

**Contrasting Dynamics of Organizational Learning:
A Process Theory Perspective**

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Abstract

In this paper we analyze the process characteristics of organizational learning. A wide variety of process models of organizational learning have been proposed in the literature, but these models have not been systematically investigated. In this paper we use Van de Ven and Poole's (1995) taxonomy of process types to compare the extant conceptualizations of organizational learning. We show that the four types of process models - life cycle, evolution, teleology and dialectics - can also be found among prominent models of learning. In order to analyze the relationships between these different types of learning processes, we present observations from two field studies. These observations illustrate the existence of multiple processes, their coexistence and their complementarity in producing learning outcomes. But the observations also show that the coexistence of multiple process types can lead to tensions and conflicts that have to be dealt with by organization members. We conclude that the competing, complementary and conflicting relationships between process types underscores the importance of a process theory perspective on organizational learning and the necessity to study process models simultaneously and interactively.

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INTRODUCTION

Organizational learning has been around in the literature for about forty years now. In this period, it has turned into an important and prolific field of research. Whereas in the mid-nineties complaints were still voiced that the field was an 'ugly duckling in the pond of organization theory' (Miner and Mezias 1996: 88) and that there were 'more reviews of organizational learning than there is substance to review' (Weick and Westley 1996: 440), during the past decade a wealth of empirical studies of organizational learning have been produced, providing rich insight in conditions and outcomes of learning. These studies have shown learning to enhance the performance, innovativeness and survival of organizations, and pointed at cultural, structural, strategic and environmental facilitators for learning (Bapuji and Crossan 2004). But research has also showed learning to be an elusive phenomenon, that may not occur when it is expected (Zollo 2005) and, when it occurs, is more transient than permanent (Huzzard and Östergren 2002; Tosey 2005), implying that there is more work to do in this field.

In this paper we seek to enhance understanding of the learning phenomenon by investigating the process characteristics of organizational learning. To state that organizational learning is a process is, of course, a commonplace. At the heart of learning lies change, and change is the core feature of processes. Indeed, from early discussions of organizational learning onwards, a wide variety of process models have been proposed, which represent organizational learning as a structured process, made up of a number of phases or activities. Among the better known models are the *model of adaptive learning* as presented by March and Olsen (1975; 1976), Kolb's (1984) *experiential learning cycle*, the *social learning cycle* developed by Boisot (1995), the *organizational learning cycle* by Dixon (1994) and the *4-I model* of organizational learning by Crossan et al. (1999). Because we consider learning to be the development of organizational knowledge that increases the repertoire of organizational actions (Huber 1991; Berends et al. 2003), models of organizational knowledge development can be added to this list, including Nonaka's (1994) *SECI model* of organizational

knowledge creation and the *knowledge evolution cycle* presented by Zollo and Winter (2002).

However, the process characteristics of organizational learning have not been systematically studied. The different process models of organizational learning have not been systematically compared, leaving the literature in a fragmented state. Furthermore, few empirical examinations of these models have been produced. For example, Bapuji and Crossan's (2004) recent review of empirical research on organizational learning presents a wealth of findings on conditions and consequences of learning, but few findings regarding its process characteristics. This is in line with the dominance of research methods for variance theories in organization and management studies and the relative neglect of methods for studying processes (e.g. Mohr 1982; Poole et al. 2000).

The existence of the multitude of models present in the literature and the limited research into the adequacy of these models, gives rise to two questions. The first question is whether the different process models of organizational learning are really different conceptualizations. A negative answer to that question – models may merely rephrase other models and be easily translatable into each other – would explain their relatively peaceful co-existence. A positive answer would call for further scrutiny. The second question is what the existence of different models imply for the explanation and facilitation of organizational learning.

This paper contributes in two ways to the integration and extension of our understanding of the process characteristics of organizational learning. First, the paper uses Van de Ven and Poole's (1995) pivotal work on process types to structure the set of process models of organizational learning and to enable their systematic comparison. Our analysis makes clear that the process models differ in a fundamental sense. Second, we present observations from two field studies in which different types of learning processes are complementary and conflicting. We argue that this emphasizes both the validity and relevance of distinguishing types of organizational learning processes and presents a strong case for future in-depth research into the process characteristics of learning.

PROCESS THEORY AND ORGANIZATIONAL LEARNING

Process theory

Process has always been a core category of theorizing on organizations, but the distinctive characteristics of process studies have only recently been fully articulated. From an ontological point of view, it has been argued that organizations can or should be conceived as a continually evolving set of processes in stead of a collection of entities, properties and relationships (Tsoukas and Chia 2002; Van de Ven and Poole 2005). From an epistemological point of view, Mohr (1982) made a distinction between variance theories and process theories. Variance theories focus on explaining the behavior and characteristics of objects. In contrast, process theories focus on explaining change through a sequence of events.

