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Management science and organizational learning

Peter Pawlowsky

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Institute for Personnel Management and Leadership studies Chemnitz University of Technology
TU Chemnitz: Tel: (0371) 531-4312 and 531-8354; Fax: (0371) 531-4342 Internet: http://www.tu-chemnitz.de/wirtschaft/bwl6/ e-mail: Peter.Pawlowsky@wirtschaft.tu-chemnitz.de

1. Introduction

What is commonly shared in the literature on management is the emphasis and the need for concepts of organizational change which are more suitable for a business environment that is becoming increasingly more turbulent and complex. The interpretative framework for this situation varies, however, and encompasses a number of scenarios such as a post-industrial society, a service economy and a knowledge society. All these scenarios catch some aspects of a radical change in economic and social conditions that are occurring. The core notion of all of these assumptions and the major impact on management seems to be the fact that this change involves a declining importance of physical assets and a growing importance of intangible assets. This means that management is not only confronted with new combinations and new patterns of old variables but also, that the logic of business itself and the assets that it is dealing with are involved in a fundamental change.

What management has primarily focused on from early industrialization is the transformation of physical resources under conditions of the division of labor. What it will have to learn is the transformation of informational and knowledge resources under conditions of integration. Innovation, growth and productivity gains do not result from separating tasks in the workflow of a knowledge intensive operation, but rather from integrating and combining knowledge in order to develop new ideas and jointly develop solutions in problem solving processes. Traditionally management concepts and tools have specialized in dealing with the transformation of physical resources. Increase in value attained by economic activities is measured as the difference between the raw product and the production process's output. Besides the increase in speed and decrease in failure obtained through learning curve effects, little is known about the role of knowledge and learning as a promoter of change and added value. One of the major challenges for management is to understand the role of knowledge and learning for organizational change and business success. Quinn (1992) for example argues that the organization of enterprises and effective strategies increasingly depend more on the development and deployment of intellectual resources than on the management of physical assets: 'As a company focuses ever more on its own internal knowledge and service skills and those of its suppliers, it increasingly finds that managing shifts away from the overseeing and deployment of fiscal and physical assets and toward the management of human skills, knowledge bases, and intellect both within the company and in its suppliers' (Quinn 1992: 72). Similarly Boisot (1995) concludes that 'we have an economic theory that can help us to understand and manage the production and exchange of tangible goods but

which is unable to help us understand and manage intangibles like knowledge' (Boisot 1995). Even the traditional accounting principles are being questioned and altered in order to capture the true value generating resources (Kaplan and Norton 1996; Sveiby 1997). Based on studies of performance measurement, Kaplan et al. (1996) argue that financial indicators of business success are no longer sufficient – companies in the Information society have to invest into their intellectual capital and they have to assess new indicators beyond the traditional financial scores in order to succeed (see also the contribution by Reinhardt et al. in this book). According to Sveiby (1997) especially knowledge intensive organizations have to free themselves from the mental strait-jackets of the industrial age by employing strategies that focus on intangible rather than tangible assets if they want to succeed. Which solutions can management science offer to organizational decision makers in order to cope with these challenges of the information society? Let us therefore review the development of theoretical insights on organizational change and learning and subsequently question the practical implications that can be derived from this theoretical work for management.

2. Theoretical Perspectives on organizational change

The topic of organizational change is not new to management science. Since it became apparent that there is no one best way to manage an organization that fits all circumstances alike the question arose which solution best fits which circumstances. Hence the relation between organizations and its environment can be identified as a central issue of theoretical perspectives on organizational change. What differs between the approaches is mainly the assumption of correct solutions to the management of this relationship. On a global level several authors have grouped the theoretical approaches according to different schools or lines of thinking. Astley, Van de Ven (1983) distinguish deterministic from voluntaristic orientations. Pfeffer (1982) differentiates three perspectives: (1) purposive, intentional, goal directed and rational perspectives, (2) externally constrained and controlled models and finally (3) emergent, almost random perspectives. Scott (1992) uses two basic dimensions for his systematization of organizational theory. On the one hand he distinguishes between closed systems models and open system models and on the other dimension he differentiates different levels of analysis such as the social psychological, the structural and the ecological level.

Looking more closely at these theoretical approaches we see that early deterministic approaches are rooted in economic thinking which is based on the assumption of **equilibrium states** of the firm. Here organizational behavior is conceived only in direct reaction to market prices and demands. There is only one best way to manage a business which is strictly determined by markets (Debreu 1954; Zimmerman 1961; Schumann 1976; Jensen 1983; Schreyögg 1996). Managements task here is to keep the organization in balance with these market forces. **Evolutionary approaches** such as population ecology do not define rules but interpret survival of organizations as being based on environmental selection (Hannan, Freeman 1977; Nelson, Winter 1982; McKelvey, Aldrich 1983). This selection is determined by evolutionary process. Organizations are conceived as self reproducing, closed systems that develop a variance in practice. The ‘best practices’ are the ones that enable organizational survival. Organizations cannot escape this selection process. The process of organizational change proceeds along the phases of variation - selection and retention, whereby management is considered as the initiator of necessary variation and retention that keeps the system alive. **Contingency approaches** are basically also deterministic considering different aspects of environmental influences such as the nature of the environment or technological factors on organizations, giving management a standard to adapt internal structures and processes. In the adaptation perspective the management of change requires the identification of environmental characteristics and the design of organizational architecture and procedures according to the changing external influences (Burns, Stalker 1961; Lawrence, Lorsch 1967; Thompson 1967; Woodward 1958). In order to adapt organizations to changing contingencies management has to focus primarily on the technological complexity and develop a best fit. Child (1972) argues that contingency approaches have a mechanistic flavor and that there are strategic choices for management. The **strategic choice view and strategic contingency approaches** open room for strategic choice – because there is no one best way- but several ways of managing change successfully. This implies that the environmental forces are not seen as the sole determining factor of organizational structures and behavior, but also as a dependent variable that can be influenced by organizational strategies under certain circumstances. Management has to analyze contingencies and design strategies on the basis of the organizations strength’s and weakness in order to develop strategic advantages (e.g. Porter 1985). Out over these basic theoretical perspectives of adaptation, evolution, selection, contingency and strategic choice view, organizational change is also conceptualized in connection with models of organizational change and **maturing**. Here organizational change is conceived in close analogy to biological concepts, as a development process along different

stages of maturing from the founding phase to its perish. Managements task is primarily to support the transition from one phase to the next as these shifts are mostly connected with severe problems or even symptoms of crisis in organizations (Greiner 1972; Quinn and Cameron 1983; Lievegoed 1974; Mintzberg 1979). We also find numerous **models of intended organizational change** that do not explicitly relate to organizational theory. Based on early research on resistance to change – (Lewin 1947, 1958) and the development of survey-feedback methods (Likert 1961; Mann 1961) concepts of planned organizational development include a large number of organizational development practices and systemic interventions methods such as Survey Feedback, T-Groups, Grid development, team-development and paradox intervention and others (e.g. French and Bell 1973; Schein 1969; Blake, Mouton 1969, 1985; Selvini Palazolli et al. 1988). Finally a growing number of **organizational learning concepts** deal with organizational change. Here organizations are not victims of a natural selection process, nor solely dependent variables of determining environmental forces but rather conceived of as active learning institutions, that can develop according to goals and intentions of their founders and members, and also learn to move beyond these original goals. Similarly as the basic differentiation between individual stimulus-response learning (operant conditioning and classic conditioning) and intentional cognitive learning, the organizational learning approach considers learning not merely as adaption to contingencies, but as learning through insights, understanding and interpretation. The different approaches to organizational learning are rooted in wide variety of theoretical foundations and so far there is no theoretical platform that can serve as a common basis for further development.

