceum*, as a cure-all prescription for how a modern company should organize its activities in order to solve its problems and increase profitability and efficiency. Its promise for organizations is assumed to lie in knowledge-sharing leading to the creation of some form of "distributed cognition" (Knorr-Cetina & Bruegger, 2001:181), where all employees know what their colleagues in the rest of the organization know. The hope is that in this way the organization will be able to stop the "reinvention of the wheel"; that people will be able to solve problems more efficiently by gaining access to the knowledge of others, who have previously solved similar problems.

Consequently, there exists currently a wide range of knowledge management tools to choose from in the mainstream managerial literature, which are often evaluated along functional and technical lines on their capacity to help to "overcome the disadvantages of the localness and asymmetry of knowledge" (Davenport & Prusak, 1998:130), and to put to use knowledge that exists in one part of the organization in other parts (Dixon, 2000:2).

One of these tools often mentioned is "best practice" (see e.g. Codling, 1992; O'Dell & Grayson, 1998; Grant, 2000; Davenport & Probst, 2002; Mertins, Heisig & Vorbeck, 2003). It builds on the assumption that innovation and learning take place continuously throughout the organization and that if these innovative activities are similar even though they are conducted in different locations, then value can be created for the organization through the rapid internal diffusion of such knowledge – "through the systematic transfer of best practices" (O'Dell and Grayson, 1998:11). Apart from best practice there is a variety of other tools – often based on some form of intranet solution, because as Kreiner and Mouritsen (2003) suggest, the intranet promises companies to know more – and many researchers claim that if managers can find the

right mix of information technology, people and organization for the change processes, they will succeed in benefiting from the promises offered by knowledge management (see Davenport & Prusak, 1998; Despres & Chauvel, 2000). The performativity of knowledge subsequently assumes a prominent position in the mainstream literature.

At the same time, an increasing number of researchers has understood knowledge in a much broader sense, emphasising the situatedness of knowledge and learning (Suchmann, 1987; Brown & Duguid, 1991; Lave & Wenger, 1991; Lave, 1993; Boland & Tenkasi, 1995; Gherardi & Nicolini, 2000; Nicolini, Gherardi & Yanow, 2003), the importance of narrative knowledge (Lyotard, 1984; Orr, 1996; Czarniawska, 1997) and the importance of passion and desire in the search for knowledge (Gherardi, 2003). In doing so, these researchers heed Lyotard's (1984) advice not to treat technical or scientific knowledge as the only legitimate knowledge, and highlight the complexity and ambiguity that are constitutive of knowing in organizations.

In this paper I examine this complexity more closely by emphasising the importance of mimesis in knowledge sharing and as a basis for organizing in general.

The concept of mimesis appears in a variety of different academic fields, but has not featured prominently in organization and management studies. The term comes from Greek and means imitation. In biology, for example, the term *mimicry* is used to describe the close external resemblance of one animal to another animal that is distasteful to predators. In art and art history it is often understood as corresponding to "representation" (see e.g. Walton, 1990).

Mimesis also plays an important role in literary theory, and can be traced back to the works of Aristotle, where it surfaces several times in the *Poetics* (Sullivan 1989; Varsava, 1990). Mimesis is imitation, which in turn is often seen as duplication; doing *the same as* – or becoming *the same as*. But as Ricoeur (1981:179-180) argued, mimesis[1] "does not mean the duplication of reality; *mimesis* is not a copy: *mimesis* is *poesis*, that is construction, creation" (italics from original). What makes it different from copying is the fact that what is imitated, such as words, artefacts (e.g. technology), symbols or actions (e.g. practices), changes during the process – in other words, is reinterpreted and transformed.

Consequently, mimesis can mean the copying of, for example, a practice; but it also might mean something else. Michael Taussig (1993) suggested that mimesis can be either *copy of* or *contact with* what is imitated (or both), building this distinction on James G. Frazer's (1963) "Law of Similarity" (copy) and his "Law of Contagion" (contact). Taussig defined mimesis as the faculty to imitate, copy, represent, make models, explore differences, yield into and become Other[2]. "The wonder of it lies in the copy drawing on the character and power of the original" (Taussig, 1993:xiii). In this sense he concurs with Ricoeur that what is imitated changes: a copy is not a copy in the sense of being what we might usually mean when we say a "faithful" copy. In the sense of mimesis as *copy of* or *contact with* what is imitated, the result of the imitation process is unpredictable.

Although Taussig (1993) discussed mimesis predominantly in direct encounters between the "primitive" and the "civilised", where the mimetic faculty is equated with the primitive, he argued that "magical mimesis", where the copy takes power from the original does not belong to a bygone age. Instead, he believes that the rise of modernism has brought with it a renewed focus on mimesis. Modernity, he claims, provides the cause, context, means, and needs for the resurgence of the mimetic faculty, aided by "mimetic machines" such as phonographs, cameras or advertising.

Barbara Czarniawska (2002) accordingly used Taussig's concept of mimesis in order to describe how meaning of the past and relation of organizational actions to the actions of others is created in organizations. If the aim is to popularise a practice, the way to enhance mimesis is to facilitate both contact and copy with that practice.

This insight used to be incorporated in the formal education system. In Germany for instance, students of business administration or economics are still today doing a *Praktikum* (internship) in companies, in order to learn in a context where a given practice is well developed. However, in times of mass education, mechanical reproduction and electronic communication, such a strategy is often not considered to be feasible, mainly because of the costs involved (Czarniawska, 2002:87). Already Benjamin (1968:83-84) pointed out that "[e]xperience has fallen in value. And it looks as if it is continuing to fall into bottomlessness" in our contemporary modern society. To an ever greater extent practices become embodied in people or machines in order to be sent from one place to another, and mimetic machines simulate contact.

In the present paper I attempt to highlight the importance of mimesis in knowledge sharing and organizing using an account based on an ethnographically-inspired study. The study concerned the failed attempts of a group of managers, engineers and IT consultants at Engico – a large Scandinavian industrial manufacturing company – to construct, implement and activate a knowledge management system in form of a best practice process. The paper is organized in the following way. In the next section I present the study I did at Engico, describing the company that opened its doors to me as well as the Best Practice Tool (BPT) project. I then present my findings including theoretical explanations when I feel they are needed and round off the paper with some concluding remarks.

The Setting – Engico and the BPT Project

Engico is one of the leading global manufacturers of products and components for, among others, the electrical and heavy machinery industries. The company employs over 30.000 people in 50 countries, and is the world leader in a number of product segments. Less than 10% of its total workforce operates in Scandinavia, with its main business activities concentrated at its headquarters, where it operates two factories, a laboratory, and one of its main warehouses.

Industry experts as well as Engico employees agree that the company's heart and soul are still influenced by its engineering roots and its founder's ideas. As one can expect from such

an organization, engineering skills are the key to status and respect at Engico: "practical experience", "knowing the machines", being "a production man" (sic).

Engico is organized into six divisions, each serving a global market and focusing on its own specific customer segments, and an equal number of staff departments. At the head of each division is a divisional management team of process development managers and product managers. These managers are senior engineers in charge of coordinating the manufacturing and product development process activities of the different factories. Some of them work at the different production sites; others are stationed at Engico's headquarters.

The company's factories typically house a number of manufacturing channels producing certain specific products. Each channel consists of a number of different machines. The raw material enters the channel at one end and is transformed as it moves from machine to machine, eventually resulting in the finished product or in components used in a different channel in the manufacturing of a product.

In the factories situated on the premises of Engico's headquarters, the parallel channels are arranged in a number of large factory halls. A handful of engineers work in each channel to ensure that the maximum number of products was manufactured in the shortest possible time.

A channel can be used to manufacture more than one specific product, not simultaneously, but sequentially. This process requires the machines to be adjusted – from manufacturing one product according to certain specifications to manufacturing another product according to different specifications. The process of adjusting the machines is called *resetting*.
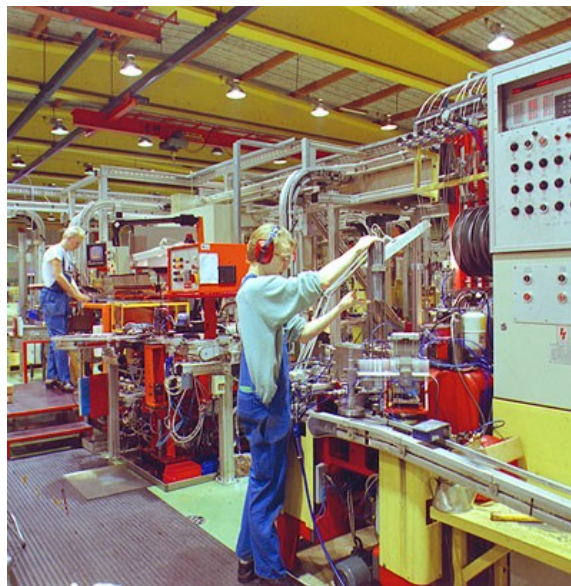

Fig. 1. *Work in a manufacturing channel at one of Engico's factories in Scandinavia.*

The company's engineering culture is especially tangible in one of its staff departments, Corporate Technical Development (CTD), which, apart from coordinating Engico's R&D and technology innovation activities is also responsible for the development and implementation

of the BPT process. The CTD employs primarily highly educated engineers, the majority of who work with R&D activities focused on both the development and improvement of the manufacturing processes and the products manufactured in the factories.

A number of knowledge management techniques and models had recently been developed and implemented at Engico. These included knowledge mapping, e-learning, knowledge repositories and best practice aimed at achieving efficiency and an increase in productivity through the optimisation of the knowledge resources of the company. The Best Practice Tool[3] (BPT) project formed part of these efforts and focused on constructing and implementing a knowledge management technology: an intranet-based software application, and a system of practices aimed at facilitating knowledge sharing in the form of best practices throughout the organization.

For almost four years (from 1999 to 2003) a group of engineers, managers and IT consultants worked with moving the technology from a prototype to a "taken-for-granted piece of equipment" (Latour, 1987) to be used by the engineers at Engico's factories as part of their daily work activities. However, the process never really materialised the way the BPT innovators[4] had planned. Initially, they wanted to transfer a best practice tool, the Best Practice Replication (BPR)[5] process, from Ford by signing a licensing agreement. This "knowledge transfer", as it was referred to by the engineers-turned-managers at Engico, failed to materialise (more about it later), and so they decided to build their own system modelled on the BPR process.

The result, in the form of the Best Practice Tool and the accompanying process, was launched in 2000, but a few months later only about 20-25 best practices had been submitted on the BPT homepage, and none of them through the system of practices as stipulated by the BPT innovators.

The engineers in charge of the BPT project were disappointed, but they did not give up. As is often the case in knowledge management and innovation projects in general, the innovators instead put the blame on the future users and others who did not understand the tremendous benefits of using the new technology and/or technical problems (see Latour, 1996). They believed that all their problems would be solved once the tool they were putting in place was improved.

Subsequently, the BPT application was removed from the intranet server in order for improvements to be made in anticipation of a future re-launch. After a number of unsuccessful re-launches BPT project was eventually "put on ice" in September 2003.

The fieldwork

My fieldwork has been influenced by Schütz's ideas best expressed in the *Phenomenology of the Social World* (1967). Schütz postulated the impossibility of understanding human conduct by ignoring its intentions, and the impossibility of understanding human intentions by ignoring the settings in which they make sense. Such settings may be institutions, practices or

other contexts created by humans and nonhumans – contexts with a history, *Lebenswelten* (life-worlds) within which both particular deeds and whole histories of individual actors can be and must be situated in order to be intelligible. For me this meant that I felt the need to gain an understanding of the *Lebenswelt*, or rather the "work-world" (see Czarniawska, 2002:6) of the participants in the BPT project, a work-world dominated by the strong engineering culture prevalent at Engico.

Consequently, I followed the BPT innovators during their working day and recorded their activities and interactions over a 2-year period between September 2001 and November 2003. Apart from conducting a total of 18 formal interviews, I observed 16 formal meetings and telephone conferences involving the innovators and the designated future users[6] of BPT, as well as informal conversations, computer use, training activities, modelling and so on, constituting the work activities of the managers and engineers. I also analysed a large amount of documents such as information pamphlets, training material, manuals, etc. produced as a result of the project work.

In what follows I present an account of how the idea of Knowledge Management was translated at Engico in the form of the Best Pracice Tool and its accompanying process aimed at "identifying, managing and spreading best practices" throughout the organization, in order to examine the role of mimesis (or lack of it) in what happened.

The Idea of Best Practice – *the* Best Practice?

The idea of Best Practice arrived at Engico in 1999 in the form of a report compiled by Sweden's Technical Attachés (STATT) – an organization describing itself as a "global knowledge organization focusing on innovation-related analyses and internationalization of small and medium sized companies" (www.statt.se/extern/statt/vision.htm, 2003) – on what their consultants judged to be successful Knowledge Management and innovation projects around the globe.

Although many companies were working with implementing and maintaining Best Practice and other knowledge management systems, the engineers at Engico believed that it was Ford Motor Company that worked with it most successfully: in other words, Ford's practice was seen as *the* best practice (in Best Practice). Consequently, they wanted to imitate Ford: to do what the US carmaker was doing. But the attempt to license the BPR process and implement it in their organization failed. Two explanations were given, the first and foremost being the exorbitant licensing fee. But this does not completely explain why the Scandinavians chose to abandon the licensing process and develop their own system. After all, the licensing of BPR promised to bring huge savings and increases in productivity, compared to which the initial licensing fee and the consultants' fees would have seemed all but negligible (Ford claimed to have generated close to US$ 1 billion in value-added with their BPR process). The second reason, judged less important, was that the signing of third-party agreements was avoided whenever possible at Engico. Also, Ford did not want to be held responsible for problems

experienced with parts of the BPR software that had been developed by other companies; therefore Ford required that Engico sign separate agreements with these companies.