An important advance in theorizing about processes in organization studies has been made by Van de Ven and Poole (1995). Based upon an extensive literature survey, they distinguish four types of theories on change and development, each of which views process as a different cycle of change events and as being governed by a different underlying mechanism. These four types differ with regard to two basic dimensions: Does change operate on a single unit or multiple units? And: Is change prescribed or constructive?

- (1) *Life cycle models* describe prescribed change in a single entity. Life cycle models depict the process of change in an entity as progressing through a necessary sequence of stages, driven by an immanent program, regulation or compliant adaptation.
- (2) *Teleological models* describe constructive change in a single unit of analysis. Teleological models view development as goal-oriented, and occurring through process steps like evaluation and adaptation.
- (3) *Dialectical models* describe constructive change processes operating upon multiple entities. Dialectical models explain change through the confrontation of a thesis and an antithesis. Struggles for dominance lead to a synthesis, the dominance of one perspective or a status quo.
- (4) *Evolutionary models* describe prescribed change acting upon multiple entities. Evolutionary models depict development and change as a sequence of variation, selection and retention, which is driven by scarcity, competition and environmental selection.

In the next section we show that each of the four types of development and change process theories can be recognized in one or more well known models of organizational learning. Because models of organizational learning resemble different types of process theories, Van de Ven and Poole's taxonomy is highly useful in organizing the understanding of the process of learning.

Life cycle models of organizational learning

Many organizational processes can be characterized as life cycles. These include, for example, most production processes as these processes usually unfold in a fixed sequence of steps. Well known models of organizational learning that can be characterized as life cycle models include Huber's (1991) four-phase model of organizational learning (knowledge acquisition, information distribution, information interpretation and organizational memory) and Nonaka's (1994) SECI model. We focus on the latter.

Nonaka's (1994) article in *Organization Science* presented a model of organizational knowledge creation that has been highly influential, as measured by the frequency at which it has been cited. Nonaka (1994) starts from a dichotomy between explicit knowledge and tacit knowledge and presents knowledge creation as a process that consists of four subsequent modes of knowledge conversion: (1) socialization (from tacit knowledge to tacit knowledge); (2) externalization (from tacit knowledge to explicit knowledge); (3) combination (from explicit knowledge to explicit knowledge); and (4) internalization (from explicit knowledge to tacit knowledge). This model has been called SECI after the first letters of the four sequential processes. Nonaka and Takeuchi (1995: 63) illustrate this process by the example of the development of an automatic home bread-making machine by the Japanese company Matsushita. After failing to construct an adequate machine, engineers from Matsushita first learned dough-making skills of a famous baker (socialization). Crucial skills were externalized by creating the concept of "twisting stretch". This concept was combined with the technological knowledge of the engineers to create a prototype. After such a development, the knowledge that is learned can be internalized and become part of the tacit background of organization members.

Nonaka's SECI model resembles a life cycle model. Life cycle models assume that change is immanent, due to an underlying form, program or logic that regulates

the process of change (Poole et al. 2000: 60). The SECI model is characterized by a fixed sequence of steps, exhibiting an underlying logic, because each stage logically presupposes the prior stage. Furthermore, a core claim of life cycle models is that "what lies latent, rudimentary, or homogeneous in the embryo or primitive state becomes progressively more realized, mature and differentiated" (Poole et al. 2000: 60). In the SECI model, it is the latent power of tacit knowledge that gets "articulated", "crystallized", "mobilized" and "amplified" (Nonaka and Takeuchi 1995).

Despite its broad diffusion, remarkably little empirical evidence is available regarding the SECI model. Most critics of Nonaka do not address the process characteristics of the SECI model (Gourlay and Nurse 2005), but the (mis)treatment of the concepts of tacit and explicit knowledge (Tsoukas 1996; 2003). Nonaka and Takeuchi (1995) have presented anecdotal evidence for the SECI model, like the example of the bread baking machine, but the detailed analysis of Gourlay and Nurse (2005) shows it not to be convincing. Furthermore, Gray Southon et al. (2002) present evidence from three case studies, which, according to these authors, does not support the hypothesis of a regular progression between exchange processes, but rather shows "a complex, diffuse combination of interactions" (p.1058). Recently, Dyck et al. (2005) presented a case study regarding the development of a new product in a small manufacturing company, in which the knowledge creation process did proceed through the four phases of the SECI model, but they also suggest that their data give rise to the addition of a fifth phase. As the limited evidence regarding this well known model is mixed there is more than enough reason to explore other models.