3. Perspectives on organizational learning in management literature

Not much has changed since Fiol and Lyles (1985) argued that a ‘...systematic assessment of the strategic management literature suggests an interesting dilemma: Although there exists widespread acceptance of the notion of organizational learning and its importance to strategic performance, no theory or model of organizational learning is widely accepted. Major research (...) along with more modest efforts provide the basis for initial attempts to define, develop, and to differentiate organizational learning and its components. Each has approached the subject from different perspectives, leading to more divergence’ (Fiol, Lyles 1985: 803).

Indeed the divergence of perspectives has increased and so far no analytical or conceptual model serves as a framework for learning among scholars of organizational learning.

Since Cyert and March first spoke about ‘organizational learning’ and Argyris and Schön’s ‘Organizational Learning-Theory of Action perspective’ in 1978, the concept has been used in a variety of different ways in different disciplinary traditions. The amount of literature during the past two decades is overwhelming. Looking at the scope and the heterogeneity of the contributions the necessity becomes obvious to describe the concept of organizational learning under different perspectives. Which are the relevant perspectives on organizational learning and which are the core assumptions that can be traced in the literature in order to derive a conceptual framework for the management of organizational learning?

Most scholars confronted with the literature on organizational learning have major problems in organizing, systematizing and grouping the different contributions. It is difficult to judge if a new contribution should be valued as an increase in knowledge on organizational learning, or if it just adds to the growing diversity in the joint process of constructing complex reality in the mental models of organization researchers. Maybe the answer to this question reflects different paradigms of research, one that relies on adding knowledge by analysis and empirical questioning, hopefully eliminating false assumptions over time, while the other adds interpretations and thereby continues interaction hoping to develop a joint construction of meaning over time. Whatever the result may be, the current growth of literature goes along with the feeling of a lack of clarity, and consensus (Barnett 1998) and even growing confusion (Wiegand 1996; Wahren 1996; Tsang 1997; Edmondson and Moingeon 1998). There are some exceptions where attempts of integrative theorizing are presented.

Shrivastava (1983) is the first to systematically differentiate four distinct and contrasting perspectives on organizational learning: Referring to the early decision making approach of Cyert and March (1963) he labels one line of thinking as ‘**adaptive learning**’ (Cangelosi and Dill 1965; March and Olson 1976). With reference to Argyris and Schön (1978) a second perspective on organizational learning is described as ‘**assumption sharing**’. These concepts are rooted in sociological theories of knowledge (e.g. Berger and Luckmann 1966; Parsons and Shils 1962). A third perspective is referred to as ‘**development of knowledge base**’. The emphasis here is on the development of knowledge about action-outcome relationships relevant to organizational activities, as Duncan and Weiss (1978) elaborate organizational

learning. The fourth perspective is labeled as ‘**institutionalized experience effects**’ and covers the approaches to institutionalized experiences on learning curves (Abernathy and Wayne 1974).

Wiegand (1996) refers to seven theoretical perspectives on organizational learning which are based on the historical development of the contributions as well as their conceptual distinctions. First the **pioneer approach** of James March is presented with different stages of development in his works (Cyert and March 1963; March and Olson 1975; Levitt and March 1988). The second line of thinking is connected to Chris Argyris, who focuses primarily on the individual as the acting agent of the organization. Also here a number of phases in his works are distinguishable. Starting with the question of ‘Integrating the Individual and the organization’ (1964), Argyris and Schön (1978) in a second phase follow the promotion of organizational learning by interventions. Here the essential work on theories-in-action is presented¹. A third phase is associated with facilitating organizational learning by overcoming organizational defenses (Argyris 1990) and promoting higher order learning and Model II theory in use (Argyris and Schön 1996). After these two basic theoretical foundations by March and Argyris a third perspective on organizational learning is described as **knowledge based approaches**, incorporating amongst others the concepts of Duncan **et al.**, Pautzke, Huber and Walsh, Ungson, Pawlowsky, Nonaka (Duncan and Weiss 1979; Pautzke 1989; Huber 1991; Walsh, Ungson 1991; Pawlowsky 1992, 1994; Nonaka 1994, 1987). Although most approaches to organizational learning somehow relate to knowledge as the starting and end point of learning the contributions clustered here focus on different types of knowledge and organizational processes connected with knowledge creation and diffusion. A fourth perspective is named as **eclectic approaches**, referring to both Peter Senge (1990) and Bo Hedberg (1981) who incorporate different theoretical elements into their approaches. While Senge’s approach originates in a research project initiated by the MIT and large US-corporations aiming at developing Systems Thinking as a way of fostering organizational learning, Hedberg (1981) conceptualizes organizations as cognitive systems that are developed by individual perceptions and interpretations. A fifth perspective is seen as

¹ Organizational learning occurs when individuals within an organization experience a problematic situation and inquire into it on the organization’s behalf. They experience a surprising mismatch between expected and actual results of action and respond to that mismatch through a process of thought and further action that leads them to modify their images of organization or their understanding of organizational phenomena and to restructure their activities so as to bring outcomes and expectations into line, thereby changing organizational theory-in-use. In order to become organizational, the learning that results from organizational inquiry must become embedded in the images of organization held in it’s members’ minds and/or in the epistemological artifacts (the maps, memories, and programs) embedded in the organizational environment” (Argyris and Schön 1996: 16)

integrative approaches to organizational learning. Common for these approaches is the reference to a wide spectrum of literature on organizational learning aiming at a theoretical integration. Here the works of Shrivastava 1983; Fiol and Lyles 1985; Bomke et al. 1993 and Dodgson 1993 are subsumed. A sixth group of publications is seen in line **with systemic thinking and systems theory** (Klimecki et al. 1991; Reinhardt 1993; Schreyögg and Noss 1995). Finally there are a number of approaches in the tradition of organizational development (f. ex. Pedler et al. 1991 and Garratt 1990) that Wiegand (1996) labels as **individualistic-normative** perspective.

Recently Edmondson and Moingeon (1998) have presented a framework to organize the diverse 'scholarly contributions into meaningful categories' (Edmondson and Moingeon 1998: 6). The existing ideas about organizational learning are presented in a typology of organizational learning research. A distinction is made between four approaches:

(1) **Residues: organizations as residues of past learning** - lessons of the past are embodied in current routines as for e.g. in the approach of Cyert, March (1963) and Nelson Winter (1982); (2) **Communities: organizations as collections of individuals who can learn and develop**. This research is mainly descriptive (e. g. Brown and Duguid 1991; Stata, 1989; Pedler et al. 1990); (3) **Participation: organizational improvement gained through intelligent activity of individuals** - here organizational learning is viewed as an outgrowth of policies that engage individuals in contributing to the organization (e.g. Hayes et al 1988) and (4) **Accountability: organizational improvement gained through developing individuals mental models**. Here effectiveness is depends upon properties of individual cognition (e.g. Argyris and Schön 1974; Senge 1990, Brown 1991).