No doubt these reasons alone were sufficient not to sign the agreement. But I would also like to point out yet another factor contributing to not licensing the Ford product. Even though the "licensing phase" continued for nearly a year, during which a number of meetings took place between the Ford representatives and the Engico people, the latter were given very little opportunity to directly experience the everyday workings of implementing and maintaining the BPR process; an experience necessary for them to transfer/copy the technology successfully. Although there would have been ways of compensating for this lack of direct experience, they never came to the fore in the interactions, finally resulting in the Scandinavians aborting the licensing process. Of course Ford was justified in not wanting to reveal the process before it was bought; but the Scandinavians were justified in not buying a process that they did not really know. Such are the paradoxes of organizational knowledge when it becomes commodified.

This occurrence, which is in no way unusual, would be difficult to explain with the "diffusion model" (see Latour, 1986;1987), traditionally used to explain the circulation and spreading of ideas, facts and artefacts, such as an innovation, through society. The Best Practice did not diffuse; Engico did not buy the licence. And yet the Best Practice had travelled from the USA to Scandinavia in spite of this; the engineers at Engico decided to translate the general idea into a workable process themselves.

This early stage of the project can actually be better understood with the help of the concept of mimesis. The preconditions for mimesis were first created through the STATT report on global knowledge management and innovation, which offered the engineers at Engico abstract descriptions of the knowledge management activities of a number of companies around the globe. This report can be seen as "mimesis-as-description" (Czarniawska, 2002). The STATT report was the product of a benchmarking exercise during which Sweden's Technical Attachés had examined the Knowledge Management initiatives of companies in seven different countries on three continents. The report briefly presented the dominant positive Knowledge Management characteristics of each country followed by a short description of a number of best cases (best practices) from that country. The report was compiled by the Attachés to promote the idea of Knowledge Management primarily among Swedish, but also among other Scandinavian companies. Knowledge Management was a highly fashionable management concept at the time and was understood to be one of the key organizational issues for achieving and maintaining a competitive advantage over rival companies. The report was a way for the Attachés to fulfil one of their explicit goals "to strengthen small and medium-sized companies' international competitiveness through an effective contribution to technology transfer, competence development and internationalisation" (STATT, 1999).

STATT can be seen as an "idea-bearing organization" (Czarniawska & Joerges, 1996:36; Sahlin-Andersson & Engwall, 2002) that had the task of spreading ideas in time and space.

Idea-bearing organizations contribute to the creation of norms, frequently accompanied by guidelines of how they should be enacted in the idea-receiving organization. The STATT report on Knowledge Management included prescriptions for achieving well-defined goals. Engico, on the other hand, can be portrayed as an idea-receiving organization. The engineers and managers at the Scandinavian company became interested first in the idea propagated by STATT, and then in Ford's BPR process. But the descriptions alone do not suffice to transfer a technology. For this, a contact is needed (Taussig, 1993; Czarniawska, 2002; Knorr-Cetina and Bruegger, 2002 call it an "embodied presence"). As the Engico engineers put it, they felt the need "to see for themselves" what BPR was about. According to Sahlin-Andersson (1996), people in organizations seldom have direct contact with the practices that they wish to imitate or refer to. What they imitate are abstractions – descriptions, models, and stories that are constructed by certain actors in the exemplary, successful organization. The innovators were given access to the BPR homepage and were shown examples of best practices that had been created at Ford in the past. They were also shown around one of Ford's factories in Detroit and given the opportunity to try BPR for themselves and to simulate the creation of best practices through the process. They did not, however, have any contact with the daily practice of implementing and maintaining the system in the context in which this practice was well developed. They did not experience the practice of working with BPR "here and now." The BPR representatives at Ford did not provide the Engico engineers with access to the everyday work of developing, managing and implementing the BPR process. The project leader who travelled to the USA to examine BPR recounted:

> They had some form of process, which they followed when they established communities. And…eh…they argued that it took approximately two months to get a community up-and-running. How they defined communities, how they chose the people…all that…we never saw that in detail. [Erik, 020516:4]

In the case of Ford's BPR, the abstractions and prescriptions flourished, because the BPR representatives wanted to achieve two goals through their interactions with the potential licensees. On the one hand they wanted to supply potential clients with enough information about their best practice process in order to promote it as being highly successful and kindle their interest in signing the deal. On the other hand, they wanted to make sure that potential clients did not receive enough valuable knowledge to develop their own process based on Ford's solution, without paying a fee.

One would imagine that the lack of contact with the practice of developing and maintaining the BPR process could have been partly compensated through stories about everyday work with BPR. The BPR representatives from Ford could have told the Engico engineers about their experiences establishing communities, stories about successful launches but also stories about mishaps, and stories about near-misses, which Weick and Roberts (1993) view as particularly instructive. What did they watch out for? Why did they think they had succeeded with the launch of one community and failed with another? But, as

Czarniawska (2002:87) points out "the descriptions of how things should be done go on forever; while the narratives – how we have done it this time around – are fewer."

But the only stories the BPR representatives did tell were success stories, which were actually abstract descriptions of allegedly concrete events. One of these stories accentuated the progress that had been made in the development of BPR: how the process had initially been facilitated by faxing the identified and described best practices, how people soon started sending so many faxes that the BPR coordinators were unable to keep up with organizing and spreading them, and how the Internet finally saved the day.

These success stories and other abstract descriptions did not "draw from the power of the original" and did not provide enough material for the Engico engineers to copy. In other words, these descriptions did not mimic the social practices surrounding BPR at Ford in a way that would have facilitated its re-enactment at Engico.

The engineers at the Scandinavian company were not prepared to make a large financial investment in a technology shrouded in this kind of uncertainty. Had they known about how the work with BPR really took place in everyday life, however – how communities were established for example – they may have been willing to pay the price Ford asked or may have realised that this type of best practice system would not work at Engico. Instead they decided to build their own system from scratch: an "innovation work" (Clarke & Fujimura, 1992; Diedrich, 2004).

The Best Practice Tool

The BPT project consisted of the development and implementation of a system of practices built around an intranet application, which was supposed to propagate, among others, the best practices of resetting across different factories.

This meant a need to define and identify the best practice at the Scandinavian company. According to the innovators at Engico a best practice was "an already implemented good practice (improvement, application)"[7],

> …something which has already been done, which is proven, and from which you can calculate a profit…so that you can describe the process in terms of something else…. One part of this has to do with coming over the barrier of 'not invented here.' Because, if I do something and describe it to you, you shouldn't have to say to me: I don't know whether this works. It should instead be well documented and so believable that one has no reason to question it. It also becomes apparent that this is a very complex issue, because there are so many different types of best practices. [Erik, 011112:2]

The innovators at Engico identified three different types of best practice: "organizational", "work method" and "technical innovation". For them the different types of best practice stood for different forms of knowledge. While they said that technical innovations and work methods would be easily described once the engineers in the factories understood the value of participating in the process, organizational best practices, focusing on the way work was

organised, were not easily explained. In other words, some practices in the organization were seen as more suitable for sharing than others.

But where would the best practices come from? In the words of the project members, "a best practice needs to be born".[8] But who conceives it? Where is it born? Why? How? The innovators at Engico were concerned about the possibility of formalising the different types of best practices – of being able "to describe them in terms of something else". After all, a best practice was not supposed to be "a fancy idea" [9], but had to have been proven to work somewhere in the organization.

They believed that the answers to all these questions must be found within the BPT process, which they understood as the identification, description and "creation" of a best practice in one part of the organization, ending with its "implementation" in a different locality in the organization.

The BPT Process:
from "Mother Best Practice" to "Implemented New Best Practice"

Fig. 2 below shows the BPT process as envisioned by the innovators. According to my interlocutors, a best practice would emerge somewhere in the organization through work with quality improvement, idea management, projects, etc. How, where and why that would happen, the innovators did not know.

They have been assuming, however, that the engineers in the factories continuously came up with new and innovative ways of doing their work, leading to improvements in the company's products and in the manufacturing processes themselves. Echoing the senior managers at the CTD and Engico as a whole, the innovators believed that these improvements did not reach a wider audience, because the managers and engineers in the factories were unwilling or unable to share their knowledge with their colleagues from other factories or other divisions. The possible reasons were the competition between the divisions, and the "not invented here syndrome" (an opinion that engineers like to solve their own problems and build their own systems, and are often suspicious of solutions that come from elsewhere).

This was where BPT would come in. The project leader spent great effort on telling the engineers from the factories about the benefits of BPT and what it could do for the entire company. According to him, one of the key aspects of the BPT process was the identification and establishment of *communities of (best) practice*, organised around different parts of the manufacturing processes and different fields of knowledge, such as machine design, assembly, resetting or metallurgy, for example. These communities were to be Intranet-based and envisaged to transcend organizational (divisional) boundaries and facilitate the sharing of best practices between factories and divisions. The process of creating such communities was negotiated between the BPT innovators and the process development managers from the factories in a series of meetings, and the goal was to eventually standardise this process.

Different roles were allocated within the communities: the Community Head (CH) had the overall responsibility for the community and for accepting or rejecting proposed best practices. The Best Practice Coordinators (BPC) were stationed in the different factories belonging to the community and were in charge of identifying and describing best practices and sending them off to the CH. Finally, Readers were engineers who were not members of a community and therefore could not partake in the activities of the community. They were however authorized to access and read the best practices that had been submitted. He used hypothetical examples; here is one of them:
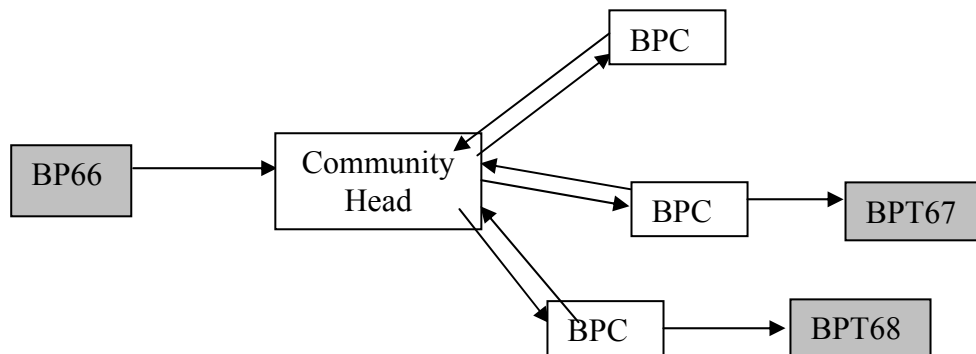

Fig. 2: *The BPT process according to a sketch drawn*
by the project leader at one of the meetings with a prospective Community Head

The Best Practice Coordinator in one of the factories constituting the Resetting Community has found out through benchmarking, that the time it takes his engineers to reset the particular machine is significantly shorter than that of his colleagues working with the same machine in the other factories. The BPC then describes this best resetting practice according to a standard format[10] and sends the template – here referred to as BP66 – via the intranet system to the CH for approval. If the CH chooses to approve BP66, it will be automatically sent out to all the BPCs in the community via a mailing list. The "mother best practice", BP66, will then arrive in a work list on the BPCs' computers, and they will be alerted by an e-mail sent from Lotus Notes that a new best practice is pending their attention. If one of the BPCs decides that BP66 is applicable in his or her factory, in other words that the engineers and workers should imitate (emulate) the practice represented by BP66, he or she will then "implement" the best practice. The BPC is then required to send a "Response" (here called BPT67), for which there is another template on the BPT homepage, in which it is described how BP66 was implemented in the factory: whether it was adopted or had to be adapted to local conditions, etc. If the BPC decides that BP66 is not applicable in his or her factory – one reason could be that the factory might not operate that particular type of machine – he or she is nevertheless required to send a Response.

The different Responses to a "mother best practice" will be listed at the bottom of the best practice description on the BPT homepage. The community members and the Readers will be therefore able to see where the different best practices originated, where they were sent and where they were implemented.

One of the BPT project members thus summarised the envisaged benefits from introducing the process as described above:

> What we offer is a vocabulary…we offer a structure…. We introduce this concept of best practice […], which has a value in itself, and signal them down to the lowest shop floor: we want to receive these real best practices. We promote them and you will get credit for them…eh…if you succeed with this. We will be able to […] measure how active they are…these different factories. If a factory isn't active at all we will be able to ask: what are you doing when it comes to improvement work? […].This will lead to a more positive development for us. We will be able to develop ourselves more quickly…to become an even better manufacturing company then we are today. [Karl, 020806:15/19]

BPT and "Informal Storytelling"

The senior managers at Engico believed that the work of the engineers in the factories was highly complex and that their company was a "leading global player" facing challenges from a variety of directions, such as downturns in the economy or the threats from low-cost, Asian producers. They described their company as "globally dispersed" and made sense of the problem of coordinating Engico's employees and business activities by using the metaphor "reinventing the wheel". As mentioned earlier, they assumed that although the engineers and workers in the factories were continuously coming up with new solutions to the problems they faced daily, the knowledge resulting from these practices remained in the local group instead of being shared with others doing similar work in other parts of the organization. According to them, knowledge sharing in the organization occurred primarily on a local level, between the engineers working in one channel or working in different channels within the same factory. One of the innovators, who spent a considerable part of his working day in Engico's factories working with improving resetting methods, often spoke about how the engineers and managers in the manufacturing channels worked:

> Their focus at the moment lies firmly with their own organization…their own work with improvement…. In other words, who does what when resetting a manufacturing channel…that's what they are doing. And they have their network, and they have their meetings via telephone…and they meet once or twice a year in this network. And they are probably satisfied…they are successful in their area. But we do not get this effect that they…eh…. We do not get this [knowledge] from them in a structured way so that it can be shared with others…apart from the fact that two people in that group talk with each other…this informal interaction. [Karl, 020806:19]

Thus when the engineers in the factories came up with a new way of going about their work, such as a new method for resetting a machine which leads to a reduction in the resetting

time, he shared this knowledge by either talking to his colleagues about it or by submitting the knowledge about the method to the local databases that many groups of engineers had constructed in order to organize their knowledge. For instance, one of the product managers from a factory told me about knowledge sharing in his group:

> We have a database today, which we run on Lotus Notes…and that everybody has access to. And there you can find all the information about the project: our memos, benchmarking information, customer demand survey. You can also find improvement tools, activity lists and reports from workshops…and local factories have the opportunity to report on their business. […]. We have operated this database for three years and we today have 325 documents…212MB of information in it. […]. And this database is highly frequented for being a project database. Some of the company's big databases are not as highly frequented as ours. [Hans, 020523:9]

These actions were situated and based on mimesis: the engineers saw or heard what their colleagues were doing and organized their own activities around this knowledge. From a managerial point of view this way of working was inefficient, because the knowledge purportedly gained was not spread beyond the borders of the specific group and, as one of the CTD engineers, an expert on metallurgical processes, put it:

> One doesn't only solve problems twice, but three times…many times. [Udo, 021106:8]

According to the BPT innovators, their BPT process provided the answer to this problem. They admitted that knowledge existed in the informal interaction of the engineers and managers in the factories, in the practices they engaged in together and in the stories they shared. However, they did not recognise the value of this situated, narrative knowledge to the organization. As one of the innovators said:

> It's not that we lack the knowledge today…it's just that it is very informal storytelling. [Karl, 020806:19]

The importance of this form of knowledge in organizing has been acknowledged by a number of researchers in the past (e.g. Weick & Browning, 1986; Boland, 1989; Boje, 1991; Orr, 1996; Czarniawska, 1997). Orr (1996), in his ethnographic study of copy machine repair men, showed how the technicians solve the problems they face with the help of storytelling. He argued that their anecdotes of experience – what he referred to as "war stories" – served as a "vehicle of community memory" for the group of technicians he studied over a longer period at Xerox. The stories about the machines they worked with were important for the repair men when they made sense of their everyday work, and when they shared information with those members of their community who did not experience what they experienced firsthand. Focusing on reforms in the Swedish public sector, Czarniawska (1997:28) has discussed the importance of narrative knowledge as a means of making sense of what is going on in the everyday life of organizations (both for the actors involved in the organizing processes and for researchers – or for others, for that matter), and thus as constituting the core of organizational knowledge.