Evolutionary models of organizational learning

A completely different strand of models of knowledge development are those of an evolutionary nature. Specific for evolutionary models is that the focus is not on a single entity moving through phases, but on a population of entities that compete for survival.

Evolutionary models of knowledge development have in the first place been brought forward by philosophers working under the banner of "evolutionary epistemology" (Popper 1972; Campbell 1960; 1974; Hahlweg and Hooker 1989). Building upon Popper's (1963) interpretation of scientific progress as a process of conjectures and refutations, these philosophers developed the claim that scientific

knowledge develops through a process of blind variation and selective retention (Campbell 1960; 1974). Whereas biological evolution exists in the variation, selection and retention of organisms and their genes, the evolution of knowledge is supposed to occur through the variation, selection and retention of hypotheses (or theories, ideas, concepts). The process starts with the generation of a variety of hypotheses, which is supposed to be a blind process because it is impossible to determine in advance which hypothesis will turn out to be adequate. Some of these hypotheses are selected by an environment for their fitness to solve scientific problems and retained by being passed on to new generations of scientists. Other hypotheses are eliminated. Sociobiologists have extended this basic evolutionary epistemology to a model of cultural evolution, in which 'memes' are posited as the cultural analogue of genes (e.g. Blackmore 1999; Weeks and Galunic 2003).

Recently, Zollo and Winter (2002) presented an evolutionary model of knowledge development that resembles the perspective of evolutionary epistemology. Their 'knowledge evolution cycle' contains four phases: (1) generative variation; (2) internal selection; (3) replication; and (4) retention (Zollo and Winter 2002: 343). In the generative variation stage, individuals generate a set of ideas on how to approach old problems in novel ways or to tackle relatively new challenges. These ideas are then subjected to internal selection pressures. The third is an additional phase as compared to standard evolutionary models and emphasizes the need for new knowledge in organizations to become widely shared. Finally, retained knowledge is routinized. By claiming that knowledge is ultimately stored in routines, the model is also linked to the evolutionary economics perspective of Nelson and Winter (1982). A comparable perspective has been applied in the study of the open source development of Linux (Lee and Cole 2003). This innovation process is characterized by the distributed creation of ideas and pieces of software for new features, which are selected through a peer review process and, if successful, ultimately incorporated in new versions of Linux.

The evolutionary model is predominantly attacked on theoretical grounds. For example, it is often claimed that the growth of knowledge is not based on blind variation, as hypotheses are purposefully created to explain phenomena. Furthermore, it is argued that the intentional selection of ideas is not comparable to natural selection and that the retention of knowledge differs from the retention of genes (Buskes 1998). Such arguments are particularly raised from a teleological point of view.

Teleological models of organizational learning

Whereas evolutionary models interpret knowledge development as a "blind" process, teleological models posit learning to be a goal-directed process. In 1975, March and Olsen claimed that learning is ordinarily understood in terms of a model of simple rational adaptation. In this tradition, knowledge development is interpreted as a form of rational problem solving: a set of activities to arrive at the goal of solving a problem. The philosopher Dewey was one of the first to formulate a full problem solving cycle. He described a five step iterative process of problem solving that comprised: (a) a felt difficulty, (b) clarification of the problem, (c) identification of possible solutions, (d) testing the suggested solutions, and (e) verification of the results (Dewey 1933). The crux of such a model is not that it presents a fixed a sequence of activities that guarantees a successful outcome (a misconception that also underlies the idea of a so-called "Scientific Method"), but that activities are undertaken iteratively until a successful outcome is realized.

The logic of experiential learning as described by March and Olsen (1976: 56) builds upon this problem solving logic: "An action is taken; there is some response from the environment; there is some interpretation and evaluation of that response; and then a new action is taken reflecting the impact of that sequence". Applied to organizations, this learning cycle consists of four stages: "individual beliefs" are turned into "individual actions", which become part of "organizational actions", leading to "environmental responses", which in turn are interpreted in individual beliefs.

The problem solving perspective has also been applied to scientific knowledge development. Klahr (2000), for example, used the formalization approach to problem that was developed by Newell and Simon (1972) to model the process of solving scientific problems. The model posits that scientists, who aim at the explanation of a phenomenon, develop a hypothesis, put that hypothesis to the test and, depending upon the outcome of that test, accept the hypothesis, subject it to further testing or reject it.