These distinctions of organizational learning approaches may be of help in understanding the basic assumptions of organizational learning, but only insofar as they use the same analytical dimensions in defining the theoretical clusters. Looking at the distinctions presented above, with the exception of Shrivastava's typology, the perspectives are made up of different analytical dimensions such as the chronological development of a theory (e.g. pioneer approaches), or the author as the main anchor of a perspective. Furthermore we find different content dimensions, such as integration or eclecticism as criteria of distinction. In order to distinguish different theoretical perspectives on organizational learning it might prove useful to apply a consistent analytical approach, namely by organizing the key contributions to

organizational learning according to theoretical traditions. A review of the literature to date suggests that it is possible to distinguish between five clusters of theories:

- the organizational decision-making and adaptation perspective,
- the ‘System-Theory’ perspective,
- the cognitive and knowledge perspective,
- the ‘culture’ perspective,
- the ‘Action-Learning’ perspective,

By examining each in turn some core assumptions for the management of organizational learning can be distilled.

Obviously the different perspectives do not completely exclude each other, because most approaches incorporate a number of different views and theoretical approaches. Not only have authors such as James March and Chris Argyris changed perspectives on organizational learning over time, and added new aspects, we also find that the lines between approaches such as the adaptive learning approach or the cognitive and epistemological approaches are blurred. Nevertheless, most approaches seem to be centered around clearly distinguishable theoretical assumptions that make it possible to define genuine qualitative clusters.

3.1 The organizational decision-making and adaptation perspective

The early work of Cyert and March (1963) centers around an stimulus-response (S-R) based behavioral approach to learning and is based on a contemporary conceptualization of decision making processes in organizations. Looking at preceding publication of March and Simon (1958) we can see that their understanding of the learning process and their postulates about human organism are rooted in Tolman’s (1932) goal directed behaviorism. Although the human organism is considered as a complex information-processing system, human memory is seen to include ‘all sorts of partial and modified records of past experiences and programs for responding to environmental stimuli’ (March and Simon 1958: 10). The internal states are divided into evoked and unevoked parts. External stimuli are triggers to evoke certain parts of the memory. ‘When one of these elements is evoked by a stimulus, it may also bring into the evoked set a number of other elements with which it has become associated through the learning process. Thus if a particular goal has been achieved on previous occasions by

execution of a particular course of action, then evocation of that goal will be likely to evoke that course of action again' (March and Simon 1958: 10). In their understanding of organizational learning this mechanistic stimulus-response (S-R) conception of the learning process is transferred to organizational learning, whereas the individual concept of memory is exchanged by 'standard operating procedures' on the organizational level. In 'A Behavioral Theory of the Firm' Richard Cyert and James March (1963) for the first time conceive organizational learning as a concept located on the organizational level:

'Organizations learn: to assume that organizations go through the same processes of learning as do individual human beings seems unnecessarily naive, but organizations exhibit (as do other social institutions) adaptive behavior over time. Just as adaptations at the individual level depend upon phenomena of the human physiology, organizational adaptation uses individual members of the organization as instruments. However, we believe it is possible to deal with adaptation at the aggregate level of the organization, in the same sense and for the same reasons that it is possible to deal with the concept of organizational decision making' (Cyert and March 1963: 123).

In Cyert, March's (1963) understanding, organizational learning is triggered by external shocks. An external source of disturbance or shock to the system, which cannot be controlled makes adaptation necessary. (1963, p.99). The organization has a number of decision variables and decision rules internal to the system. Each combination of external shocks and decision variables in the system changes the state of the system. Organizations learn by memorizing disturbances and reaction combinations according to decision variables. Standard operating procedures are referred to as the memory of the organization. By learning new combinations of external disturbances and internal decision rules the organization increases its adaptability to differing environmental states. Any decision rule that leads to a non preferred state at one point is less likely to be used in the future. Just as the probability of a specific individual behavior decreases with the expectation of negative outcomes in behavioral learning theory. '...Organizations exhibit (...) adaptive behavior over time'. (Cyert, March 1963: 123). 'We argue...that a business organization is an adaptive institution. In short, the firm learns from its experience' (1963: 100). The concept is based on a perception of adaptive learning which can result in (Cyert and March 1963: 126) 'uncertainty avoidance', 'problemistic search' (search that is motivated by a problem and is directed towards finding a solution to that problem) and 'organizational learning' (adaptation of goals, adaptation in

attention rules and adaptation in search rules). Outcome of organizational learning is a adaptation or change of organizational rules and standard operating procedures. We can see that organizational learning is not dependent on an increase of knowledge of it's members, rather learning is seen as organizational memorizing of S-R combinations. Learning then is seen as reactive adaptation in line with S-R learning principles, there is no cognitive or knowledge related learning.

Unlike Cyert, March (1963) we find that in March and Olsons (1976) concept of organizational learning the first reference is to 'organizational intelligence' (p. 55), and to cognitive processes. Here organizational learning is clearly conceptualized as experiential learning, based on 'cognition's and preferences', 'models of the world' , ideas, beliefs and attitudes that members of the organization hold (March and Olson 1976: 338). Individual capabilities of correctly interpreting environmental ambiguity, which rely on cognitive processes and their limitations are of central importance to organizational learning in March and Olson's model. In comparison to the mechanistic S-R learning model from Cyert and March (1963), March and Olson (1976) extend organizational learning to incorporate social-psychological factors and cognitive structures as important elements of organizational learning. The incomplete learning cycle not only takes into account individual psychological 'pre-existing structure of related values and cognition's' (1976: 60) but also social-psychological aspects such as role constraints.

Levitt and March (1988) develop the concept of organizational learning further. In their approach 'Organizations are seen as learning by encoding inferences from history into routines that guide behavior. The generic term 'routines' includes the forms, rules, procedures, conventions, strategies, and technology around which organizations are constructed and through which they operate.' Levitt and March explicitly add: 'It also includes the structure of beliefs, frameworks, paradigms, codes, cultures, and knowledge that buttress, elaborate, and contradict the formal routines' (Levitt and March 1988: 320). These routines are considered independent of the individual actors and they are capable of surviving considerable turnover in organizational actors. These Routines are more than standard operating procedures (Cyert and March 1963), they open up the way to conceptualizing collective knowledge bases of organizations that are the result of learning from direct experience, learning from interpretations such as stories, paradigms, frames of reference, culture and learning from the experience of others.

It becomes clear that March's understanding of organizational learning has changed considerably from the early mechanistic concept of standard operating procedures to the learning cycle that includes subjective interpretations of reality and gives the individual in organizations an important function in shaping the organizational learning process and finally to Levitt and March's concept of routines which goes one step further by including a broad range of knowledge bases in organizations that are seen as a result of different individual learning histories.