For the BPT innovators, however, the informal storytelling of the engineers in the factories signified, above all, uncertainty, messiness and indeterminacy. They saw it as the reason for why the engineers in the factories were wasting their time doing the same things and solving the same problems over and over again in different parts of the organization. The innovators wanted a tool that would eliminate any waste or inefficiencies in the knowledge sharing and would systematise knowledge production. They wanted to displace the informal storytelling with a process, which they assumed was to allow them to acquire the right knowledge at the right time in order to make it available to the right people. Instead of "reinventing the wheel" the engineers were to work based on standardised methods, best practices:

> If a new person joins the team, he is not supposed to use Gunnar's method if he works with Gunnar…and if he works with Rolf he uses Rolf's method. Instead he should get the information: if you reset a certain machine, this is the way we do that around here. Then we will achieve storytelling on a higher…on a better level than what we have today. [Karl, 020806:15]

Put differently, the BPT process would allow them to obtain the best solution to a problem *automatically*, and subsequently to spend more time on being innovative. They did not see it as problematic that such a process would replace the spontaneous, informal knowledge sharing. The engineers in the factories were still expected to share knowledge, but now they were to do it in a more controlled, structured and instrumental fashion, not based on their own free ideas, but dependent on the needs of the BPT technology and of the company, as stipulated by the managers. Measurements based on observable outcomes and competent performance were given precedence, and innovative practices had to be aligned directly with the requirements of the organization and individual work activities. The BPT process would produce "straightforward" best practices that had been proven effective and that could be measured in terms of value added.

But, what if it is necessary to reinvent the wheel in order for innovation and learning to take place? Perhaps one must experience things first hand in order to be innovative? Jerome Bruner (1961), who examined active participation in learning processes among children, has argued for example that activities and attitudes associated with "figuring out" or "discovering"[11] things for oneself are especially important in the overall learning process. He suggested that learning by discovering might bring benefits which would otherwise be lost in situations in which knowledge was transmitted from teachers or other presumed experts to passive learners.

The analogy between the learning of a child as described by Bruner (1961) and the learning of a newcomer in the organization is obvious, and the point of learning through doing things oneself was not neglected by the mainstream Knowledge Management literature. Nonaka and Takeuchi (1995), for example, accentuated the importance of "learning by doing", and highlighted the value of on-the-job training. They wrote, "[a]pprentices work with their masters and learn craftsmanship not through language but through observation, imitation and practice. In the business setting, on-the-job training uses basically the same

principle". They argued that the mere transfer of information often makes little sense if it is abstracted from associated emotions and specific contexts in which the shared experiences are embedded (Nonaka & Takeuchi, 1995:63).

The idea of Knowledge Management as translated into the BPT process at Engico, however, stood in contradiction to the idea of learning by doing, of discovering for oneself and making one's own mistakes. The intended users of the process were expected to work based on what had previously been identified and explicitly described through the BPT process as best practice in the organization. The idea was that before working on a problem the engineers should enter the BPT homepage to see if the problem they experienced had been previously solved somewhere outside their community. If this were the case, then hopefully the problem-solving activity had been documented so well in the system as to allow the engineers to "re-experience" (Nonaka & Takeuchi, 1995:69) the learning for themselves.

Perfecting the Descriptions

The process of describing a best practice before submitting it to the system received a great deal of the innovators' attention. For them, it symbolised the weak link in the BPT process:

> We have tried earlier on to have the local factory coordinators do these type of descriptions…and the description quality was too bad…eh…to actually get other people interested in reading it. This is a very tricky question. [Karl, 030626:16]

The innovators said that the engineers in the factories were not, for the most part, very good at describing their practices in the manner they had intended them to – in the form of a standard template or in a Word document – because they did not have any experience in doing so. On a number of occasions, the innovators complained that the poor quality of the descriptions was probably one of the main reasons why the engineers were not interested in examining the best practices from other parts of the organization, which had been submitted through the process. The innovators said that the descriptions had to be as straightforward as possible so as to allow the other engineers, independent of where they were working, to understand them, re-experience them and relate them to their own work.

They were no doubt right. Still, even if they were able to follow the BPT process in a prescribed manner, the engineers and managers in the factories would not get the chance to set their own "task boundaries" (Nonaka & Takeuchi, 1995:76). Instead of being a part in the formulation of the learning activity and even occasionally playing a principal role in it, their role would be reduced to what Bruner (1961) called a "bench-bound listener", expected to learn based on abstract, decontextualised information.

The innovators' intention to build a technology that would produce this abstract, decontextualised information in the form of best practices to be spread throughout the organization is ironic when seen in light of the activities which unfolded during the initial stages of the project. They themselves refused to buy the Ford's BPR process, because they did not know its practice well enough. They themselves pointed out that Ford could

compensate for the lack of contact through stories about the everyday work with BPR. The abstract descriptions provided by Ford did not mimic the social practice at the US car maker adequately enough, making a re-enactment of BPR impossible at Engico. However, the innovators failed to see the analogy between this events and their own attempt to force the abstract descriptions of practices on the Engico engineers. At best, these descriptions could be compared to the abstract, decontextualised description of the BPR process packaged in form of the STATT report in order to be disseminated in the Scandinavian countries.

An engineer entering the BPT homepage and accessing knowledge in the form of a best practice in resetting a certain type of machine which had been described and submitted by engineers from another factory, lacked contact with the practice of resetting that particular machine in that specific context. The practices were situated in the same organization and probably shared a number of similarities from setting to setting. Yet the descriptions were abstract representations of situated practices and did not "draw on the power of the original", on situated actions which could provide enough material for the mimicking of the best practice to occur. This lack of contact was not compensated by stories about the everyday work– of resetting a particular grinding machine for example – making mimicry difficult.

As is often the case with innovative projects, in Latour's (1987) sense of the term, the blame for the failure was put on the technology used and the lack of understanding for the process by its future users. The innovators complained that the intranet platform, which was to facilitate the BPT process, was not working properly and that there was a lack of interest from some of the involved process development managers in the factories. Nevertheless, the project continued and the innovators' "dream" about how the process was envisioned to work in the future remained alive.

Concluding Remarks: Repressing and Re-presenting Mimesis

In the limited space of this paper, I attempted to show how the idea of Best Practice was translated into an organizational setting by the innovators – engineers, managers and IT consultants – at Engico. It is only when they themselves interpreted the project as a failure that I joined them in trying to explain it, with explanations that often went beyond theirs or contradicted theirs. It does not mean that my interpretations are "correct"; hopefully, their value lies in that they are different, and therefore add to the possible repertoire of interpretations.

There is no doubt that the concept of Knowledge Management seemed enticing to the engineers and managers at the Scandinavian company. It was, and still is, a fashionable concept, something every company believes they should do in order to remain competitive. It provided the engineers with many opportunities for building systems and structures aimed at replacing opacity with transparency, creating order and organising the previously unorganised. For the innovators at Engico, the promise of Knowledge Management lay in gaining control over, and making accessible hitherto tacit knowledge assumed to be hidden in

the heads of the engineers in the factories, and considered as the company's supposedly most important resource.

The innovators recognised that knowledge sharing already occurred in the organization, even without their Best Practice Tool. But the aim of rational management is to make the throughput processes more efficient. In the case of the BPT project, the engineers at Engico wanted to increase the efficiency of knowledge sharing by introducing a new throughput process that would more or less automatically convert inputs in the form of knowledge possessed by the engineers in the factories into outputs in the form of standardised methods or best practices of doing work.

The innovators described the BPT as a tool that could be used to facilitate this process. They understood the technology as capable of bringing about a "death of distance" (Cairncross, 1998), a situation in which social interaction, economic transactions and other relationships can continue without the need of physical propinquity. In other words, the innovators assumed that engineers separated in time and space at Engico would be able to share their knowledge with one another through the BPT in a way that was superior to what they were currently doing in their local communities. Alvesson and Kärreman (2001) have suggested, however, that there is a strong possibility that technocratic type of knowledge management will result in the removal of provisions for knowledge sharing and subsequently impede rather than facilitate knowledge creation. And Susan Leigh Star (1995:109) suggested that the "danger in attempting to capture tacit knowledge, especially in attempts to automate critical systems, is that the flexibility and smartness that comes from situated action […] may be lost, in exactly the position where it is most needed".

In the case of Engico, the device introduced in the project to reach the aims of identifying, managing and spreading best practices throughout the organization took centre stage in the eyes of the innovators. They attempted to build the perfect system: a mimetic machine able to produce an infinite number of copies of best practices that could be made available to the right people at the right place and the right time.

This mimetic machine in the form of the intranet-based software and the system of practices around it was to displace the unsystematic imitation taking place in the factories. This can be explained, along Taussig's lines, by the assumption that imitation runs counter to the modern concept of technique, based in the belief that the rules of any art can be extracted and made explicit through scientific analysis (Sullivan, 1989).

But BPT was more than the displacement or repression of mimesis. Although it was intended primarily to repress mimesis, it also meant a "return of the *repressed"*, based on the "organized control of mimesis". While the BPT innovators intended to repress mimesis in the daily practices of the engineers (in order to weed out inefficiencies associated with repeating the same things, or doing the wrong things), they simultaneously sought to re-present mimesis and control it through the sharing of knowledge in the form of best practices by means of the machine they built: the Best Practice Tool. This can be seen as "the mimesis of mimesis" (Horkheimer & Adorno, 1987) – the re-presentation of mimetic activities.

I believe that such a displacement of situated knowledge sharing (mimesis) by an automated process (mimetic machine) would ultimately result in a diminution of the complexity, ambiguity and variety associated with knowing and indispensable for the process to work in the first place. Put differently, the mimetic machine might take out what is needed for successful knowledge sharing in the first place.

Taussig says that although society is experiencing a resurgence of the mimetic faculty, this is aided more and more by various forms of mimetic machines, based in the belief that the situated, practice-based and personal knowledge and experiences can and should be identified and described, and an infinite number of faithful copies made by means of scientific analysis in order to be sent through time and space, without regard for what is lost in the process: "It is", as Walter Benjamin (1968:83) bewailed, "as if something that seemed inalienable to us, the securest among our possessions, were taken from us: the ability to exchange experiences".

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Endnotes

[1] Ricoeur referred specifically to Aristotelian mimesis, but his argument can be seen as descriptive of the broader concept of mimesis as it will be used here.

[2] Taussig (1993) explores the experience of young Charles Darwin on the beach at Tierra del Fuego on the Southern tip of South America in 1832. Darwin was full of awe at the mimetic prowess of the "primitives" and Taussig refers to this scene as a "foundational moment in the equation of savagery with mimesis". Darwin wrote: "They are excellent mimics: as often as we coughed or yawned or made any odd motion, they immediately imitated us. Some of the officers began to squint and make monkey like faces; but one of the young Fuegians (whose face was painted black with white band over his eyes) succeeded in making far more hideous grimaces. They could repeat with perfect correctness each word in any sentence we addressed them, and they remembered such words for some time. […]. All savages appear to possess, to an uncommon degree, this power of mimicry" (1896; quoted in Taussig, 1993).

[3] I have changed the original name of the project – hopefully preserving the main idea behind it – as well as the names of the companies, the IT system and all the people featured in this chapter, in order to ensure the anonymity of the people involved in the study.

[4] I will refer to the persons who worked with the development and introduction of the BPT at Engico as a major part of their work activities at times as the "BPT innovators".

[5] For more on Best Practice Replication see Wolford (1999) and Kwiecien and Wolford (2001).

[6] By "users" I mean the process development managers and production managers from the factories that have shown interest in the BPT process and have participated in some of the meetings at which the process was presented and/or discussed.

[7] BPT Handout Reference (2000)

[8] BPT Handout Reference (2000). This metaphor of the "birth" of a best practice was corroborated by my interlocutors' frequent references to "mother best practice", i.e. the initial best practice submitted for approval.

[9] Interview with a BPT innovator (Karl, 020806)

[10] A best practice is described on the homepage of the specific community. Clicking on the link "Create Best Practice", one arrives on a page where one has to fill in a variety of details concerning the "best practice", such as: the name of the person to contact for further information, the factory, the community, a short description (not more than 200 words) of what the best practice is all about, etc. Attached to this page is a Word file in which the best practice is described in greater detail. This Word file is a standard template, which can be downloaded from the community homepage.

[11] Bruner uses the term "discovery" to include all forms of obtaining knowledge for oneself by the use of one's own mind, and does not restrict it to the act of finding out something that was previously unknown to mankind.