The teleological model has been tested in an organizational context by Garud and Van de Ven (1992). Based upon longitudinal observations of a product development project, they conclude that organizational actors did not follow the logic of trial and error learning in a period characterized by ambiguity. Instead of adapting

their courses of action to events following those actions, organizational members persisted in courses of actions in the face of negative outcomes. In a second period, characterized by clear goals and few slack resources, entrepreneurial team members did act in accordance with the trial and error learning model. Apparently, the explanatory value of this model depends on situational characteristics.

Dialectical models of organizational learning

Latour (1986) stated that "science is politics by other means". If "science" is generalized into "knowledge", this statement is typical for a dialectical approach to knowledge development. The dialectical approach shares with the evolutionary approach a focus on multiple competing entities. Nevertheless, the dialectical approach is different because it does not assume an 'impartial' selection process, but power struggles between proponents of alternatives, the outcome of which is uncertain.

Sociologists of science have developed models of knowledge development that are dialectic in nature. Building upon the work of Kuhn and other philosophers and historians of science who claimed that rational considerations cannot solve scientific controversies, a range of studies sought for social explanations for the 'closure' of controversies. These studies focused on the impact of power, interests and networks (e.g. Collins 1983; Latour 1987; Jasanoff 1995). For example, MacKenzie (1978) studied the controversy between two statisticians, Pearson and Yule. From 1900 to 1914 they defended two different measures of association and attacked each other's measure. MacKenzie shows that Pearson's work was committed to a research program in eugenics, while Yule's work did not have such an association. Through this association with the eugenics program, MacKenzie, suggest, social class interests came into play, as this program was supported by the new bourgeoisie of professionals that was evolving at that time in Britain. This study, and many comparable studies, shows a dialectical view of knowledge development. The focus is on multiple entities – be it multiple theories, perspectives, ideas or other claims to knowledge – that engage in a conflict or struggle. The outcome of this struggle between the 'thesis' and 'anti-thesis' is either a newly formed 'synthesis', or the defeat of one entity by the other (Poole et al. 2000: 85).

Sociological studies of science have inspired scholars in the field of organization theory to study organizational learning as a dialectical process (e.g.,

Nicolini and Mezner 1995; Cook and Yanow 1993). Correspondingly, power and politics are increasingly recognized as important aspects of organizational learning (Coopey 1995; Hislop 2005). For example, Huzzard and Östergren (2002) criticize the unitaristic assumptions behind many of the (teleological) definitions of organizational learning and learning organizations. They analyze a learning process in the Swedish Union of Clerical and Technical Workers in Industry (SIF) in which newly developed concepts in the central organization of the union are counteracted by members of local organizations, because it conflicted with their ideologies and interests. By the end of this study, the political struggle within this organization had not yet led to a synthesis.

These sections showed that models of organizational learning are fundamentally different. In the remainder of this paper we focus on the relevance of these differences. The heterogeneity of models particularly raises questions regarding the relationships between different models of organizational learning. To address these relationships we turn to observations from two field studies.

OBSERVATIONS FROM FIELD STUDIES

In this section we provide observations from two in-depth field studies. The first observation comes from a study by the first author of a research laboratory. The background of this study is more fully described in Berends (2003). The second, more extensive, observation comes from a study by the second author at the IT organization of a global bank. For methodological details please refer to Lammers (2003). From both field studies we selected an episode with multiple learning processes, so that we can shed more light on the dynamics and interaction of learning process types.

We adopt an interpretive perspective with regard to the analysis of processes. Our starting point is the way in which organization members make sense of their own learning processes. In a double hermeneutic movement (Giddens 1984) we interpret these interpretations of organization members in terms of the four models of Van de Ven and Poole (1995).

ResearchLab

The ResearchLab is the research laboratory of an electronics company. At the time of study, 1999, it employed about 1700 research scientists and research engineers. During its rich history, the ResearchLab had developed a unique place within the

company, as it was considered to be the source of many major innovations. For decades, researchers at the ResearchLab were used to a high degree of autonomy, determining their own subjects of research, leads to follow and working plans. This changed drastically in the beginning of the 1990s. In line with reorganizations taking place within the whole company, new management methods were introduced at the ResearchLab. One important new approach was project management. Before, researchers did not interpret their work in terms of projects, but in terms of subjects, and no such a things as project budgets or project plans existed. All research was paid from one company budget.