3.2 The 'System-Theory' perspective²

By defining organizations as systems 'of consciously coordinated activities or forces of two or more persons' Barnard (1956: 75) was presumably the first to base management thinking in a systems perspective. The systems approach has a long tradition and has ramified considerably. Bertalanffy (1951) developed the principles of a general system theory as a means of linking different disciplines. This is the theoretical basis for a number of approaches that conceptualize organizations as open systems that are confronted with environmental pressure which they somehow have to adapt to. With respect to organizational learning at least three distinctive approaches have developed.

First the **traditional approaches to a system based management** perspective building on a systems view and the system-environment relations can be distinguished. Kast and Rosenzweig (1970) amongst others base their organization and management approach on a systems view. Here the systems perspective is used as an analogy and not in a strict theoretical way. With the development of an early system perspective, organizational environments were perceived as exerting pressure on organizations, that management had to deal with. For example Ashby's 1956 'law of requisite variety' implies that 'only variety can destroy variety' (Ashby 1961, first 1956: 207). Organizations that have to cope with

² Systems theoretical- and epistemological approaches can be distinguished by the notion of 1st- vs. 2nd-order cybernetics: 1st-order cybernetics is based on the assumption, that systems do exist as an *ontological reality* - and therefore can be identified and improved by tools on the basis of prescriptions. Contrary to this assumption 2nd order cybernetics or autopoietic systems theory refers to the idea, that systems are *mental constructions* (Von Foerster, 1985; see also Maturana and Varela 1987; Luhmann 1984): Hence, changing systems first must take into account the role of the observer explicitly, which for example means, that different stakeholders (must) have different goals due to their observer positions and interpretation modes.

environmental complexity have to generate structures that can deal with complexity. Thus a complex environment needs a complex 'inside' of organizational structures. This view of perceiving organizations as open systems in the context of a general-systems view was further developed e.g. by Katz and Kahn 1978: 'The organization lives only by being open to inputs, but selectively; its continuing existence requires both the property of openness and selectivity' (Katz and Kahn 1978: 31; Emery, Trist 1965; Emery 1969).

Secondly we can identify concepts which are based on the assumptions of **self-organization processes**³. These concepts take into account self-referentiality as basic processes in organizations to deal with (e.g. Beer 1972, 1979; v. Foerster 1985; Probst 1987; Willke 1987; 1998; Reinhardt 1993; Ulrich 1984; Malik 1987, 1992; Steinmann and Schreyögg 1993). Organizational learning is conceived as an increase in problem solving potentials of social systems derived by institutional learning (Klimecki et al. 1991). According to the authors that represent this perspective, institutions have to build organizational slack in order for self-referential processes to take place and thereby develop the organization to a higher level. Here management is advised to allow autonomous developments in systems and to design structural preconditions in organizations that promote such self-referential processes.

Finally the **System Dynamics Approach**, which originates from population analysis and was developed amongst others by Forrester (1969, 1980, 1987) is to be mentioned. The concept plays an important role both in Peter Senge's (1990) approach to organizational learning as well as in the St. Gallen's school's view on organizational development (Vester 1991; Gomez 1981; Ulrich and Probst 1984, 1990; Probst, Eberl, and Klimecki 1991; Senge 1990, Senge et al. 1994; Morecroft 1988; Morecroft **et al.** 1994). The basic assumption here is that once we have reduced complexity of a network system by analyzing the features of all relevant factors and their dynamic relations over time, this knowledge can be used to understand the functioning of complex systems networks and to intervene accordingly. All outputs of systems are seen as input to other systems, therefore learning means understanding the complex relations of social systems and their dynamics. In this approach looking at one system-level, for example the organization, also implies defining the elements of this system on a lower level - the groups or individuals - and describing the larger system into which the

³ In order to avoid misunderstandings we have to distinguish between self-organizational and autopoietic or epistemological approaches: Self-organization is an element of autopoiesis but not vice versa: Autopoiesis implies self-creation *and* self-maintaining on the basis of self-organizing processes; the notion „self organization“ lacks the self-maintaining aspect (e.g. Hejl, 1984).

system of interest is integrated into. This methodological procedure is based on both an analytical and on a synthetic outlook: We are to look at the elements of a system (analysis) and we can aggregate to the next system-level by synthesis and describe the learning relations on this next level⁴. Basically the system-dynamics perspective is derived from a cybernetic concept of single loop learning, as the model builds on feed-back loops and a perspective of stabilizing systemic structures by balancing loops. Possibly Senge's (1990) propositions about systems archetypes (1990, p. 378) can be interpreted as Bateson's (1992) Type II or Type III learning because they are based on assumptions that are a result of reflection about 'higher-order-rules'. System thinking is seen as the essential fifth discipline⁵ for organizational learning by Peter Senge (1990: 57) and 'Organizational learning processes are most effective when they help managers develop a more systemic and dynamic perspective' (Senge and Sterman 1992, p.354).

3.3 The cognitive and knowledge perspective

There is only a gradual transition between Levitt and March's (1988) 'routines' and cognitive conceptions of organizational learning. Basically the cognitive perspective is centered around the assumption '...that all deliberate action had a cognitive basis, that it reflected norms, strategies and assumptions or models of the world which had claims to general validity...Human action and human learning could be placed in the larger context of knowing.' (Argyris and Schön, 1978: 10). Essential to cognitive notion is the conscious character of learning. Members of organizations are not merely a storage bin of past rational experiences but interpreters of reality ('enactment') according to the specificities of their cognitive system. The cognitive and knowledge perspective of organizational learning also includes a variety of clusters that each emphasizes different aspects.

First we can distinguish two cognitive based approaches that have received a considerable amount of interest recently: (1) **structural approaches** also labeled as 'Representationism' (von Krogh et al. 1996) which focus on information processing abilities depending on structural characteristics of the cognitive system (Bartlett 1932; Schroder **et al.** 1969; Axelrod

⁴ The idea that a lower system-level also constitutes an element of a higher system-level provides insight into the necessity of the differentiation between 1st- and 2nd order cybernetics, since the „element-relation“ only makes sense within an ontological interpretation of systems (1st order cybernetics).

1976; Scholl **et al.** 1993; Dörner 1976, 1989; Streufert and Streufert 1978; Streufert and Swezey 1986; Huber 1991; Rumelhart 1984) and (2) **corporate epistemology** (von Krogh, Roos, Slocum 1996, p.157) which considers the interpretation process and the cognitive construction of reality as the central issue of importance for learning (Daft, Weick 1984; Sims, Goia 1986; Weick and Bougon 1986; Reinhardt, 1993; van Krogh **et al.** 1996, Smircich 1983; Smircich **et al.** 1985). Let us look at these two approaches in more detail.

The assumption of structural concepts, that both learning and decision making depend on the structure of the knowledge system is certainly not new to psychological thought. Much of cognitive psychological research has shown that the capacity of human information processing depends on the characteristics of individual cognitive structures (the individual knowledge system) or stages of moral development. Recent research in the dynamics of organizational social cognition also suggests the applicability of the cognitive construct idea on the group and on the organizational level (e.g. Streufert and Swezey 1986).