Developing a passion for discovery:
Organizational learning from medical error

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Organizational learning from medical error contributes to alleviating unnecessary patient suffering and reducing healthcare costs associated with preventable patient injuries (Kohn et al., 2000). Whereas such instrumental goals are important, they may not adequately explain what triggers physicians' interests in initiating and participating in organizational learning from medical error. In the current study, we ask physicians to describe their experiences with organizational learning from medical errors in hospitals and explain their decisions to initiate, promote (or refrain from) learning.

Previous Organizational Learning Research

We define organizational learning as a process in which decision makers weigh the organization's experience as a basis for changing the routines that will guide future behavior (Levitt & March, 1988; March, 1999). Although organizational learning (OL) researchers have yet to agree on a common definition, a review of the literature (Bapuji & Crossan, 2004) reveals that they do concur that learning occurs on individual, group and organizational levels. There is increasing interest in learning on the inter-organizational level, but there has been little recent attention to the role of individuals in organizational learning.

Tracing the roles of individuals' activities related to OL can illuminate the processes by which organizations learn from their experience. Individuals participate in different organizational learning forums and engage in an array of processes that support learning, such as information gathering, analyzing events from the organization's history, and considering changes in existing routines and standard procedures. By focusing on individuals, researchers can also explore the relationship between individual learning activities and those on the organizational level.

Under assumptions of bounded rationality, organizational decision makers may trigger OL processes when they notice that the organization has performed either above or below normative performance standards. Such assumptions are still common in the strategy literature (for a recent review that includes this literature see Argote & Ophir 2001). There is an implicit functional assumption that decision makers seek to learn so that the organization may reach its objectives more effectively or efficiently. Indeed, this may often be a goal of decision makers who seek to draw conclusions from the organization's past experience, although organizational learning processes need not result in improvement despite the individuals' efforts (March, 1999).

In the current study, we also draw on previous research on organizational learning in hospitals. Hospitals are characterized by an array of organizational learning mechanisms (OLMs), which constitute necessary but not sufficient conditions for learning. Lipshitz and Popper (2000:347) coined the term OLM to designate "institutionalized structural and procedural arrangements, and informal systematic practices for collecting, analyzing, storing, and disseminating information that is relevant to the performance of the organization

and its members." In hospitals OL tends to be fragmented, with a "patchwork quilt" (Edmondson, 2004; Edmondson, Bohmer & Pisano, 2000) of independent OL processes occurring within patient care units and departments, as well as at the hospital level (Tamuz,Thomas & Franchois, 2004). Previous studies have focused on the variations in nursing unit management (Edmonson, 1996) and work processes (Tucker & Edmondson, 2003) that influence reporting among nurses. They have also highlighted the cultural factors that make residents, or physicians in training, reluctant to disclose their errors for fear of appearing unprepared or incompetent (Hoff, Pohl & Bartfield, 2004). However, relatively little research has been directed towards identifying the factors that promote organizational learning among physicians.

We build, in part, on previous studies of learning in high-hazard industries, characterized by infrequent but potentially disastrous and highly visible accidents. The current study focuses on the role of physicians in learning from safety-related events, such as errors, near misses, and adverse events. Learning from error can offer valuable lessons to organizations (Sitkin, 1992), but the process is fraught with difficulties when even small errors can result in patient injury.

Adverse events, in which a patient suffers a preventable injury or death, occur much more frequently in healthcare than in high hazard industries, such as aviation (Kohn et al., 2000). However, in both hospitals and organizations operating in high-hazard industries, the opportunities for learning from adverse events are limited. The costs of trial and error learning are unacceptable (La Porte, 1982). Although preventable injuries occur relatively frequently in hospitals, especially as compared to the air transportation industry (Thomas & Helmreich, 2002), they are distributed among many healthcare providers and patient care units. Each provider and unit may lack extensive direct experience with events resulting in preventable patient harm (March, Sproull & Tamuz, 1991), If the patient is not harmed, healthcare providers confront disincentives for disclosing what went wrong (e.g., Edmondson, 2004). Finally, the classification of an event as a potential or actual preventable injury often remains ambiguous (Sagan, 1993). It can be attributed to the patient's underlying illness or "defined away" as not constituting an error on the part of a specific healthcare provider (Tamuz, Thomas & Franchois, 2004). We seek to deepen our understanding of the feasibility of learning from safety-related events, by examining how hospital-based physicians perceive the factors that promote (or hinder) their efforts to construct guidelines for the future, derived from an analysis of events in the organization's history.

For students of organizational learning, this study seeks to illuminate the role of key individual decision makers in initiating and implementing organizational learning processes. It also examines how professionals' individual learning activities correspond and contribute to processes of organizational learning. For those who advocate organizational learning from safety-related events in hospitals, it is important to understand how physicians describe and explain their involvement, if any, in organizational learning processes. Given the

importance of and difficulties inherent in learning from medical error, are there organizational arrangements that support physicians in a search for knowledge?

Research questions

Part of a larger research project examining organizational learning from medication errors in hospitals, the current study focuses on the physicians' perspectives. The first research question was proposed a priori; an additional research questions emerged as the research team analyzed the physicians' interview responses.

1. How do physicians describe their roles in organizational learning from medical errors?
2. How do physicians explain what spurs their interests, if any, in drawing conclusions from medical errors?

Methods

Sample

We focused on a sample of 36 physicians from three urban tertiary-care teaching hospitals, including residents (n=12), fellows (n=7), and the supervising attending physicians (n=17), from a total of 342 hospital healthcare providers and administrators. The interview sample was comprised of a random sample of physicians working in select patient care units and physicians who were chosen because of their key decision-making roles, (e.g. committee chairs). Interviews ranged in length from 25 minutes to repeated interview sessions culminating in about 3 hours. We speculate that those who had a keen interest in patient safety may have been more willing to participate than others. Although a few physicians appeared to be wary and reticent in their responses, we found that most of the physicians were remarkably candid in their answers to potentially sensitive questions.

Data Sources

Using a semi-structured interview protocol, we asked participants to describe reporting systems and other programs designed to monitor medication safety. The interviews were voluntary and confidential; they were audio-recorded and transcribed. The interview data were supplemented by field notes, document review, and observations of routine activities.

Data Analysis

A multidisciplinary team of researchers, with expertise in nursing, medicine, qualitative methods, and organization theory, reviewed the interview transcripts, listening to the audiotapes as needed. We used a focused thematic analysis (Miles & Huberman, 1994) in a three-stage process. First, one of the researchers thoroughly read each transcript, identifying

themes, exemplar segments, and making notes in relation to the research questions. In the second stage, two other researchers discussed the themes and exemplars with the first researcher, challenging the interpretations and modifying and developing new codes. The three researchers collaboratively worked through the material to produce a refined and parsimonious list of themes and associated exemplars. The fourth researcher read the refined themes and exemplars as an outside reviewer who was not involved in the coding processes. This enabled him to take a skeptical view and challenge the data analysis and interpretation proposed by the other research team members.

To protect the confidentiality of the individuals and the hospitals in which they worked, we do not use any names or specify any locations. In addition, we use female pronouns for all of the physicians and male pronouns for the nurses and the patients. In the study, we interviewed a mix of male and female doctors, although most of the nurses were female.

Results

Descriptions: Leadership role

As the patient safety literature suggests, we found some evidence of physicians' assuming a leadership position in learning. In particular, we noticed example of leadership among the heads of the patient care units, as illustrated by this statement: "'No. I'm responsible for this.' I said, 'This is my [unit]. I was here. I was in charge. I'm responsible for it, and I'll find out what went wrong.'" However, publicly taking a leadership role in supporting patient safety from "the top down" seemed to be somewhat uncommon. Attendings, including those in positions of authority, tended to describe individual and organizational learning as part of their everyday activities instead of occasional public displays of leadership. This suggests that attending physicians might see their role as providing "bottom-up" support for organizational learning from safety-related events, rather than taking a "top down" public, symbolic leadership role, reflecting their positions of authority in the hospital or the patient care unit.

Descriptions: Organizational Learning Mechanisms

As expected, the physicians described their participation in a range of organizational learning mechanisms, including general organizational learning forums and those designated specifically for patient safety. In both types of forums, decision makers initiate organizational learning processes following an event, such as an error, near miss or an adverse event, where the patient suffered a preventable injury or death. As an attending explained: "Periodically, we'll look at the overall process. But obviously, it has to be triggered by some type of event."

Physicians described using general purpose learning forums to focus on patient safety issues. Such forums included using hospital incident (or variance) reporting systems and

participating in Pharmaceuticals and Therapeutics (P&T) committee meetings, and Morbidity and Mortality (M&M) sessions. For example, doctors requested that events be reported to the hospital's incident (or variance) reporting system, as reflected in the following remarks by an attending. "It's really because we tentatively report out more of those kind of problems, that the kind of accommodation of physicians and nurses and pharmacists tend to get together and say, 'what can we do about this situation?'" They also participated in periodic Morbidity and Mortality (M&M) sessions, as the following physician notes:

Because this is a teaching institution it [adverse drug event] actually became our M&M for the following month. We talked about changes that we could suggest to improve the system…. It kind of went through our [physicians'] learning process one way and then it kind of went through the hospital side the other way.

In the M&M sessions all the physicians in a patient care unit, including attending physicians and physicians in training, discuss cases in which a patient suffered injury or death. These cases include but are not limited to adverse events in which the patient injury could have been prevented or was possibly due to error.

Physicians also described their participation in OLMs that were designated for patient safety issues. These included formal root cause analyses (RCAs), both those in which attending physicians or residents were involved in the triggering event and those in which an attending was invited to participate in seeking a solution. One of the attending physicians noted:

S: We asked for the [Drug A] medication but the nurse gave them the wrong one because he had another patient on the other side that was getting the [Drug B] medication...

I: Okay this is a good, really good example. And so, in this case you filed a variance report what happened next?

S: Went to a root cause analysis and the root cause analysis tried to come up with some, some simple solution and that was basically it.

In this instance, the hospital quality assurance personnel followed their standard routines for calling a root cause analysis. They invited the attending physician to participate because she had direct knowledge of the event. A quality assurance representative served as a facilitator in the RCA and guided the participants to generate proposed solutions. As evident in this quote, the attending thought that the group chose simple, readily implemented solutions rather than identifying the root causes of the event.

Most of these opportunities for learning were triggered by an event, but some informal organizational learning mechanisms centered on receiving feedback from safety procedures that had been implemented. In one hospital, the attendings described how the physicians working in the patient care unit routinely reviewed the protocols they established, for example, for the dosing and monitoring of particular medications. "In our [weekly departmental physicians] meetings we periodically review each protocol and get feedback on

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how each one is working." Although these protocol reviews take place in an informal OLM, they are not triggered by a safety-related event.

As expected, the physicians described their participation in a range of organizational learning forums that analyzed safety related events and sought to draw conclusions from them. But some physicians spontaneously described their frustration with the existing decision making forums. They described examples where the existing OLM did not promote, or even hindered the physicians' attempts to learn. Consider how one attending explained how the lack of feedback from the hospital incident (or variance) reporting systems hindered individual learning:

S: Basically yeah, you can send it all out, but you get nothing back. You don't learn from your own mistakes, 'cause you don't even know you made a mistake. Unless you reported it yourself, you didn't know you make a mistake.

I: So, someone else could have caught, reported it, and you'd never even know?

S: I guess if it's important enough, you'd probably find out. But short of that, yeah. You might have fifteen Variance Reports about you, and you don't even know about it.

I: You're kidding.

S: Sure. Why not? You don't sign it. I mean, the person that fills it out signs it, not the person that the incident happened to had to sign it. They don't sign it.

The physicians wanted to learn from variance reports how to improve their individual practice as well as procedures in the unit and hospital, but did not systematically and consistently receive feedback. They participated in RCAs, but in some cases found them inadequate to actually get to the root of the problem. Attending physicians complained that RCAs resulted in the identification of simplistic solutions that were easy to implement, but did not address the underlying causes of the event. Furthermore, physicians considered some of the existing OLMs to be ineffective methods for implementing solutions. Both residents and attending physicians recounted that the same errors were repeated, because safety measures had not been implemented.

Descriptions: Taking Initiative

Physicians described how they took initiative in promoting organizational learning. They initiated activities that contributed to an array of organizational learning processes, ranging from identifying issues that were potential learning topics to gathering data about relevant issues, to calling for an informal or formal investigation, such as a Root Cause Analysis.

Issue identification

Physicians spontaneously described how they proactively engaged in promoting patient safety issues. Although they did not use the term "issue identification," they described how they recognized and classified particular concerns as topics for organizational learning. The

chair of a hospital committee explained how she used her role to promote the safe use of medications:

I can't work on improving wrong-site surgery, but I can work on making sure that the patient doesn't get the wrong drug during surgery. It's not that it's not important to everybody else, but this is something that I don't see anyone else grabbing ownership of. There's nothing stopping me from grabbing ownership of it.

The committee chair proceeded to give specific examples of how she created opportunities to consider the hospital's experience with hazardous or new medications as a basis for changing future guidelines. In one example, the chair convened a group of decision makers who re-evaluated the hospital policy for administering a new and potentially hazardous medication.

Taking the initiative to identify errors as potential safety issues that warrant organizational learning was not reserved only for committee chairs or attending physicians. A resident explained how she built on her own experience of finding out that she had made an error.

I don't want this to happen to me or my patients again. And so you ask. And I went straight up to the attending … Listen, this is what happened. Now I know. I know what happened, but how can I prevent this from happening again or what should I have done differently? And you have to do that. Not doing that, I can't even imagine not doing that. You can't just sit there in your call room or whatever and be like "Oh I made a mistake. Oh well, whatever. Next patient." That doesn't seem appropriate.

This illustrates how the resident took the error correction "I know what happened" and sought to understand "what should I have done differently" and what she could do to "prevent this from happening again". By asking these questions, the resident identified the specific error as an issue that should be the topic of learning.