The introduction of project management methods was accompanied by a new resource allocation system, according to which two third of research should be paid for by a product division. At the time of study, the project management process was organized as follows. By the end of the summer, researchers had to formulate project proposals for the subsequent year and submit these proposals to product divisions or apply for corporate funding. This project proposal had to contain a description of the research products to be delivered by the end of each quarter. Two times a year a report should be written and submitted to an information system, in which the progress of the project is compared to the projected deliverables. In the second half of the project, it should be decided to terminate or to continue it, with new deliverables, for another year. This particular process structure that was imposed on the knowledge creation process of researchers can be characterized as a life cycle process, because it prescribes a sequence of stages that an entity should go through. As such it is not itself a model of learning, but it is a process structure that is imposed on learning.

Although this system certainly had its merits, it also conflicted with the learning process as it was experienced by the researchers. This conflict stemmed from the fact that researchers did not experience their work as a set of stages to pass through, but as a goal directed search process. The researchers agreed with the main goals presented in project proposals, but the solutions to the problems posed were developed through trial and error search processes, making it unpredictable if, how and when problems were going to be solved. Some of them compared their work to that of a detective, for example when the objective was to find the cause of unexpected behaviour of a material. Such a study can be finished soon when the first lead proves successful, but carry on for a long time as well. Therefore, the temporal dynamics of the iterative trial and error logic of the teleological process did not match

the sequential life cycle process. Yet, they had to commit themselves to deliverables, which had to be promising enough to raise interest and get funding from a product division. "It is like you have to put the rope round your own neck", one of the researchers remarked.

In order to deal with the tensions produced by these contrasting teleological and life cycle processes, the researchers used several coping tactics. These tactics were meant to create 'slack'. For example, in order to create an initial buffer, researchers could promise results at some future milestone that were actually already achieved. Furthermore, if a study progressed rapidly, so that results were ahead of promised deliverables, results could be held back in order to satisfy the project management system in 'rainy days' (see also Sewell & Wilkinson 1992). In other cases researchers could renegotiate the deliverables of the project or just hope that product divisions would accept that the project did not proceed in accordance with the project plan.

Success Bank

The second illustration comes from a prestudy for a knowledge management project at the Success Bank, which was studied by the second author as part of an action research project. Knowledge Management entered the IT organisation as early as spring 1996, when a few early adopters had caught the phrase at a conference and started to talk about its potential for application in the Success bank. Within a few weeks, knowledge management was a major hype within the organisation, a topic that was discussed by both executive and middle management in lunch breaks, corridors and – eventually – over a dedicated conference within the organization. Although significant uncertainty existed regarding the exact content and benefits of knowledge management (at that time, apart from Nonaka & Takeuchi no other knowledge management publications or 'best practices' were known), in the fall of 1996 senior management decided that some resources should be made available to develop a 'business case' for a knowledge management change intervention within the IT division of the bank.

The project team started with a rational problem solving approach to define the knowledge management business case. As a first step, they held about 30 interviews within the IT organization to identify the knowledge management problems, to

explore their possible origins and to allow the interviewees to point to designs for possible solutions (also called knowledge management practices). These interviews brought several knowledge management related problems to the fore. Problems included: a knowledge 'gap' between available and desired IT competence areas (e.g. there was a lot of knowledge regarding traditional mainframe technology, but not in new or strategically important areas such as Windows NT or internet-technologies and languages such as java); a lot of bureaucracy which had led to communication problems and islands of knowledge that didn't exchange their knowledge with other departments; insufficient communication media in use (e.g. there was no central 'information warehouse' or 'corporate memory' where all relevant handbooks, guidelines, policies, past projects etc. could be found) and several stories that referred to cultural norms within the organization that severely limited the tendency to share, use or develop knowledge (e.g. 'networking is a waste of time', 'never ask employees about their opinions', 'never admit to making a mistake'). In addition to the discussion of knowledge related problems, a number of possible solutions were proposed by the interviewees to address them. Suggested solutions included the organization of sessions to share knowledge regarding new IT developments, adjustments in human resource management practices regarding the division of work and the reward system (e.g. managers should also be evaluated against criteria regarding the knowledge development within their departments, employees should also be evaluated in terms of their professional development, their development of new ideas to improve business and their contributions to knowledge sharing). Because there were changes in the team composition, the new project team decided to proceed with these investigative activities. They organized several brainstorm sessions with a broad mix of organization members with a variety of functions and seniority in order to broaden their spectrum of knowledge management ideas, to discuss the pros and cons of each suggestion and to establish the prioritization of the proposed knowledge management solutions. Finally, the project team wrote their final report in which they offered a plan for an extensive knowledge management intervention, which included amongst other things the implementation of an 'organizational memory', the organization of several kinds of knowledge sharing meetings, some proposed adjustment of the HRM system and the development of a methodology to systematically evaluate past IT projects.