‘Organizational mind’ and ‘collective cause’ maps are two approaches towards organizational knowledge systems (see Fig. 1). Organizational learning in this perspective can be considered as a modification in the organizational knowledge system, that enables organizations to improve their understanding and evaluation of the internal and external environments. Or as Fiol and Lyles argue: ‘Learning enables organizations to build an organizational understanding and interpretation of their environment....it results in associations, cognitive systems, and memories that are developed and shared by members of the organization’ (Fiol, Lyles 1985: 804). Thus knowledge systems are both antecedents and results of organizational learning processes. If this is the case, characteristics of the organizational knowledge systems can be considered as determinants of the organizational learning process on the one side, and the results of learning processes can be observed looking at the characteristics of knowledge systems on the other side. In the literature on organizational learning we can identify a number of concepts of organizational knowledge systems (see Fig. 1).

⁵ The other four disciplines according to Senge (1990) are: (1) Personal Mastery (2) Managing Mental Models (3) Developing Shared Visions and (4) Team Learning

Author	Concept
Boulding (1956)	Image
Wilensky (1967)	Organizational Intelligence
Weick, Bougon (1977)	Collective "Cause-maps"
Argyris, Schön (1978)	Organizational Theories-in-Action
Tushman, Nadler (1978)	Information Processing System
Duncan, Weiss (1979)	Knowledge about the Relationship between Specific Actions and Outcomes
Starbuck (1982)	Logically Integrated Clusters of Belief
Shrivastava, Schneider (1984)	Organizational Frames of Reference
Hall (1984)	Organization's Cause Map
Daft, Weick (1984)	Organizational Interpretation Systems
Salancik, Porac (1986)	Distilled Ideologies
Sims, Goia (1986)	Organizational Schemata
Sandelands, Stablein (1987)	Organization Mind
Lundberg (1989)	Operational Cause-Map
Pautzke (1989)	Organizational Knowledge Base
Senge (1990)	Shared Mental Models
Klimecki et al. (1991)	Joint Construction of Reality
Baitsch (1993)	Local Theory
Nonaka (1995)	Organizational knowledge-base-layer
Lyles et al. (1996)	Organizational Knowledge Structures and Shared Belief Structures

Fig. 1. Concepts of organizational knowledge-systems

In the research tradition of the structural approaches there is a considerable amount of work on human information processing and complexity theory to build on. This line of research is associated with Bierie (1968), Zajonc (1965), Scott (1969) Schroder, Hunt's and Driver's (1976) work and has been developed considerably by Siegfried and Susan Streuferts complexity theory in 1978 (Streufert and Streufert 1978). Following Lewins, Heiders and Scotts thinking, very basically the assumptions of complexity theory are, that cognitive structures can be analyzed according to content and structure. Streufert and others have concentrated only on the structural aspects, which means that complexity is concerned with how people think not what they think. Structure of individual knowledge-systems are defined along the dimensions of differentiation (dimensionality in the cognitive semantic space) and integration (the flexible relationships among various dimensions with regard to specific stimulation). Practically it can be shown that there is significant impact of individual differences in cognitive styles of managers (which relate to the structure of their knowledge system) on executive performance (Streufert et al. 1990) . This research seems to offer interesting ways of accessing individual knowledge systems because they are measurable and because they have prognostic validity for business success. Moreover recent research has effectively utilized the simulation procedures (SMS: Strategic Management Simulation) with decision making processes in groups (Streufert, Pogash, Piasecki, and Post 1990). The concept may be used to assess teams of decision makers that must, for example cope with complex uncertain and fluid task environments. At least partially this theoretical perspective gives access to the quality of a knowledge system on the group level and allows to evaluate efficient learning in teams. Organizational learning here implies the distinction of structural characteristics of collective knowledge systems—in other words if groups learn to evaluate and discuss in a more differentiated and integrated way and if they have a number of ways of interpreting and reflecting on topics, or observe processes from different angles. At the same time a more differentiated and integrated collective knowledge system is a requisite for differentiated perception and effective learning of a team.

In regard to corporate epistemology the emphasis is placed on the question how organizations develop knowledge. Essentially these approaches do not define knowledge as a 'objective' mental reflection of reality, but as a coexisting and conflicting interpretation of reality that is based on the history of each participating member of a joint knowledge system. Weick (1969) has coined the phrase of the 'enacted environment' meaning that... 'the human *creates* the

environment to which the system then adapts. The human actor does not *react* to an environment, he *enacts* it (Weick 1969: 64). Subjective construction of meaning is developed on the basis of symbols and language (von Krogh, Roos, and Slocum 1996: 157). Organizational reality thus is constructed by interaction between members of the organization developing a joint interpretation. Von Krogh, Roos et al. 1996, similarly as Reinhardt 1993 build a bridge between the cognitive rooted approach and autopoiesis theory on the basis of Maturana and Varela (1987). Knowledge here is a result of the self productive (autopoietic) process and embodied in the individual (p. 163f.). This 'private' knowledge can be conveyed to organizational knowledge through interactions: 'Knowledge of the organization is shared knowledge among organizational members' (von Krogh, Roos, and Slocum 1996: 166; see also Weick 1969: 'double interact'). Therefore the epistemological perspective suggests cooperative experimentation and interactive methods, especially language games as means of promoting knowledge development and thus organizational learning (Krogh, Roos, Yip 1996; Vicari et al. 1996).

The second major theoretical cluster in the cognitive and knowledge perspective are approaches to organizational learning that center around (1) **core competencies** and (2) **knowledge creation and development processes**. Certainly the above mentioned aspects play a role here also but the main focus is on other aspects. The basic assumption of the core competence approach is that an organization's competitive advantage depends on the knowledge and skills it possesses in a distinct area. Core capabilities in organizations are seen as the "wellspring" of organizational learning processes (Leonard-Barton 1995). This line of thinking is influenced by the traditional approach on the diffusion of innovations (Rogers 1983), as the central question asked here is concerned with the identification, development and diffusion of core competencies in organizations (e.g. Leonard-Barton 1995; Jelinek 1979; Jelinek et al. 1990; Lullies et. al. 1993; Wikström et al. 1992; Grundy 1994; Hamel, Prahalad 1995; Prahalad 1996). The main emphasis is placed on discovering both the core rigidities and the core capabilities of organizations which are considered as 'interlocked *systems* of knowledge bases and flows.' (Leonard-Barton 1995: XIV). In order to promote organizational learning different activities such as integrated problem solving across different cognitive and functional barriers, implementation of new methodologies, experimentation and importing know-how from outside are suggested (Leonard-Barton, 1995: XV).