Data collection

Physicians described how they had identified a particular problem as a patient safety issue, but lacked the data necessary to analyze how to address the problem. One attending described how that the hospital variance reporting system was not effectively collecting information. Few reports of a particular problem were compiled by the hospital system, yet each attending had personally observed this problem in her own practice. The attendings decided to take action and generate the data:

We could name, off the top of our heads, the name of five patients each, each one of us, we could name five patients this [the problem] happened to us. Off the top of our heads. So you're going to tell me that you have one? Something's wrong; we're missing data. So we started writing variance reports. It's not necessarily that we need a variance report, but we need to be able to have a way of generating that data.

In this case, the attending and her colleagues not only took the initiative in reporting key events, but they also addressed a shortcoming of the hospital incident (or variance) reporting

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system. The physicians took the initiative in reporting data regarding a salient issue and in improving the operation of an organizational learning mechanism.

Event analysis

Several attending physicians spontaneously described how they would initiate a RCA after discovering that an error occurred. This differs from the usual procedure, mentioned above, in which Quality Assurance facilitators invited a doctor to participate in a RCA because he or she was involved in the event or could assist in analyzing it as an outsider. One attending explained that if no easy explanation could account for the patient's poor outcome "then it is RCA time." To illustrate, an attending described how she called for a RCA following a medication error.

Not long ago, we had a nurse taking care of two patients. I don't remember what the medication ordered was. I think it was [drug X]. Another was on [drug Y]. He was scrambling to keep things going with two patients. The [drug X] dose is a little brown vial. The [drug Y] is a little brown vial. He ends up giving [drug Y] intravenously rather than [drug X]. That's a medication error with RCA, and it's easy for me to ask for that one.

Attendings took initiative when they called for a RCA after a near miss, when a patient was unharmed but the circumstances had the potential for harm. Another example of physicians initiating a RCA is from an attending who explained:

I have a low threshold for it. My belief is that it allows us to look at the system problems and it helps people realize we're all in it together. The fact that somebody gave the wrong medication this time doesn't mean that it's going to be the same person next time. Calling attention to the system lets people see where they are in the delivery system.

For this attending, a Root Cause Analysis provided an opportunity not only to learn what caused a particular mishap but also for participants to better understand their interdependent roles in the hospital.

Several attending physicians described how they participated in informal data gathering and analysis activities in which they questioned the health care providers involved in an event and identified possible causes and implemented solutions without taking part in a formal meeting or participating in a Root Cause Analysis session under the guidance of the hospital's quality assurance representatives.   Here an attending described how she initiated informal problem-solving processes:

There have been many times where I've just gone and grabbed the Nursing Director and said: "There's this problem; we've got to do something about it." And I'll just leave him alone and a week later he'll find me and tell me how he handled it.

This example illustrates how these informal learning processes can involve multidisciplinary groups of healthcare providers.

Descriptions: Transforming Individual Learning into Organizational Learning

This study focuses on understanding the roles of physicians in organizational learning. Therefore, as we were coding we sought to carefully differentiate between instances of individual and organizational learning. We found that some of the attending physicians spontaneously provided examples of how they leveraged their individual experience as a basis for organizational learning. In some cases, attendings sought to explore whether their colleagues had similar experiences with errors, as one attending physician noted:

I mean, can't fix the problem without knowing what the problems are, and I guess people bring up different things. If you have a bad experience and then all of a sudden based on your bad experience you're like "hey, yeah, I had that too." And then start looking at that data.

If a particular error was a common occurrence it might indicate that it stemmed from system problems rather than random errors by individuals.

There were also examples in which physicians identified organizational learning issues based on their personal experience. In these cases, they did not describe the need to gather further data before identifying their experience as an indicator of a significant issue for the patient care unit. In one instance, an attending described her individual learning experience in which she identified a common medication mistake that occurred during the night shift and changed her practice to reduce the likelihood of such errors. Yet she realized that her actions would not eliminate the error because it was caused by a fundamental limitation in the organizational procedures in the patient care unit:

The problem is that's partly all our fault too because we don't have staffing model where we can have somebody here for the whole 24 hours. So we finish our weekends and we leave so there is nobody here.

She described how her past experience with a night-shift medication error, reflected and indeed was caused, in part, by organizational conditions. She used her individual learning experience to identify an issue for organizational learning that she was seeking to resolve.

In another instance, a physician learned from positive feedback rather than from an error or adverse event. When the head of a patient care unit learned from her personal experience, she translated her individual learning into policy changes for the unit.

There were a number of times, however, that I was here taking care of sick patients in surgery, and they [the surgeons] said, "You know, it makes a difference when you're here." It never occurred to me that that might be the case. As I told them [the faculty] when I went to the surgery department faculty meeting, "If it does make a difference, then that's what it will take."

The head of the patient care unit leveraged her personal experience to identify a topic for organizational learning. Based on this experience, she gathered data to see if the surgeons' perceptions were shared by others and eventually changed the unit policies to enable increased presence of attending physicians in the patient care unit.

Not all of the physicians transformed their individual learning experience into organizational learning. In one instance, a fellow did not feel responsible to reflect on her experience with medication errors and consider the procedures enacted by the unit or the hospital:

All I can do on my end is write the order on the correct patient's chart, write the correct drug and the correct dose and the correct route and then a whole process goes in that I really don't have much control over. I can't control whether downstairs they write the right label, I should be able to control whether or not they can read my handwriting or the resident's handwriting, I can't control whether or not the nurse gives it to the right patient, if I have written it on the right patient's chart. I can't control whether she gives it through an IV that is incompatible with something else.

Although the fellow occasionally caught medication errors she did not see it as her responsibility to question why these errors occurred, and stated emphatically: "Usually it is the responsibility of the other staff, it is everyone's responsibility to prevent these errors." This fellow did not see her role as considering whether error correction could be transformed to individual or organizational learning.

Other physicians sought to transform their individual learning to organizational learning, but did not know how or used ineffective measures. Consider a resident who was frustrated that the pharmacy repeatedly changed her orders when they substituted medications available in the hospital formulary for the non-formulary drug that the resident ordered, without notifying her.

S: I called up the pharmacist and I said, 'can you tell me what happened here?' I mean I wasn't that nice. 'I wrote for this. You switched it out and you gave a full dose.' And they're like 'well we don't really…' and I'm like, 'I want to talk to your manager.' So, I spoke with the director, manager, or whatever and he's like 'yeah, this was a mistake. I'll track down the pharmacist, I'll take care of it.'

I: Now, did you hear anything since then?

S: No, I didn't hear anything more and I didn't file any reports.

I: And did you think about filing? Did it occur to you to file a variance report then?

S: I don't know why I don't do that. I mean they really make me mad but I don't ever do it. Maybe I should do it.

In this case, like the night-shift medication error noted above, the physician discovered that other healthcare providers were not carrying out her medication order. However, despite the resident's efforts, this remained an error correction rather than organizational learning. The head of the pharmacy would reprimand the individual pharmacist, but this would not result in a change in the pharmacy's routines for dealing with the substitution of medications that were unavailable in the hospital formulary.

Explanations

In this section, we explore how the doctors' explained their engagement in organizational learning. (See Table 1.) Our coding of the data revealed two clusters of themes: one set focuses on instrumental explanations and the other on non-instrumental ones. By instrumental explanations we refer to reasons that focus on achieving a particular objective, including protecting a patient from harm. Non-instrumental reasons refer to enjoying or engaging in a process rather than seeking to fulfill a medicine-related goal. We will first address some of the instrumental explanations, such as fulfilling role expectations, responding to environmental pressures, liability concerns, concern for the patient, and responding to personal experience with an event in which a patient injury or death could have been prevented. Following these practical explanations provided by the physicians, we will explore non-instrumental explanations. Some physicians provided an array of explanations for their engagement (or rejection) of organizational learning activities, while others appeared to be influenced primarily by one.

Table 1. *Physicians' Explanations of their Participation in Organizational Learning*

Instrumental Explanations	Non-instrumental Explanations
• Role Expectations	• Passion for Improving Patient Safety
• External Environmental Pressures	• Passion for Teaching
• Liability Concerns	• Intellectual Curiosity
• Concern for the Patient	• Concern for Organizational Politics
• Personal Experience with an Adverse Event	• Influenced by Organizational or Professional Culture

Instrumental Explanations

Role Expectations

Some physicians described their learning activities as part of their job descriptions. One attending explained that she was taking an active role in collecting the data necessary for learning because she was asked to assume this responsibility: "[The Department Chair] asked me to kind of take over the QI stuff for our Department [because] we don't have a good way of tracking. We have a database up there that's good for some things, not good for others." The attending explained that each of the attending physicians was expected to take responsibility for a special project. She was made responsible for gathering Quality Improvement data.

External Environmental Pressures

Physicians responded to external pressures from accreditation agencies and correspondent attention from hospital administration. An attending physician, who also played a key role in several hospital committees, explained:

That's where you do your root cause analysis. That is your sentinel event policies that have been put into place over the last several years. Where they are analyzed in much greater detail than they were previously.

The attending illustrated how the analysis of sentinel events, in which a patient was seriously injured or died, was determined by policies specified by an external accreditation agency. She continued to express her frustration in meeting the sometimes-conflicting requirements that were imposed on the hospital by many external accreditation or professional bodies: "One hand is telling you to do this and the other hand is saying, you better not."

Liability Concerns

Less than a third of the physicians mentioned liability concerns, but of those that mentioned them, their perceptions differed. They tended to focus on the influence of liability issues on disclosure and data gathering as well as the investigation of safety-related events, especially those in which a patient suffered preventable harm.

Some physicians noted the influence of malpractice concerns on their disclosure of errors or potentially harmful events. Among the physicians who expressed liability concerns, their perceptions of how malpractice law inhibits disclosure differed. Some were certain that concerns over malpractice dissuade physicians from openly disclosing their errors.

You could eliminate malpractice, so that people weren't afraid to report errors, because I think that the dominant reason that errors are not thoroughly discussed is because people are afraid they'll get sued and they're right.

Another generally reserved and soft-spoken attending physician, strongly expressed her concern that liability issues were hindering self-reporting:

I really think [it would be] a perfect world if we didn't have lawyers. I still think that that's pressure on people wanting to self-report. So, if we throw all the lawyers into the ocean, I think that would be a start.

Others argued that residents are largely free from malpractice concerns, while one of the attending physicians who worked closely with residents did not know if liability concerns hindered residents from speaking up about medical errors. When asked how concerned residents were about legal liability, one resident replied:

We get told about it. We know we are covered by a certain amount of malpractice insurance and that if we are involved in a mistake, risk management is going to contact us but I don't know I think we are fairly shielded because the attending will take on more of that responsibility than we will.

The inherent conflict between holding physicians liable and enabling them to learn is particularly strong for residents, who are expected to learn from their mistakes. As one attending physician emphasized:

I think that the physician needs to be aware of it, for one thing. If there's an error then they need to learn from that error. Sometimes you cannot protect them from the liability that's going to come with that error.

Perhaps, these different perspectives were best captured by an attending physician who called liability concerns a "double-edged" sword:

I think that it's kind of a double edge sword where yes, I think it really has an edge for wanting to report less, but then on the other hand, we want to create a system where errors don't happen. So it's kind of a double edge thing.

To avoid liability, physicians have an incentive to refrain from self-reporting errors. However, by reporting errors and near misses, physicians can increase the capacity for organizational learning, thereby reducing the probability of future preventable injuries and lawsuits that accompany them.

Influence of liability concerns on event analysis and learning

The physicians who expressed liability concerns included those who were attentive to the influence of liability issues on event analysis and learning. One attending emphasized that the hospital promoted the investigation of safety-related events to better understand what went wrong.

But if the physician writes for something and you know messes up at pharmacy or it messes up at the nurse or whatever, then you know it doesn't come back to the physician. And not that it's like the liability issue or whatever but, you know, its where did that, where did it go wrong?

Others spontaneously argued that malpractice suits promoted organizational learning. One physician provided a vivid example in which she discovered that the pharmacy computer system was contributing to medication error. The attending conducted a careful investigation that was prompted because a malpractice suit was filed against the hospital.

In another example, physicians learned from previous experience that they needed to practice "defensive medicine." A fellow explained: "People talk about it all the time. For some people it seems to be their prime directive in what it is that they're thinking about when they practice medicine. 'How do I not get sued in treating this problem?'" She continued that some individual physicians built their practice around defensive medicine and attempted to persuade their colleagues to follow the same standard procedures.

So they [particular physicians] will try to force the whole group of people to do things their way, so they don't get sued -- even if they aren't the attending."

In this case, liability concerns promoted individual learning of defensive medicine, where the individual sought to change the standard treatment procedures for other physicians in the

patient care unit. In contrast, an attending physician perceived that concerns over legal liability prevented the exchange of information about medical errors among hospitals, impeding their ability to learn from the experience of other organizations.

Concern for patient

As could be expected, some of the physicians explained their involvement in learning from medical errors in terms of protecting the patients' well being. One attending explained that she filed a variance report because: "I mean the patient suffered in my eyes as a result of the wrong medication." A resident in the same hospital echoed this concern:

Just focus on the patient. I think when people start aiming their focus away from the patient, there's where things start going wrong.

The resident explained that concern for the patient guided his concern for learning how to improve patient safety.

Personal Experience with an Adverse Event

Some physicians described a personal commitment to support organizational learning efforts resulting in part from their personal experience of narrowly avoiding or actually witnessing a preventable patient injury. One experienced attending physician linked his previous observation of medical errors with his understanding of the complex causes that contribute to such errors:

I have seen several medical errors, drug errors, in my life; I have seen drug errors that were unintended. Like, for example, someone wrote a drug for analgesia, like [Drug X], and the patient got a paralytic agent, like [Drug Y]… the patient died. … So there are a lot of things involved in this. Not only the poor writing, the poor understanding what you are doing, lack of attention — there are several layers and levels of mistakes in drug–associated events.

A fellow demonstrated how her experience with a harmful medication error caused her to change her personal practice when there was a strong probability that the patient would require medications urgently in a code situation.

And I had requested to my attending, having related to her that I had witnessed a huge mistake before.… And I would say to the surgeon and the attending, we have the code meds ready if you need any code meds.

She not only changed her practice, but also asked that her colleague enable her to change the practice of the group.