This problem solving approach of the project team is a clear example of a teleological process. However, by thus approaching their task, the project team had ignored the social context of the organization, in which dialectic processes were omnipresent. This became unmistakably clear when the results of the project team were discussed with the senior manager who had given the assignment to the project team. He was disturbed and very dissatisfied with the results of the project teams doing, and questioned the adequacy and the quality of the work done. He summoned that the results of the project team were to be kept silent and not to be distributed any further. This – for the project team surprising – conflict with their key sponsor point to the necessity to reanalyse the past events taking a dialectical perspective.

Before explaining the conflict between the project team and its sponsor, a rough description of the political context within this organization is provided. In the Success Bank, several subgroups existed that had their own goals regarding knowledge management. *Senior management* (including the CEO and the knowledge management project sponsor) saw knowledge management as an opportunity to increase both the performance of and the control over the IT organization ('to lay bare the swamp', as they described it). They were in favour of a knowledge management definition that was in line with the current system of authority, that would tighten the controls on the organization's employees and middle managers, and (as they were all ambitious people) that would yield the quick results that were needed to be able to make the next career move.

As the IT organization was a project organization, the middle management consisted of two groups of managers with competing interests: project managers in charge of several IT projects, and resource managers who were in charge of the well being of the employees that worked in the IT projects and other long term goals within the organization. *Project managers* usually had both a short-time and an IT focus. Generally they were in favour of knowledge management, as long as it didn't threaten their autonomy nor brought additional work for them, and particularly when knowledge management was defined as the development of an IT tool (a 'knowledge warehouse') that would be helpful in finding the information sources that they needed in their projects. *Resource managers* were supposed to have a long time and people-oriented focus, but as about half of them used to be project manager in their former job, and a lot of them were struggling with a large span of control (120 people was no

exception) this wasn't always the case. Resource managers tended to be against knowledge management (because it would mean more work for them) but on second thought were strongly in favour of a definition of knowledge management being understood as IT tools that would help them do their job, such as intranet-pages to spread human resource management rules and regulations, or a skills, knowledge and competences database that would allow them to assign people to projects more easily. *Employees* were in favour of knowledge management in any way that would shift the balance between labour and capital more towards the former. The turn towards knowledge was being recognized as a new instrument in this battle, that might lead to a decrease in the levels of control, an increase of their chances to be recognized as experts in certain areas, an increase of the level of participation in organizational decision making, and an increase in the possibilities to develop and use their own knowledge base.

Recognizing this array of interest casts a new light on the learning processes regarding the adoption of knowledge management in this organization.

The early adopters within the Success Bank who embraced knowledge management as possibility to advance their own goals came from all of the different groups that are being described above. Their different goals and perspectives lead to individual learning processes or idea development processes which were in itself teleological in nature, which enabled the development of different understanding of what the concept of knowledge management could mean to advance this goal.

The decision to start a pre-study into knowledge management and to assign a project team was the first intervention by senior management to impose their meaning and interests regarding knowledge management on the organization. The project team consisted of a project manager, a project leader, a consultant and the action researcher. By excluding any resource manager from this project team, top management made sure that 'resource management issues' would not appear on any future corporate knowledge management agenda.

The project leader and the project manager shared the goal of defining a knowledge management business case that would consist of only the implementation of a 'knowledge warehouse'. The interviews regarding the identification of the knowledge management problems were being executed by the action researcher and the consultant. By talking with strategists, staff members, resource managers, project

managers and several employees they gathered and developed a number of ideas on how to improve the knowledge dynamics of the IT organization. When it came to writing however, all proposals of the consultant and the action researcher that were not in support of the development of a knowledge warehouse, were excluded from the proposal, either in team meetings to discuss progress, or in the final edit by the project leader. When the consultant challenged these decisions by the project manager (by trying to get his interview partners involved in the writing process) his services were no longer needed. These events point to the struggle between thesis and antithesis that are central in dialectic models of organizational learning. The thesis is here the ascribed meaning that knowledge management equals the implementation of a knowledge database, which was supported by both the senior management and the project management which together formed the dominant coalition within the IT organization. This thesis was challenged by two antitheses: knowledge management as increased autonomy for the employee as knowledge workers that was supported by the employees; and knowledge management as the development and support of human resource management tools, which was supported by the resource management coalition. As the consultant and the action researcher, in pursuit of a teleological approach towards knowledge management, tried to be 'objective' and 'neutral', they also supported the two anti-theses. At this point in time, the struggle between the 'thesis' and the 'antithesis' was not a newly formed synthesis, but the defeat of two entities (the employees and the resource managers) by the other (the project management). But the struggle continues.