The second line of thinking, the knowledge development and creation approaches, are closely related to epistemological concepts of organizational learning and build on Polanyi's understanding of implicit and explicit knowledge in organizations (Polanyi 1966). Explicit knowledge is understood as insights that can be articulated and transferred by language. Tacit knowledge in contrast is based on individual experiences and cannot be transferred and articulated by language. Knowledge development is described as an interactive process between these two types of knowledge on different levels of the organization. Without going into details (see the 'SECI-Model' in the chapter by Nonaka, Byosiere in this volume ("The theory of organizational knowledge creation")) we can state here, that the crucial question of knowledge creation lies in mobilizing the tacit knowledge in organizations and transferring it to the group and organizational level in order for collective system-levels to learn. This means that individual knowledge and experiences which often are implicit in nature have to be articulated and experienced by other members of the organization. On the basis of a phase model a number of tools and methods are derived that enable the necessary transfer of knowledge and promote knowledge creation. This perspective also discusses and analyses intercultural differences in typical knowledge management styles and emphasize the distinction between western management styles that rely mainly on explicit knowledge, while the Japanese approach to knowledge is much more aware of tacit knowledge in organizations (Pautzke 1989; Nonaka 1988; 1991; Nonaka, Takeuchi 1995, Nonaka, Konno 1998).

3.4 The 'culture' perspective

A number of approaches have focused on the culture concept and view organizational learning, as for example Argyris (1990), as a change of defensive routines in organizations and or the development of an organizational learning culture (f.ex. Mitroff and Kilmann 1976; Dierkes 1988, 1992; Schein 1984, 1991; Sackmann 1991; Hawkins 1991; Frost et al. 1991; Klimecki et al. 1991; Argyris 1990; Cook and Yanow 1993;) "At the simplest conceptual level... we can say that culture is the shared common learning output" (Schein 1991: 247). Cook, Yanow (1993) describe the distinctive view of the culture approach to organizational learning: 'Our intention...is to outline a "cultural perspective" on organizational learning (...) We see this perspective as a complement to, not a substitute for the cognitive perspective' (Cook et al. 1993: 4), and they argue, that the cognitive perspective focuses only on the individual level while the cultural perspective can capture the learning on a collective learning

level. Therefore organizational learning is seen as a process "...when a group acquires the know-how which enables it to carry out its collective activities.." (1993: 13). The definition for culture as the '...set of values, beliefs, and feelings, together with the artifacts of their expression and transmission (such as myths, symbols metaphors, rituals) that are created, inherited, shared, and transmitted within one group of people and that, in part distinguish that group from others' (Cook et al 1993: 15), makes clear that this perspective is closely linked to the epistemological approaches. Culture and joint construction of reality are basically the common core. Several contributions have build on the culture dimension and help to bridge the gap between individual concepts and collective concepts of learning. This can be shown for example by Sackmann's (1991) concept of 'cultural knowledge in organizations' which is based on the assumption 'that culture can be conceptualized as the collective construction of social reality' (p. 33). Sackmann distinguishes between four classes of cultural knowledge, which additionally are divided up into several categories. The classes can be described as follows (Sackmann, 1991: 34–39): (1) *Dictionary knowledge* describes organizational reality that is considered to be relevant in a given cultural setting by its members, for example the strategy of a firm. The descriptive dictionary knowledge can be elicited by 'what?'- questions. (2) *Directory knowledge* represents commonly held theories of actions, which contain causal-analytical attributions. The directory knowledge can be elicited by 'how?'-questions. (3) *Recipe knowledge* consists of normative prescriptions or causal-normative attributions. Recipe knowledge can be elicited by 'what should be?'- questions. (4) *Axiomatic knowledge* consists of causes, assumptions, and beliefs. Axiomatic knowledge can be elicited by 'why are things done the way they are?'- questions. Based on this approach it is possible to link cultural changes to the process of organizational learning: Dictionary knowledge is strongly related to functional domains, which implies that changing dictionary knowledge occurs for example by changing incentive and reward systems. Changing directory knowledge can be interpreted as an organization wide learning process, which for example is driven by the change of organizational control mechanisms. A change in recipe knowledge can be triggered by the degree of autonomy and selection procedures, while changing axiomatic knowledge is strongly related to the learning of top management teams, e.g. by sharing beliefs within this group.

Argyris (1990) clarifies in an impressive way in his approach that organizational defense mechanisms towards learning processes are grounded in a cultural and emotional level of the organization. He distinguishes two contrasting types of cultures in organizations: : 'Model I

Theory-in-Use' and 'Model II Theory-in-Use'. 'Model I Theory-in-use instructs individuals to seek to be in unilateral control, to win, and not to upset people' (1990 13)...Model I theory-in-use is designed to produce defensive consequences and therefore requires defensive reasoning' (1990: 23). 'Model II is the new theory-in-use. The governing values of Model II Theory-in-use are valid information, informed choice, and responsibility to monitor how well the choice is implemented' (1990: 104). The predominant values in the context of the 'Model I' ('control', 'to win and not to loose', 'to avoid negative feelings'), lead to defensive routines in organizations: 'For example, whenever human beings are faced with any issue that contains significant embarrassment or threat, they act in ways that bypass, as best they can, the embarrassment or threat. In order for the bypass to work, it must be covered up. The basic strategy involves bypass and cover-up.' (Argyris, 1990: 25). Organizational learning as cultural change thus also implies affective and emotional aspects of common culture. Therefore knowledge systems in organizations cannot be seen as joint constructions of reality only, but also as general constructions of meaning with affective connotations. If one regards this cultural perspective as the affective component of collective knowledge systems, a broad variety of approaches which are closely linked to the cognitive perspective outlined above opens up under the generic term of 'Management of meaning' (cf. Pondy et al. 1983 Gray 1985; Gioia, 1986; Smircich 1983; Smircich et al. 1985 Schein 1991)

3.5 The 'Action-Learning' perspective

Essential to action-learning is the idea that learning occurs through acting. The basic idea is that a deeper understanding of contents are developed by a reflection process that follows action. Pure cognitive learning may be memorized but does not allow for understanding. Necessary for action relevant learning is the reflection on ones own experiences. The action learning approach is quite heterogeneous with theoretically and conceptual based models such as Kolbs learning circle on the one hand and the practical action-behavior orientation that can be found in Revans (1980) and Pedlers et al. (1991) approach to organizational learning practices. Originally Revans has applied action learning to different learning situations since the 1950s (Revans 1980). These approaches conceptualize behavioral oriented intervention as the starting point for learning processes in a theoretical framework of experiential learning (Dewey 1910, Kolb 1976, 1984; Argyris, Schön; 1978; Revans 1982; Forslin, Thulestedt 1993; Inglis 1994; Pedler 1997).

According to Revans (1982) learning occurs from experience—the basic idea is that we have an experience and then we think and reflect on this experience by relating it to former experiences. ‘We continue to think about the experience, but now we are making generalizations and fitting the results into our personal view of reality. And finally we test our conclusions by using a modified approach the next time a similar set of circumstances arises.’ (Inglis, 1994: 14). Similarly to other conceptions of organizational learning the necessity of organizational adaptation to changing environments is considered as the trigger to learning. Following Revans (1982) the learning process can be expressed as $L = P + Q$ (where L is learning and P stands for programmed knowledge and Q for the ability to pose questions; Inglis 1994: 8). Inglis extends the formula to $L=P+Q+I$, where I is implementation. ‘Action learning requires action to be taken, not merely recommended’ (Inglis 1994: 9).