Non-instrumental Explanations

Among the non-instrumental explanations, some reflect the physicians' passionate interest in organizational learning. This passion for learning may reflect their personal

interest in promoting patient safety as well as their passion for teaching. For others, their engagement in organizational learning was linked with intellectual curiosity, in particular, in comparing medicine to other industries. Yet other explanations were based on the response to organizational politics within the hospital, or reflected the influence of the organizational or professional culture.

Passion for improving patient safety

Some of the physicians expressed a passionate and personal interest in patient safety issues. One attending clearly stated:

So I might as well work on something that I personally think is important to work on. Patient safety is an important issue, to me -- just because of what happened to my [family] last week, and from my training in the past and what I see could be done better.

She explained her personal enthusiasm for working on patient safety issues because a close family member suffered a medical error and because of her particular expertise. In listening to the audiotape, the affect and sincerity were evident in the speaker's voice.

Another attending not only espoused her personal commitment to patient safety issues, but also clearly demonstrated it in her behavior. We observed that the attending was working the night shift in an effort to implement new patient safety procedures. She explained:

People said, "Why are you doing that?" I said, "Well first of all, I'm not going to ask [other] faculty to do something I'm not willing to do. I want people to see that it's important enough for me then I'm going to be here to do it." I'm going to go door-to-door and talk to the nurses about this and this. I'll try to soften the concept of change. Change is tough.

This attending expressed and demonstrated her passion for learning how to modify the unit's procedures in an effort to reduce the probability of preventable patient harm due to medical errors.

Passion for teaching

The majority of attending physicians expressed their commitment to training the next generation of physicians. A few of the attending physicians spontaneously emphasized their personal involvement and enjoyment of guiding residents and fellows in their professional development. One attending emphasized: "You have to really be there and engage in it with them [the residents]. Which is what I'm doing [today]. And I like it. I've done this for many years, and I still love this job." The passion for teaching and personal engagement is clear from their words and reinforced by their tones of voice and expressions, evident when listening to the audiotape of the interviews.

Intellectual curiosity

Some physicians expressed their intellectual curiosity by gathering and analyzing data using conceptual frameworks from other industries, such as management and aviation. One attending physician spontaneously exclaimed: "There's all these industries that have learned to do things so much better. Why can't medicine do the same thing?" Another attending referred to her own experience in other industries and described how it informed her involvement in seeking to improve patient safety:

I went through a lot in the 1980s with quality training -- Crosby, Duran, Deming and all those people. So to tell you the truth, none of this is new to me. I do have a different take on a lot of these things and a lot of other people because of that.

Interestingly, the physicians not only described their intellectual curiosity about other industries and the relevance of that experience for medicine, but one attending also explained how she appealed to the intellectual curiosity of others to promote interest in organizational learning from safety-related events. She said: "You stimulate people; people get it, are stimulated about it, curious about it. Start investigating. Spread the word. And things explode out." This appeal is explicitly non-instrumental. She emphasized stimulating people's curiosity rather than stressing the benefits that organizational learning would provide to the participants.

Response to organizational politics

Some attendings described how they gathered data about a problem and were instrumental in changing the hospital's procedures to resolve the problem. When the interviewer asked what prompted their actions, the physicians explained them in political terms. Rather than focus on the importance of a particular safety issue for the patients, the physicians emphasized that the issue was important to the healthcare providers. One attending described an instance of conflict among physicians:

There were inter-physician tensions that were not necessary. There were some encounters-- not physical encounters, but verbal encounters with some verbal exchange that was not necessary and it shouldn't have happened. But the patients didn't have bad outcomes, [but] they could have had bad outcomes if this thing continues, you know. It has the potential for bad outcome.

Although the patient did not suffer a bad outcome, the attending invested time and energy in finding a solution in an effort to defuse the conflict among the physicians.

Similarly, an attending who also was the chair of a hospital committee, changed hospital RCA procedures in response to informal complaints:

S: My constituents claim we see all these Root Cause Analysis happening and we don't see what's being done about any of it.

I: Who was saying that you have people on the committee?

S: No, sometimes just people, staff and faculty, it's like: "Does anything ever come out of all these things?

Responding to pressure from her "constituents," she guided the implementation of a new policy in which the Quality Assurance representatives routinely provided feedback on the changes implemented as a result of RCAs.

Reflection of organizational or professional culture

Some attending physicians were attentive to the influence of the organizational culture of the hospital on their behavior. One attending had developed professionally in the same hospital, growing from the rank of a resident to an attending physician. She commented on changes in the culture of the hospital:

But my perception is, at least in a critical care units, that the culture has really changed, and that, as I've gone through, that really we're doing more self reporting, that anytime a little mistake is made we're reporting it out because we're seeing that more as a systems problem and also to get support from the hospital and the administration for counterbalances to our mistakes. …. When I was a medical student – […] and an intern here, I can definitely say that when mistakes were made it was like, "Oh my God!" but everybody talked about it and it wasn't reported out as much. And, I think that over the [10] years I've been here that the culture really is changing.

The attending attributed her willingness to self-report as consistent with these cultural changes.

Another attending, a specialist in anesthesiology, attributed her interest in patient safety to her professional background:

Anesthesiology is a different way to look at things, and if you're gonna look at anesthesiologists in charge, and other people in charge, you're gonna see a big difference in approach, because we look at things in a different light.

She explained that anesthesiologists are trained primarily to work in the operating room. Their patients are usually healthy and there is an expectation that they will live through the surgery. If something goes awry, the anesthesiologists are more likely to investigate whether they made an error rather than to attribute the bad outcome to the patient's illness.

Discussion

This study examined how physicians described their role in organizational learning processes and how they explained their involvement in these activities. As expected, physicians described their routine participation in Organizational Learning Mechanisms, including general purpose OLMs (e.g., hospital incident reporting systems) and those designated for learning how to improve patient safety (e.g., Root Cause Analyses). The results also revealed that some of the physicians in the study, including residents, fellows,

and attendings, took a proactive role in initiating processes that contributed to organizational learning, such as identifying potential patient safety issues, gathering event data, and calling for the convening of RCAs.

Some of these physician-driven initiatives were related to cognitive processes more than behavioral ones. They assisted their colleagues in reframing and reinterpreting the experience in the patient care unit and the hospital. They served as catalysts to transform episodes of individual learning into opportunities for organizational learning. Similarly, they reframed common error-correction activities as opportunities to assess the events as potential triggers for organizational learning. For example, when a pharmacist calls a physician because they have detected a potential dosage error, physicians typically accept the call, thank the pharmacist, and make the correction. Some physicians can transform this error-correction episode into an opportunity to engage in organizational learning by asking questions, such as: How did the error occur? If the patient had received the wrong dosage, was there potential for harm? Could this or similar error recur? Have other colleagues had similar experience with ordering the incorrect dosage of this medication?

In seeking to understand why the physicians in this study engaged in organizational learning activities, we found that their responses could be grouped in two main categories: instrumental and non-instrumental responses. Instrumental responses, aimed at achieving a particular medical-related objective, included fulfilling role expectations, responding to the demands of external accreditation agencies, and responding to liability concerns. We also included in this group physicians, who explained that they initiated RCAs because of concern for their patients or changed practices in a patient care unit because of their personal experience with an adverse event.

The non-instrumental responses physicians offered included expressions of personal commitment to promoting patient safety and a passion for teaching. For example, some physicians spontaneously expressed how much they enjoyed training the next generation of doctors. These responses included intellectual curiosity, in particular about the lessons that medicine could learn from other industries. Physicians also described how their participation in organizational learning activities was influenced by hospital politics and the hospital's organizational culture.

Some of the explanations proposed by the physicians in this study are consistent with patient safety policy publications, while others are not. Given the cultural emphasis in medicine on "Do no harm, "we could have expected that physicians focused their learning efforts on protecting the patients from preventable injury. This expectation might have been reinforced by the current emphasis on "patient-centered" practice advocated by the Institute of Medicine through its major initiatives. The Institute of Medicine initiatives have generated considerable research within the medical community on different strategies for improving patient safety (e.g. Uhlig et al., 2002).

Similarly, we could have expected that physicians would be sensitive to liability concerns. While "throw the lawyers into the ocean" might be a popular sentiment, we were

surprised that liability concerns were not particularly salient for most of the physicians in this study. We reason that malpractice concerns may alternatively hinder and promote organizational learning. Individual physicians may be reluctant to speak up about their own errors, lest they expose themselves to legal measures. Collectively, physicians might be interested in promoting learning efforts to reduce the likelihood of future errors that might harm the patients and entangle the physicians as defendants in costly and stressful legal proceedings.

Given the strong emphasis that health policy studies place on promoting patient safety from the "top down" through the commitment of the hospital's leaders (e.g., Classen & Kilbridge, 2002; Kohn, et al., 2000), it was surprising that there were few public expressions of leadership in support of organizational learning from safety-related events. Indeed, our results suggest that patient safety initiatives were triggered much more frequently from the "bottom up." In particular, attendings described how they implemented changes within their own practice and that of their residents and fellows. Several of the attendings, including those in positions of authority, specifically emphasized the need to introduce new patient safety measures behind the scenes as a method to reduce resistance to change.

Although we expected variation among doctors in their descriptions of their roles in organizational learning, we did not anticipate the expressions of intense interest and engagement in organizational learning--the passion for questioning, discovery, and change-- expressed by some of the participants. As expected, physicians participated in an array of Organizational Learning Mechanisms. We did not anticipate that some of the physicians would take initiatives that expanded the scope and impact of existing OLMs to promote different processes that contribute to organizational learning, such as fostering event reporting and conducting impromptu investigations of safety-related events.

Directions for Future Research

Our study results raise several questions for future research: What encourages physicians to take initiative in promoting organizational learning? We argue that the explanations that physicians themselves offer may provide insight. We reason that physicians who demonstrate a passion for patient safety or teaching or express a personal commitment to learning would be more likely to also initiate organizational learning activities. Specifically, if physicians have passionate personal involvement in learning, rooted in personal experience, intellectual curiosity, or political skills, we hypothesize that they tend to be involved in promoting organizational learning by serving as a catalyst in four ways:

1) They take initiative and go beyond the expectations for those in their roles.
2) They tend to refrain from expressing their leadership in public statements. Instead, they guide and promote learning by "working under the radar," with each physician working in his or her own sphere of influence.

3) Assist themselves and others to reframe and reinterpret experience, transforming it from individual learning into an opportunity for organizational learning,

4) Assist others to reframe and reinterpret their experiences of error correction to asking questions that initiate a processing of learning from past experience in the patient care unit or the hospital.

Note that in some of these hypotheses about how physicians promote organizational learning they do so through their actions, whereas in others we posit that their role is cognitive as well as behavioral. By reframing and classifying an experience as a "near miss" or "good catch" or potential patient safety issue, physicians can initiate processes of organizational learning. This is especially critical in a hospital setting where physicians who have been trained to "do no harm" often do not consider errors to be significant if there was no harm done. Similarly, there are ingrained procedures of correcting errors and continuing the work. At best, an individual physician might learn from her experience, but the same error might repeat itself because no one asks whether it might reflect a system problem rather than an individual's random mistake.

The research questions we propose to guide future research might also have practical applications. If we can expand our understanding of what draws physicians to be interested in the learning process, we might be better able to promote organizational learning in hospitals and develop new organizational learning mechanisms that would appeal to physicians, as well as other healthcare providers.

Conclusion

The study results raise questions relevant to theory and practice. First, they illustrate the multiple interests and passions that spur decision makers to initiate and participate in organizational learning processes. Second, they also suggest how the confluence of individual and organizational histories and near histories with adverse events can foster (or impede) organizational learning from error. Finally, patient safety advocates could further explore the conditions under which a hospital could support physicians' efforts to develop intellectual and emotional commitments to organizational learning from medical error.

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How is Organizational Knowledge Created?
Rethinking Managerial Control in an Era of Knowledge Work

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Abstract

In this paper I evaluate the usefulness of explanations of control based on orthodox Marxist labour process theory (LPT) under conditions of "knowledge work." LPT problematizes control around the need to resolve the indeterminacy of labour—i.e. how do managers ensure that workers' actual labour approaches their potential labour power. I argue that control can also be problematized around the indeterminacy of knowledge—i.e. how do managers ensure that workers' cognitive efforts approach their full cognitive potential. For some time now prescriptive management writings have maintained that the best way of achieving the later objective is to cede discretion to workers so that they can freely exercise their mental capabilities in order to solve workplace problems. This requires mechanisms of control that operate under conditions that ostensibly reverse the traditional Taylorized separation of conception and execution we associate with Marxist LPT analyses. In making this distinction, I do not contend that problematizing control around the indeterminacy of knowledge is a more accurate representation of the fundamental laws of capitalist accumulation. Rather, I take it to be a particular mode of subjectification that constructs the disciplined body as an object to be controlled, establishes why this level of control is deemed to be necessary under the circumstances of knowledge work, and sets the criteria by which such control is judged to be successful or otherwise. Finally, I argue that we have systematically underestimated the knowledge content of traditional work and systematically overestimated the knowledge content of today's so-called "knowledge work." In order to avoid this in the future, we need to develop a conceptualization of knowledge work and the knowledge worker that acknowledges the complexities of the embodied and contingent nature of knowledge under varying arrays of power relations.

Raking over the Ashes of Labour Process Theory: Rethinking Managerial Control in an Era of Knowledge Work

Marxist Labour Process Theory and the Problem of the Indeterminacy of Labour

In this paper I want to present a personal view of how we can think of workplace control in a way which acknowledges empirically observable changes in the organization of work but also retains a certain critical edge that allows us to appreciate the potential struggles that may arise in an era where some proclaim the demise of conflictual workplace relations—I wish to counter the rhetoric of "We're all friends now" by showing that opportunities for coercion and domination (and, for that matter, resistance) still abound. What I am appealing for is a consideration of what Carver (1998) calls the "Postmodern" Marx where our focus is on the *discourse* of commodities, value and money—i.e. how we come to define the value of resources that there are, or might be, in the world. In this way we need to account for the presence for control under circumstances where, arguably, the physical toil of manufacturing

is being replaced by a world where we work more with our heads than our hands? Most obviously this appears to bridge the fault line between managers (who conceive work in minute detail) and workers (who simply carry out the tasks set by their superiors).