When we go back to the actual events regarding the knowledge management start up process, we have mentioned before that after an initial but substantial interview round, prestudies were continued due to personnel changes in the project team. The project manager and the project leader were being replaced by two others, who were given the task to start preparing the implementation of knowledge management, as soon as official budget approval would have been achieved. The new project leader decided to start all over again in establishing the knowledge management problems and possible solutions, and organized a series of brainstorm events. Together with the new project leader, the action researcher was one of the authors of the report with the main findings. Following McKinsey's 7S model, the writers discussed possible changes in systems, strategy, structure, management style, skills, culture and staff. Among other

things, this new report included the recommendations (mainly put forward by employees) for a cultural and management style change (thus suggesting a change in the status quo) as well as recommendations for changes in the resource management practice within the organization (that were supposed to be excluded from the knowledge management corporate agenda). The new project leader and the project manager approached their task of implementing knowledge management in a teleological mode, but in doing so unknowingly gave support to what was interpreted by the sponsor as ideas in support of anti-theses toward their thesis regarding knowledge management.

From this dialectical perspective, the rejection of this report by the sponsor of the project team can now be understood. The report was interpreted by senior management as being critical, and thus threatening, for the status quo, something they had not foreseen or desired. And the report was seen as 'some sort of coupe by the personnel department', in other words in support of the goals of the resource managers in stead of the goals of project management.

DISCUSSION

The episodes described above make a strong case for the relevance of a process theory perspective on organizational learning. The first thing to note is that different process types are identified within the observed knowledge creation processes. Although the actors do not use the language of process theory themselves, their interpretations of their work can be conceptualized in these terms. These interpretations are consequential as they lead to specific actions, therewith enacting a reality that corresponds to a stronger or lesser degree to the process types. It is noteworthy that the knowledge workers in both examples think of themselves as working in accordance with a teleological model, but that their work cannot completely be caught in terms of such a model because other process types - life cycle and dialectical processes - were active as well. We did not observe an evolutionary perspective in these two cases, but assume that such processes will be present in other cases (see e.g. Cole and Lee 2003).

From the observation of multiple learning process types in organizations, we conclude that we need more than one process model. This is a direct indication for the empirical relevance of distinguishing different models. It confirms the limited and mixed evidence regarding the validity of different theories of organization learning,

and suggests that the descriptive and explanatory success of these theories depends on situational characteristics. Given that learning takes place in all organizational functions, under different conditions and at different levels (e.g. single loop versus double loop learning; explorative learning versus exploitative learning), it is likely that models have a limited application domain, creating a need for multiple models. Indeed, Crossan et al. (1999: 522) suppose that differences between organizational learning models originate from different foci, as they have been developed for specific phenomena like information processing (Huber 1991), innovation (Nonaka 1994) and strategic renewal (the focus their own 4-I model). However, those application domains are not always clearly stated, and certainly not widely acknowledged. To give but a small example, the recent textbook by Hislop (2005) describes the 4-I model by Crossan et al. without referring to strategic renewal or limiting the application domain in another way. As long these application domains are not clearly found to be disjunctive, these models provide competing explanations the same phenomena. For example, Huzzard and Östergren (2002), present their dialectical model as an alternative to traditional models of learning organizations based on the assumption of shared goals (i.e. teleological models), and claim that their case study findings cannot be explained by those other models. Furthermore, philosophers of science have debated the merits of evolutionary, teleological and dialectical explanations of scientific knowledge development (Buskes 1998; Collins 1983).

Furthermore, our observations suggest that processes operate concurrently. A combination of processes is necessary to describe learning outcomes in a specific organizational setting. This is in line with the general point of view of Poole et al. (2000: 79), who emphasize that some change processes need multiple process types to be comprehensively explained. Processes may be nested within higher level processes or processes may provide input to each other. In the ResearchLab example, the life cycle process and teleological process operate more or less parallel, while they are related through input-output relations. In the Success Bank example, the teleological process is nested within a dialectical process. In a comparable way, Lee and Cole (2003) describe teleological and dialectical processes supporting the evolutionary development of knowledge in the open source development of Linux.