Practically action learning with its roots in the English socio-technical tradition is a popular approach in leadership and management development programs. Its main advantage being a learning based on experience and the simultaneous processes of learning and congruent change in the client system. It also offers a flexible and meaningful learning situation for the individual and provides support in problem solving. Action learning is also viable, however, for collective, experiential learning. In terms of higher order learning (double loop learning), an action learning set - a group of participants who work on forming shared knowledge—is a powerful instrument. Experiences are shared, analysis is enhanced and gradually new and understood concepts develop, which meet the needs of the group. The learning and problem solving process is supported by the introduction of relevant external knowledge and typically the process is managed by a facilitator. Learning sets can consist of members from the same organization or from separate cooperating organizations, for example in a network. The participation in a learning set is an experience that highlights the learning aspects of problem solving and the set develops an attitude towards learning that could be seen as a case of deuterio-learning - that is, the set learns to learn⁶. Recently Pedler (1997) suggests to develop a constructionist interpretation of action learning which ...‘frees us from the limitations of individual action and learning’ (Pedler 1997: 261). In this view action learning helps to develop ‘a shared process of meaning-making, helping to create frameworks of understanding within which to act’ (Pedler 1997: 261). This conceptual extension allows the integration of an epistemological perspective and we can see that organizational meaning and acting of organizational members are closely connected on the organizational level.

⁶ Thanks to Jan Forslin for his discussion and contribution on this perspective

4. Management of organizational learning: a conceptual framework and practical suggestions

What then are the implications of these perspectives for the management of organizational learning? The assessment of the literature on organizational learning has made clear that there are distinct perspectives on organizational learning that differ in respect to certain basic assumptions for example the rationality assumption or the nature of the organization and its environment as being either objective reality or subjective construction of reality, or in their emphasis on certain aspects of organizational learning such as the cognitive, the culture or the action perspective. Besides these differences that result out of distinctive theoretical traditions we can also observe similarities in these approaches, that reappear, sometimes with other labels but essentially refer to similar aspects. All approaches on organizational learning somehow refer to the transfer problem of learning from the individual to a group or to a organizational level. Most approaches also distinguish learning levels such as simple adaptive learning and higher order reflective learning. We can also observe that the differences between cognitive, cultural and action approaches diminish as authors from all theoretical ‘sides’ seem to suggest an integration of cognitive, cultural and action related aspects into their approaches of organizational learning. In other words it is possible to see outlines of a picture that visualizes basic building stones of an integrative model of organizational learning. This could not only help to define hypothesis that are open to empirical research and thus refine our understanding on organizational learning but also help the practitioner to identify relevant organizational factors that influence learning. Let us look more closely at these integrative dimensions. Our review suggests four different dimensions of organizational learning:

- different system-levels of learning (from individual to network)
- different learning modes, such as cognitive-, cultural- and action learning
- different learning types (single-loop, double-loop, deuterio-learning) and
- different phases of a collective learning process.

4.1 System levels

As has often been pointed out, organizational learning has to be distinguished from *individual learning*. Therefore most concepts define learning levels above the individual level in order to conceptualize organizational learning. Of special interest here is the group or the *team level* as this level offers a gateway to organizational learning. Especially system-perspectives and knowledge creation approaches have pointed to the vital function of groups as the core level of organizational learning e.g. Senge (1990): 'Team building is vital because teams, not individuals are the fundamental learning unit in modern organizations. This is were 'the rubber meets the road', unless teams can learn, the organization cannot learn' (Senge 1990: 10). As Nonaka and Takeuchi (1995) point out the focus on groups is traditionally embedded in the Japanese culture, while western management usually deals with individuals. In Japan... 'the interaction of tacit and explicit knowledge tends to take place at the group level' (1995: 198). Groups are not only the link between the individual and the organization but also the crucial intervening social system in which 'sharing' (Jelinek and Litterer 1994), learning and organizational behavior takes place, where the individuals view of the world is shared, mediated and influenced. Looking at the early research on group dynamics (f.ex. Bion 1968; Cangelosi, Dill 1965; Cartwright, Zander 1968; Bales 1955; Weick 1969, Lewin 1947; Likert 1976; Katzenbach, Smith 1993) much knowledge can be revitalized for questions of organizational learning. Wiegand (1996) has undertaken the task to elaborate how research on groups can be transferred to problems of organizational learning, arguing that groups play a central role in the emotional support of individual learning and that phases of group development can be reinterpreted as learning phases opening new chances for interventions and promoting of learning (see also 'Learning Networks' in the Tools chapter).

On the next level *intraorganizational learning* is often conceptualized. Mostly the question arises how organizations as an entity can learn. Rarely are there any attempts in precisely defining what collective learning means on this level. Beyond the individual, the group and the intraorganizational level, much focus has been on the network or interorganizational level of learning lately. How can organizations learn in networks and how can external knowledge systems be used to support learning. Basically any conceptual framework for organizational learning theory should therefore incorporate at least four different analytical system-levels: the individual level of learning, the group or interpersonal level, the organizational or intraorganizational level and the network or interorganizational level of learning.

4.2 Learning modes

As we have noted most approaches to organizational learning are based on one or more of the following three distinct perspectives: A *cognitive perspective* on organizational learning, which is based on the early works of decision-making processes in organizations but has developed far beyond the concepts of bounded rationality in terms of its ability to integrate the value and belief perspective. Here cognitive systems are the basic concepts applied on the individual and collective level. A *cultural perspective*, which has its roots in an interpretative approach to human behavior and builds on the notion, that members of organizations create a set of intersubjective meanings (construction of reality), that can be assessed by artifacts such as symbols, metaphors, ceremonies myths etc. and which are tied together by values and beliefs and emotions. A *action perspective*, which derives its assumptions from several traditions. It emphasizes the importance of educational concepts and experiential learning in the tradition of Kolb (1984) and Revans (1980).

These three perspectives represent three existential stances that man/women can take with respect to the human condition: Knowing, feeling, and acting. "Throughout the classical tradition, from Plato and Aristoteles on, theorists repeatedly proposed the same three components of attitude under their latinized names of cognitive, affective and conative" (McGuire, 1968, p. 155). Rather than excluding one of these views, or harmonizing the differences between these perspectives on organizational learning, we assume that all three components—knowledge, culture and action—have to be considered complementary if organizational learning is to be promoted. Management of learning makes it necessary to understand learning , not only as a matter of cognitive learning, but also of values, emotions and behavior. Social psychological research on attitude change makes the assumption likely, that the relation of these three components are an important aspect of attitude change. People in organizations not only have to understand or create new realities, they have to feel that it is right to adopt new hypothesis or views and that they are able to act accordingly. Neither the 'sharing' of tacit knowledge in groups, nor the 'suspending' of assumptions⁷ that is necessary for true dialogue has a chance if people are afraid to loose in such a process. Management of

⁷ "To 'suspend' one's assumptions means to hold them, 'as it were, 'hanging in front of you', constantly accessible to questioning and observation....This cannot be done if we are defending our opinions. Nor can it be done, if we are unaware of our assumptions" (Senge 1990: 243).

learning modes thus makes it necessary to establish, create and fertilize a culture of mutual trust (f.ex. Zand 1977; Luhmann 1989; Bleicher 1995; Seifert et al. 1998; Cohen 1998: 36).