My starting point may seem quaintly old-fashioned and may also surprise my fellow contributors to this conference. It is that, when it comes to a consideration of workplace control, Marxist critiques—for example, Labour Process Theory (LPT)—are not completely exhausted as a source of intellectual inspiration. I would temper this remark by saying that we have to be wary of the tendentious and degraded character of what Foucault (1991) called "Marxism after Marx," with its characteristically obsessive and abstract theoretical system building undertaken at the expense of thinking about how individuals might effectively resist the power effects they encounter every day of their lives (see also Gouldner, 1980). Nevertheless, the central problematic of LPT—the indeterminacy of labour and, concomitantly, the perennial desire to reduce the gap between labour power and actual or executed labour—still has some relevance for discussions that centre on what is increasingly characterised as "Knowledge Work." Of course, there is a good deal of debate as to whether knowledge work—usually taken to be the manipulation of symbols rather than things, concepts rather than materials—is a specious distraction from more pressing social, economic, and political matters (see Fleming et al., 2004). Leaving aside these concerns for the time being, for me the burning question is whether we take the indeterminacy of labour as a literal representation of the immutable laws of capitalist exploitation or as an exercise in normative figuration that conveys a wider discourse of rationalization as an unavoidable condition of Modernity (Burnham, 1941; Gerth and Mills, 1942; Carver, 1998). I subscribe to the latter view and, in this way, the indeterminacy of labour should be seen as a single expression parsimoniously articulating a belief system that, in Blau's (1961) terms, "socially legitimates" the need for and exercise of control (and, to some extent, the legitimacy of resistance to that control). The equivocal nature of this last parenthetic comment is particularly important because, under the rubric of classical Marxist LPT, both control itself and practices that aim to resist it are premised on the attribution of rational and strategic intent: managers want workers to work as hard as they can in order to maximise surplus value while workers want to minimise this exploitation and keep the fruits of their discretionary effort to themselves. One might remark that few business schools today teach the necessary political economy for such informed practice to take place. Indeed, unless knowledge of Marxist LPT is passed on to successive managerial generations through DNA we might even have to concede that some people who spout the unitarist rhetoric of "empowerment" and "mutual commitment" really believe in it. For these unreflexive souls the problem of control is more likely to be articulated through the ostensibly neutral "free-rider" problem of neo-liberal economic theory—i.e. to protect the majority from a minority who indulge in opportunistic self-interested behaviour (Sewell and Barker, 2004). Under these conditions any objections to efficient control are deemed to be irrational; a knee-jerk reaction that ultimately becomes a self-defeating exercise for who could possibly argue against systems or safeguards

that protect the majority against the self-interested behaviour of the minority (even if, in the restricted language of economics, those free-riders are still behaving "rationally" in the pursuit of personal utility)? In contrast, I am making the claim that we can still consider the labour process to be a struggle over indeterminacy, not of *labour* but of *knowledge*. Thus, rather than being a direct contest of wills with a zero-sum outcome (i.e. less effort expended towards the creation of surplus value is a victory for "Labour" at the expense of "Capital"), it should be considered as a contest over what I will call the "elicitation" and "representation" of what is to become considered as "legitimate" knowledge (by definition a process that also excludes or marginalises all that is considered to be "illegitimate" knowledge).

Rethinking the Problem of Indeterminacy in Knowledge Work

In order to make the implications of this proposition clearer I need to define some terms. First, under the rubric of classical LPT the separation of conception and execution is premised on the belief that managers must exercise monopolistic control over the conception of work, thereby driving out any discretion on the part of employees who are left to carry out those tasks in a way that is tantamount to being an automaton (Braverman, 1974). However, even the most desiccated neo-liberal economic theory recognises that contracts are always and necessarily incomplete and that some discretion is always ceded to the "agent" (i.e. the employee) by a "principal" (i.e. the manager) in the execution of a contracted task. The constant presence of discretion, even under the most tightly regulated contractual arrangements has been seized upon by many advocates of teamwork and empowerment; instead of expending effort and resources using control to minimise the amount of discretion and ensure that contracts are fulfilled to the letter (thereby also incurring transaction costs), why not invert the problem completely and allow employees to use that discretion to the benefit of the corporation? Not only does this potentially reduce the transaction costs of monitoring compliance but, as countless HRM texts proclaim, it also acknowledges that managers may not have a monopoly on knowledge when it comes to the conception of effective work solutions. In this way the problem of the labour process moves from "How do we ensure that employees do as managers say?" to "How do we ensure that employees realise the full fruits of their own expertise and ingenuity for the purposes of the organization?" This view is consonant with much of the organizational learning literature (Blackler, 1995; Tsoukas and Vladimirou, 2001) in seeing the full extent of employees' cognitive abilities as a means of mobilizing what Heidegger (1977) called a "standing reserve"—a more or less elusive resource that already exists "out there" somewhere and will greatly benefit us, if only we can find a way of tapping into it.[2] Thus, in reintegrating conception and execution (at least to a limited extent) the problem of indeterminacy shifts from "Did *X* actually perform their allotted task to the best of their *physical* abilities?" (i.e. "Did their expended physical labour approach their full potential labour power?") to "Under circumstances of limited discretion, did *X* actually perform their allotted task to the best of their *cognitive* abilities?" (i.e. "Did

their cognitive efforts approach their full cognitive potential?"). As I stated earlier, even though today's managers may not be schooled in Marxian political economy they can certainly understand the justification of control as shifting from solving the problem of free-riding or of "not pulling one's weight" in a physical sense to one where it is matter of not giving over one's mind fully to the organization.[3] Taking the latter conception, for control to be effective in going some way toward resolving the indeterminacy of knowledge, two related functions must be performed. First, control is implicated in the identification of useful knowledge, a process known in the language of artificial intelligence as "elicitation." In crude terms this can be thought of as seeking out what exists inside the head of the person considered to be the most cognitively able employee. From this position it is a logical move to the process of "representation"; taking that knowledge and translating it into a form that can be apprehended by others in the organization, thereby potentially making it available to the entire organization (and, in the absence of intellectual property restrictions, beyond the organization too). As I have argued elsewhere (Sewell, 1998), this kind of thinking is closely linked to the logic of continuous improvement and employee problem solving we associate with managerial movements like total quality management and teamwork.

A good illustration of the related nature of these two elements of elicitation and representation again comes from the well-established artificial intelligence literature, especially activities that centre on the development of expert systems. Here a "knowledge engineer" conducts a "data mining" session, interrogating an expert—say a physician—in order to elicit the personal cognitive process that they go through when a patient presents with a complaint. This will involve tried and tested diagnostic "algorithms"—institutionalised decision-making techniques and practices that they have learnt in medical school—but it may also involve personal "heuristics" that they develop through their own experience and their exercise of judgement in the "field" (Tsoukas and Vladimirou, 2001). If this personal approach is deemed to be useful to others then it is the job of the knowledge engineer to formalise these heuristics into an algorithm that can be represented in a way that is compatible with and additional to existing diagnostic decision-making rules. In this way, knowledge that was formerly considered to be "in the head" of the expert becomes a publicly available resource (incidentally, an argument that has commonly been advanced to explain the effective deskilling of some professions [see Johnson, 1972]). The key difference, however, between this conception of the elicitation and representation of knowledge and the one that I am proposing we consider in relation to workplace control centres on the latter's dynamic nature. Thus, whilst an expert data mining session is usually a "one-off" event, the logic of continuous improvement and the search for "competitive advantage" demands that new knowledge is always being generated. In response to this particular demand, the elicitation and representation of knowledge must proceed constantly and in real "real time." It is not sufficient for employees to exercise their cognitive abilities in an episodic manner; once the mentally agile have solved one problem they must move on to turn their cognitive abilities to the next pressing matter after having passed on those solutions to their less able colleagues.

Such a view is also at odds with the traditional conception of the dynamics of control. For example, when it came to the detailed execution of work tasks Taylor (1912) certainly recognised workers possessed know-how that managers did not have; his objection was that he simply did not trust them to exercise that know-how to the good of the organization. Thus, the fear of shirking, free-riding or "soldiering" won out over the potential productivity benefits of allowing any employee discretion and it became the manager's "duty" to first set and then rigorously enforce work rules. In this way a managerially defined productivity norm not only represented the acceptable minimum, it was the maximum too—why bother striving to exceed performance targets when, paradoxically, working "too hard" could just as easily be construed as a form of disobedience as "not working hard enough?"[4] This brings me to a crucial point: With its concentration on the indeterminacy of physical labour and its belief that real subordination should be resisted by refusing to yield to the demands of managers (i.e. by exercising *autonomy*), Marxist LPT represents the obverse of a liberal view of workplace control premised on mutual protection against free-riding. Thus, whether it is seen as a form of legitimate resistance (let us call it the *Radical* perspective) or as a form of opportunistic self-interested behaviour (let us call it the *Liberal* perspective), not working as hard as one could implies a degree of rational and calculative intent on the part of the employee. Similarly, the exercise of control by managers is also seen as a rational response to these forms of behaviour, either to ensure that labour approximates to labour power or to protect all members of the organization from being exploited by the selfish actions of the minority.

Both these Radical and Liberal conceptions of the general purpose of control can both be used to justify common managerial practices such as performance monitoring, workplace surveillance, reward, punishment, and retraining (cf. Goulder, 1955). The important point to note here, however, is that regardless of which conception is preferred they are both, in Burke's (1969) term, somehow "indebted" to each other. In this case the indebtedness stems from them both being particular expressions of a Nietzschian will-to-power—i.e. our ceaseless attempts to reorganize the world in pursuit of our desire to subsume all aspects of human life under a totalizing rationalism that gives rise to a successive array of power relationships (Schacht, 1995). This is helpful because it demonstrates a perhaps unexpected degree of continuity between classical LPT literature and more recent thinking about the control of knowledge work in that the problematization of control around the indeterminacy of knowledge, with its subsequent solutions founded on the need to elicit and represent the acquired know-how of employees, is an expression of the same Nietzschian will-to-power, only articulated in another way. Moreover, this conceptualization of knowledge work and control reflects similar Radical and Liberal preoccupations in that the appearance of "hoarding" knowledge or in some way keeping it to oneself can be seen as either a rational form of resistance to subordination or as utility maximising self-interested opportunistic behaviour (i.e. "Why give up something that confers upon me an advantage in doing my job if it means that I will lose the potential to earn more than my colleagues?"). This is not to say, however, that the "array of power relations" to which it gives rise is identical. Let me give an

example to show what I mean here. As I indicated before, under classical LPT it is argued that the obsession with obedience means that the potential productivity of any part of the organization is effectively limited by the lowest common denominator. Under the rubric of control problematized around knowledge that I have set out here, however, this logic is inverted. Thus, rather than setting productivity targets at the level of the "poorest" performer—or even an "average" performer, for that matter—it is the intention (of managers at least) that targets be set at the level of the "best" performer whose "unique" know-how becomes common knowledge that should enable *everyone* to improve their performance through enacting the processes of elicitation and representation described above. Moreover, it is the duty of all employees constantly to seek to exceed these targets; to experiment and innovate in the pursuit of continuous improvement. Bauman (2002) provides us with an interesting insight into how such an array of power is at odds with the inclusive and unitarist rhetoric of common managerial discourses of empowerment and teamwork. Far from being a group of equals, Bauman argues that a team's principal purpose is to serve its "strongest" member. In this way,

> … it is no longer the job of the managers to keep their subordinates in line and guide their every move; and if it is still their job here and there, it tends to be resented as counterproductive and making no economic sense. It is now up to subordinates to capture the eye of the superiors, to vie with each other for their attention and to make them wish to *purchase* services which once upon a time the superiors, in the past the avatar of bosses, supervisors, and foremen, *forced* them to provide … Employees have been 'empowered'—the endowment which boils down to bearing responsibility for making themselves relevant to the company (Bauman, 2002: 34—emphasis in original).

Of course, such vying for the eye of superiors in the pursuit of preferential treatment has always gone on but it is Bauman's contention that its placement at the heart of the labour process (admittedly not a term that he uses) systematically undermines any vestiges of solidarity that may exist between employees. I agree with him up to point but, unlike Bauman who predicts that the minute surveillance of employees by managers will eventually fade away in this ruthless "open market" of individual contractors (where competition between peers seems bound to reveal every subtle innovation or improvement possible), I argue that the fear that even the "best" employees are holding back something from the organization—in this case their "knowledge" rather than their physical effort—is so overwhelming that practices of control will remain, albeit in forms that respond to the changing circumstances of work organization.

Workplace Control as a Discursive Construction

To restate one of my major claims, one of the advantages of characterizing control as a problem of indeterminacy of knowledge as set out above is that it allows us to retain a critical edge in the current climate of management theory and practice that celebrates the rise of empowerment and the demise of conflictual workplace relations. By engaging with the array

of power relations that surround the elicitation and representation of knowledge we can talk about the persistence of domination in circumstances where the fault line of traditional LPT—the continued separation of conception and execution—appears to have been have been sutured. At this stage, however, I feel it is again necessary to reiterate that I am not claiming that I have discovered yet another fundamental and immutable law of Capitalism. Rather, it is my much more modest claim that thinking about control in this way continues to justify the minutest scrutiny of employees, even in circumstances where they are ostensibly trusted to exercise the most meagre levels of discretion to the "good" of the organization.

In going beyond the preoccupation of orthodox LPT with physical effort to embrace "knowledge" work in this way the accusation looms that I am merely replacing one idealised Marxist abstraction (labour power) for another equally idealised and abstract category that approximates to Heidegger's "standing reserve" of knowledge; a fixed resource waiting to be released by whomsoever has the ingenuity and determination to set it free. Such a view would, of course, be at odds with one of my higher order intentions: To situate this discussion of control in a wider context where discourses of management represent systematic approaches to truth claims about what an organization is and what it should do. In this way, thinking about control as the elicitation and representation of knowledge is not extra-discursive and we must consider the following five elements:

i) the presentation of coherent and systematic statements about organizational control that delineate our understanding of it and construct its "objects"—i.e. what organizational "knowledge" consists in, where it resides, and how it should be pursued;

ii) rules which prescribe certain ways of talking about the creation of knowledge and proscribe others—i.e. a justification as to why the elicitation and representation of knowledge is a solution to the exigencies of effective organization whereas alternatives are not;

iii) "subjects" who in some way personify the discourse—e.g. the "knowledge" worker (and, of course, the "non-knowledge" worker), the "resourceful" employee, the "good" team player, the "committed" employee, etc.;

iv) how this discourse about the search for organizational knowledge acquires authority—i.e. why one discourse becomes accepted as a representation of the "truth of the matter" while others do not; and,

v) the practices of elicitation and representation that not only supply practical knowledge about the organization of production but also provide the normative basis by which organizational members are expected to regulate their own conduct and that of others—e.g. systems of control, surveillance, coercion, reward, training, teamwork, etc.