However, what stands out in the episodes described in this paper is that the multiple processes that are operating simultaneously can actually conflict. In the ResearchLab example, the different temporal dynamics of the processes created

tensions, that had to be accommodated by creating slack and renegotiating deliverables. In the Success Bank example, the results of the teleological process were obstructed in the dialectical process. Whereas other authors have described the complementarity of processes, the potential for tension and conflict has gone unnoticed (which may be due to the limited amount of studies that are currently based on the process theory perspective (Bakema 2006)). These tensions were accommodated by creating slack, renegotiation, rework and adaptation to the other process. The tensions between complementary process types in actual practices, underscores the importance of applying and researching the learning models in conjunction and comprehensively.

The complexity of an analysis of learning from a process theory perspective can be enlarged by taking into account a meta-level of processes operating upon the learning processes. Our observations hint at two such meta-processes. First, as we identified conflicts between learning processes, we may also identify a dialectical process at a meta-level, in which learning process types struggle as thesis and anti-thesis towards a synthesis (although such a synthesis was not reached in both examples). Second, by suggesting that actors construct the learning processes occurring within an organization, we may also identify a teleological process at a meta-level, as designing and constructing are goal-direct activities.

Although the examples present a case for studying multiple learning processes that may be competing, complementary and conflicting, we acknowledge that the study of learning processes has some inherent difficulties. In our analysis we build upon the actors' own interpretation of their processes and concluded that these interpretations are also enacted. However, interpretations of the past may be rational reconstructions (Weick 1995). For example, the real time analysis of decision making did not find evidence for a neatly sequenced process (Witte 1972), but the analysis of post-hoc narratives of problem solving episodes showed strong resemblance to a phase model (Lipshitz and Bar-Ilan 1996). Likewise, Latour (1987) stressed differences between stories of science-in-the-making and post-hoc stories of ready-made science and warned for the rationalized logic of the latter.

Furthermore, we selected examples in which the interpretations clearly fit the models. We do not suggest that this is always the case. As Poole et al. (2000) stress, not all theories can be neatly categorized within a single process type, because

theorists may draw on elements from different models. If concepts are not fully specified, it may be hard to classify them. The notion of trial and error learning, for example, has been interpreted both as a teleological mechanism (Garud and Van de Ven 1992) and as an evolutionary mechanism (Popper 1972). It is likely that this will hold more strongly for organization members as one cannot expect everyone to have a consistent, fully developed theory-in-use regarding a difficult-to-grasp issue like learning.

Finally, the process concepts are pliable. For example, the less strict the biological analogy of evolution is implemented, the broader the application domain of evolutionary models of knowledge development. Proponents of different models may tend to interpret everything according to one model. Although empirical observation and interpretation may provide more or less evidence of the presence of goals, multiple entities, fixed sequences and other characteristics that differentiate process types (Poole et al. 2000: 98), it is not likely that empirical observations can always be decisive. Although we do not take different process theories to be incommensurable paradigms (Burrell and Morgan 1979), it might be difficult to find evidence that can serve as undisputable common ground for all.

CONCLUSIONS

We have used the taxonomy of Van de Ven and Poole (1995) to organize the extant conceptualizations of organizational learning processes. Theoretical process models of organizational learning and knowledge development can be interpreted in terms of particular, yet different process types. The observations from two field studies illustrate that process types may compete as explanations of learning processes. Furthermore, multiple process types may coexist and lead to learning outcomes in combination. But we also showed that the coexistence of multiple process types can lead to tensions and conflicts that have to be coped with by organization members. The competing, complementary and conflicting relationship between process types underlines the importance of an improved understanding of the process characteristics of organizational learning and the necessity to study process models simultaneously and interactively.

Our observations are also an indication for the practical significance of a process theory perspective on learning. Particular ways to organize or facilitate learning (e.g., dialogue; cross-project learning; continuous improvement programs)

may presuppose different process types. Particular ways of organizing or facilitating learning may be at odds with existing processes, as was the case with in the ResearchLab example. It is probable that programs that do not fit the existing practices are more likely to be counterproductive. Although conflicts are not necessarily bad - they may also be productive or just inevitable (De Dreu and Weingart 2003) - the possibility of tensions and conflicts between models calls for attention.

The analysis presented in this paper suggests a range of questions to be addressed by future research.. First, as different models are potentially competing explanations of learning processes these models should be systematically tested against each other. If the application domains of models do indeed differ, results will depend on situational characteristics. Second, we need more insight in the interaction between the processes and the dynamics of this interaction. In what ways do models complement each other? Do transitions between processes occur? How are conflicts between processes resolved? Third, besides these analytical questions, there is also a need for a design-oriented perspective on learning processes (see Romme 2003; Van Aken 2004). How can organizations design for different types of learning processes? Organizational processes are often designed as life cycle processes – think of production processes – or teleological processes. Is it possible to design for evolution or dialectics?

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