Looked at in this way the discourse of control under conditions of knowledge work displays a very different grammar and vocabulary to the discourse of Marxist LPT, whilst still being an expression of a particular will-to-power. As such, it provides us with a means of understanding the continued justification of control and the contingent nature of knowledge in particular organizational settings that, on the surface at least, look very different to traditional

mass production—after all, as Tsoukas and Valdimirou (2001) contend, to have a theory of organizational *knowledge* we also need a theory of *organization*. I take this to mean that we cannot even begin to consider control in any meaningful sense without linking it to a consideration of why we bring people from diverse backgrounds and with diverse interests together in organizations in the first place. Which brings me full circle to a question at the heart of any critical treatment of control: In whose name is it exercised? Thus, even if we adopt the liberal view of the elicitation and representation of knowledge as a neutral technology deployed in the service of all organizational members—a mere means to rational and legitimate end—as Heidegger (1977) shows, in pursuing those ends we are revealing what we believe to be true in terms of purpose, necessity, and morality. Ultimately, then, we still have to ask the question: Who determines what is the purpose of knowledge and how it is deemed to be useful to the organization; what constitutes legitimate knowledge (i.e. what is to be valued) and what constitutes illegitimate knowledge (i.e. what is to be discarded or marginalised)? Perhaps the most obvious illustration of the distinction between "legitimate" and "illegitimate" organizational knowledge is the characteristic treatment of "whistleblowers" who, in the course of their job, discover that their employers are flagrantly and systematically polluting the environment, deceiving customers, or avoiding legal responsibilities. "Whistleblowers" are invariably discredited by their former employers, frequently being labelled as malcontents, trouble-makers, or mad people (Alford, 2001), even when the "knowledge" they revealed could have saved the organization considerable amounts of money (Johnson, 2003). Knowledge then, like beauty, is clearly in the eye of the beholder.

Moving Control Beyond the Mind/Body Divide

From the foregoing discussion it should be clear that, at its heart, my position displays a Foucauldian slant—what I am effectively doing is making an appeal for a genealogy of workplace control. In drawing an analytical distinction between physical and mental labour, however, it could be argued that I am perpetuating an error commonly attributed to Foucault. For example, Shilling (1993) contends that, in focusing exclusively on discourse, Foucault is bereft of any adequate means of examining the mutual development of the body (or anything material about the body) and society; although the body is obviously present in his analysis in an epistemological sense (i.e. it concentrates, in the words of Hacking [1999] on how discourses "make up" humans) it is absent in any ontological sense. Shilling (1993: 81) puts it like this: "As the body is whatever discourse constructs it as being, it is discourse rather than the body that needs examining in Foucault's work." If this is a correct reading of the inadequacies of Foucault's approach it is indeed troubling if we are to explore the role of embodied actors in organizations, especially since Ryle (1949) disabused us of the existence of the Cartesian *deus ex machina*.[5] For example, it could also be argued that, in focusing on the discourse of knowledge, organization and control, we are still only getting half the story, except that this time it is a different half. By this I mean that in the same way that Marxist

LPT only focuses on physical labour as if human bodies were undifferentiated automata, the discursive approach focuses on knowledge as if it were completely disembodied, somehow floating free in aether. This is an important consideration so it is crucial that I demonstrate that Shilling's concerns are misplaced. Far from being absent in Foucault's analysis, on innumerable occasions he went to great pains to show that, regardless of the regimes of discipline and truth in operation at any one time, the ultimate site where all power relations are inscribed is the human body. How we understand the effects of power on the body is, however, directly linked to a political economy that purports to show us how embodied individuals can (or ought to) become useful and productive. Indeed, it is possible to make humans work together efficiently and productively only after they have been,

> … caught up in a system of subjectification (in which need is also a political instrument meticulously prepared, calculated, and used); the body becomes a useful force only if it becomes a productive body and a subjected body (Foucault, 1979: 26).

In order to counter the common accusation that Foucault was a wilful obscurantist, apropos the discussion at hand, let me demonstrate how we can interpret this statement in a very straightforward way. Under Marxist LPT (and its indebted alter, liberal economic theory) the individual becomes rendered useful by subjectification as a mere body only capable of physical effort where the *need* for control (*either* to maximise effort *or* to minimise free-riding) is the political instrument articulating the will-to-power. Ironically, such a mode of subjectification is convenient for both sides of the argument. Seeing the employee as an undifferentiated automaton—just another identical cog in the machine—means that replacing recalcitrants should have a minimal disruptive effect. In contrast, there has been a tradition in critical studies of work (e.g. Gramsci, 1971) of seeking to romanticise the essential physicality of labour to along the lines of, "They might enslave our bodies but they will never enslave our minds," thereby envisaging a form of resistance through the development of a revolutionary class consciousness that would be impossible to close down.[6] As one might suspect, given my attempt to show a degree of continuity in thinking about knowledge work, taking knowledge as a "standing reserve" awaiting mobilization by whomsoever has the resolve to capture it is also a mode of subjectification that suits both sides of the Liberal/Radical argument. Thus, a Liberal view would see knowledge as a public good that must be enlisted in the service of everyone in the organization regardless of their position whilst a Radical view would see the struggle over the "standing reserve" of knowledge as a matter of turning it to the service of the interests of employees before managers can get their hands on it.

Such apparently contrasting views—the purely physical nature of labour and the purely disembodied nature of knowledge—bear an uncanny resemblance to what Popper (1972) called World I and World III. For Popper, World I was made up of physical matter whilst World III was an autonomous realm where knowledge resides stable and fully formed, a universal storehouse of resources inscribed in texts and deposited in libraries that is awaiting anyone who cares to look for it (so long as they possess the minimal mental equipment

needed to understand it). In between lies World II—the world of conscious experience. According to Hacking (1975) at the core of Popper's philosophy was the quest for a methodology that short circuited World II—a way of apprehending the material world that went straight from World I to World III without going through the messy business of conscious interpretation. But at the heart of the physical world and disembodied knowledge there is a paradox that gives the lie to this kind of thinking and demonstrates that it is toward World II were we should be diverting our investigative energies. In relation to the discussion at hand this paradox can be stated as follows: Through the attribution of intent associated with free-riding or soldiering we are necessarily acknowledging the exercise of a degree of cognition. Likewise, the manipulation of symbols—however abstract—ultimately has a contextualised and directly physical impact that is experienced, whether it is through developing a solution to a quality problem in a manufacturing work team that leads to an intensification of work for all your fellow team members or through developing a particular way of persuading a customer over the phone to buy a seat on a plane that leads to increased pressure on you to exceed sales targets. In a sense, by taking *either* abstract labour *or* abstract knowledge as our starting point in discussions of control we have been putting the cart before the horse; instead of taking the object as either the labouring body and showing how control acts on it we need to show how control incorporates a mode of subjectification that shapes *how* control constructs its object (i.e. various incarnations of the disciplined body), *why* it is deemed to be necessary under these circumstances, and *when* it is judged to be successful or otherwise. Marxist LPT is perhaps just the most familiar mode of subjectification to be considered by critical scholars in the industrial workplace (as, of course, is liberal economic theory within another tradition of research). My argument is not that thinking about control as the desire to tackle the problem of the indeterminacy of knowledge once-and-for-all solves the shortcomings of Marxist LPT, thereby reinvigorating class consciousness by bringing discussions of control up-to-date through its extension to "knowledge work." However, it does provide us with a grammar and vocabulary that allows us to counter the words and deeds of managers who, say under the rubric of "organizational learning," wish to render employees useful in an instrumental and rationalized manner. For me this is where such an approach retains its critical edge. In other words, it is a convincing argument that points to the persistence of control in workplaces where "empowerment," "autonomy," and "discretion" are trumpeted.

Concluding Remarks: Too Much Work, Not Enough Knowledge

It is not, of course, a new conceptual departure to think about knowledge in terms of its physical embodiment and contextualization and there have recently be some fine instances of research on "knowledge work" that have engaged with such matters up to a point (see, for example, Frenkel et al., 1999; Witz et al., 2003). Much of this is indirectly indebted to the ideas of William Carlos Williams (1974) who pre-empted Piaget and Gestalt psychology by

several decades in arguing that knowledge must have an "immediate concreteness" that is assimilated into the entire body rather than simply residing in the "mind."[7] Williams also prefigured Lacan in arguing that even something as apparently autonomous as words must have an embodied quality; that although there certainly is an extra-linguistic aspect to the world (in Lacan's term, the "Real"), we can only apprehend what we take to be "reality" through a language that is the product of biological processes which are not confined to the brain. However, as befits an avowed humanist, Williams saw the pursuit of knowledge through the arts, sciences, and professions as a quest for self-actualization. Here Williams is not unlike Gramsci in believing that contemplation can set us free. Indeed, Williams contended that we can only truly become ourselves through the pursuit of pure knowledge untainted by ideology.

One of the best treatments that takes Williams' exhortation to heart in considering the embodiment of knowledge is to be found the work of Yanarella and Reid (1996), although they manage to avoid his romantic view of its necessarily emancipatory qualities. For them the body in neither infinitely malleable nor reduced to a set on universal biological needs but is a complex fusion of corporality and technology. To be sure, Yanarella and Reid are political scientists and their coverage of the immense literature on workplace control may look rather cursory to trained organization or management scholars. Nevertheless, it puts a refreshing slant on classics such Taylor and Gramsci as well as the more recent "post-Fordist" musings from the likes of Womack et al. (1990) and Kenney and Florida (1993). One of the features of this post-Fordist literature is that the demeaning and agonising toil of industrial work is being replaced by a rewarding and "knowledge rich" employment (Piore and Sabel, 1984; Zuboff, 1988; Barley, 1996). The most recent repackaging of this position can be found in the "High-Performance Work System Movement" (e.g. Appelbaum et al., 2000) which yet again heralds the familiar win-win situation—organizations perform better and employees are happier when the latter direct their discretionary effort (i.e. the fruits of their knowledge) toward the former's ends. One of the key points that we can take from Yanarella and Reid's discussion is that there is an unexpected symmetry between this post-Fordist literature, with its mythologization of self-determination and discretion, and the instrumental rationality of Taylorism with its quest of banishing all independent thought on the part of employees (what Taylor, only half-jokingly, described as his desire to create a workforce of "trained gorillas"). While the former qualitatively and quantitatively overestimates the knowledge content of post-Fordist work, the latter qualitatively and quantitatively underestimates the knowledge content of traditional work. On the one hand, a reported increase in the number of knowledge workers belies a degradation in the nature of some activities *always* considered to be knowledge work (e.g. the deskilling of some professional activities) and, on the other had, simultaneously ignores the cognitive demands that have always been placed on many employees in traditional forms of employment (Fleming et al., 2004). Moreover, this is a happening at a time when many employees' positions in an economy of power are becoming more marginalised and precarious as the so-called knowledge economy continues to exhibit

the same cruelties pointed out several years ago by Garson (1988). In sharp contrast to optimistic views of the ways in which knowledge work will shift the centre of gravity of power away from employers back toward the "new" worker—a sort of highly skilled cyberwarrior who sells their knowledge to the highest bidder and who holds all the aces (cf. Bauman, 2002)—many will find themselves in changing but equally exploitative relations. Interestingly, this perspective goes beyond the traditional manager/worker or boss/bossed oppositions for, if my interpretation is founded on one single premise, it is that we are all knowledge workers now (indeed, we always have been), whatever our nominal position in the fabric of power/knowledge relationships in contemporary organizations. For me what is most interesting is neither the numbers of occupations that are now labelled as knowledge work nor the numbers of workers who would claim allegiance to these occupations. Rather, as I have set out above it is the way in which knowledge is elicited, represented and, ultimately, rendered legitimate in the complex unfolding web of control, subjectification, power and resistance that accompanies each specific instance of work organization. This final observation brings me closer to what I believe is the most important lesson that Foucault can teach us when we reflect on these matters. It is to be wary of all approaches that invoke the idea of progress with a capital "P" in order to support the contention that things aren't as bad as they seem. Contrary to popular belief, this does not constitute a "discourse of despair" that imperils the very idea of social change on the grounds that we are impotent in the face of ineffable power. Far from it: insofar as the knowledge economy is a "real" phenomenon, it demands that we begin to map out those complex relations of power, control, and subjectification that it entails so that we can at least begin to question the analytical and political complacencies of post-Fordism, high-performance work systems or whatever constitutes the most recent invocation of the belief that "We are all friends now."

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2. To illustrate his point Heidegger (1977) uses the image of engineers thinking of the Rhine merely as a head of water standing by waiting to supply turbines with the impulsive force to generate electricity.

3. There are strong resonances here with long-standing HRM approaches that advocate a "heart and soul" commitment to the organization.

4. Of course, from the days of the Human Relations School onward, we have been alert to the idea that this was not just a one-way process. Peers have always indulged in informal work restriction and the disciplining of "chisellers" and "rate-busters."

5. The *deus ex machine*—literally the *a god from a machine*—was a piece of stage machinery used in ancient Greek drama to suspend actors above the stage so that they appeared to the audience as gods floating in space. Ryle, however, offered his own translation as the *ghost in the machine*, a derogatory term he used against those who believed, after des Cartes, that the human mind was an entity separate from the human body.

6. It is no coincidence that Gramsci's thoughts on this were penned in prison; the contemplative freedom of the mind contrasted against the incarcerated body has long been a feature of prison literature (Sewell, 2001).

7. Although Williams formulated his ideas about the embodiment of knowledge in the earliest decades of the 20th century they only existed in fragments that were not pulled together in a systematic form until 1974.