4.3 Learning types

The third distinction frequently made in the literature is based on Bateson's (1972, 1992) three learning levels, Learning I ('proto-learning', 1992: 371), Learning II ('deutero-learning', p. 219 and p. 378), Learning III ('Changes in the deutero process of learning'; 1992: 389) and Argyris' and Schön (1978) distinction between single-loop, double-loop and deutero-learning. Other authors have developed similar learning typologies which basically rest on the assumption that there are differences between learning as a conditioned response in line with behavioristic learning theory on one side and learning as a result of reflection, insight and maturation on the other hand. The overview in the following Fig.2 gives examples of different learning types in the literature, where the labels and contents do not necessarily correspond between the authors.

Authors	Learning types		
	Type 1	Type 2	Type 3
Bateson (1972)	Learning 0 and Learning I	Learning II	Learning III
Argyris, Schön (1978)	Single-loop learning	Double-loop learning	Deutero-learning
Starbuck et al. (1977)	first-order learning	second-order learning	
Hedberg (1981)	Adjustment learning	Turnover learning	Turnaround learning
Shrivastava (1983)	Adaptive learning	Assumption sharing	Development of knowledge base
Fiol, Lyles (1985)	Lower-level learning	higher-level learning	
Morgan (1986)	Self-organization		Holographic learning
Lundberg (1989)	Learning as organizational change	Learning as organizational development	Learning as organizational transformation

Senge (1990)	Adaptive learning		Generative learning
Garratt (1990)	Operational learning cycle	The policy learning cycle	The integrated learning cycle

Fig. 2: Examples for different learning types

The common distinction of organizational learning into three prototypes of learning can be clarified as ‘*Type I*’ referring to the correction of deviations („idiosyncratic adaptation‘; Pawlowsky 1994). Here learning refers to the detection of performance gaps and their correction in line with the operating norms or standards that have been defined. ‘*Type II*’ implies an adjustment to the environment. This learning prototype is based on the assumption that organizations have theories in use, interpretations-systems and frames of reference that guide and determine organizational behavior. If the environmental feed-back that the organization receives challenges the organization’s assumptions, and if these assumptions are differentiated, redefined or altered completely in order to fit the environmental demand, than one can say that learning of Type II has occurred. ‘*Type III*’ is referred to as problem-solving learning (‘learning to learn’). This kind of learning requires collective reflection of governing rules and assumptions. Garrat (1990) describes the necessary state as "helicopter view" and Senge (1990) speaks of ‘metanoia’. Essential is the fact that learning Type III is a construction of higher-order-rules based on experiences and insight. According to Bateson (1972, 1992) Learning III involves attainment of knowledge about the development and the meaning of habits (Learning II) and is only seldomly possible for individuals as it occurs only in religious and spiritual experiences or psychotherapy .

With respect to the management of ‘learning-types’ managers should have in mind that learning types differ and that different learning types are appropriate for different circumstances. Learning may well only make simple adjustment necessary to defined norms and standard operating procedures, but it may also require a profound reflection process if the possible consequences for the organization or the respective entity can be severe.

4.4 Learning Process

Finally most descriptions of organizational learning distinguish between different phases of the organizational learning process. Cyert, March (1963) differentiate ‘information taken into the firm’, ‘the distribution of information inside the organization’, the condensing of input information’ and the output of information ‘..through orders to suppliers, deliveries to consumers, advertising, petitions for patents and in many other ways’ (1963: 107). Hedberg (1981) essentially differs between four phases of the learning process: Environmental stimuli, Selection and interpretation of stimuli and reaction. Also four phases make up the learning circle in Kolbs model (1976, 1984: 30): ‘concrete experience’, ‘reflective observation’, ‘abstract conceptualization’ and ‘active experimentation’. Huber (1991) sees the organizational learning process made up of knowledge acquisition, distribution, interpretation and memorizing. Similar process phases are also described by Lundberg 1989, Nonaka 1992 and others.

Basically the process phases of learning are described along the following, not necessarily sequential learning steps: (1) The identification of information that seems relevant to learning and /or the creation (generation) of new knowledge by combination (f.ex. Koestler's ‘bisociation’ 1964 or Nonaka's "socialization" 1994 ; Lundberg's ‘puzzles’ 1989). (2) Some mode of exchange and diffusion of knowledge either from the individual to the collective level or on the collective level (f.ex. Duncan's et al. "exchange" 1979; ‘externalization’ 1994; Huber's ‘distribution’ 1991). (3) Knowledge then has to be integrated into existing knowledge systems on a collective and or individual level or into procedural rules of the organization whereby either integration or modification of the adopting system can take place⁸ (Bouldings ‘addition’ 1956). (4) Finally the (new) knowledge has to be transformed into action and applied in organizational routines in order to have an effect on organizational behavior e.g. developing new leaderships styles or new products and services. These process dimension of organizational learning can be visualized in the following simplified process model.

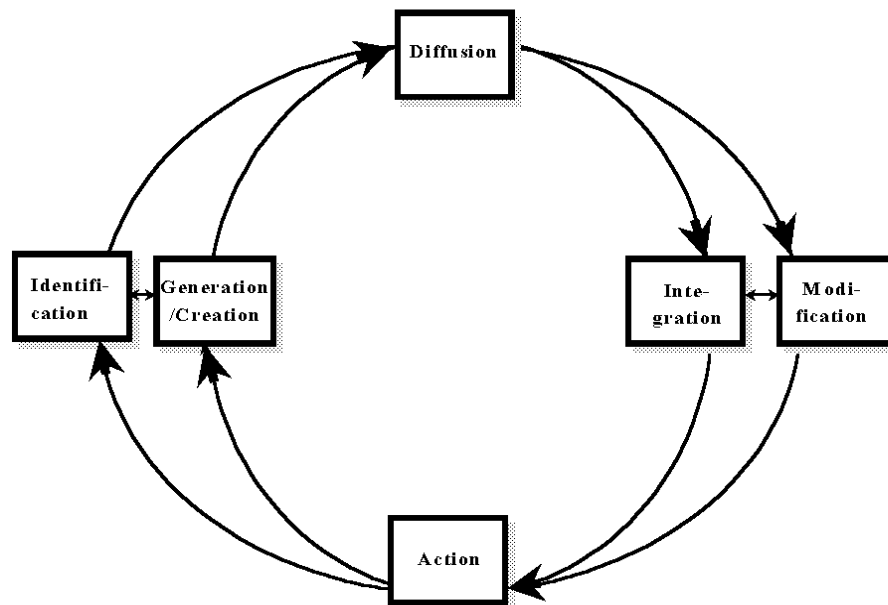


Fig. 3: "Process model of organizational learning"

Summing up four dimensions play a conceptual role in the literature on organizational learning. We suggest that these dimensions can be considered as basic corner-stones of an integrative conceptual framework for organizational learning theory and the basic architecture for knowledge management in order to promote organizational learning.

⁸ Practically a third opportunity to cope with „new“ knowledge exists: Knowledge can be ignored. In our understanding „ignorance“ implies not to learn. Therefore this option is not discussed.

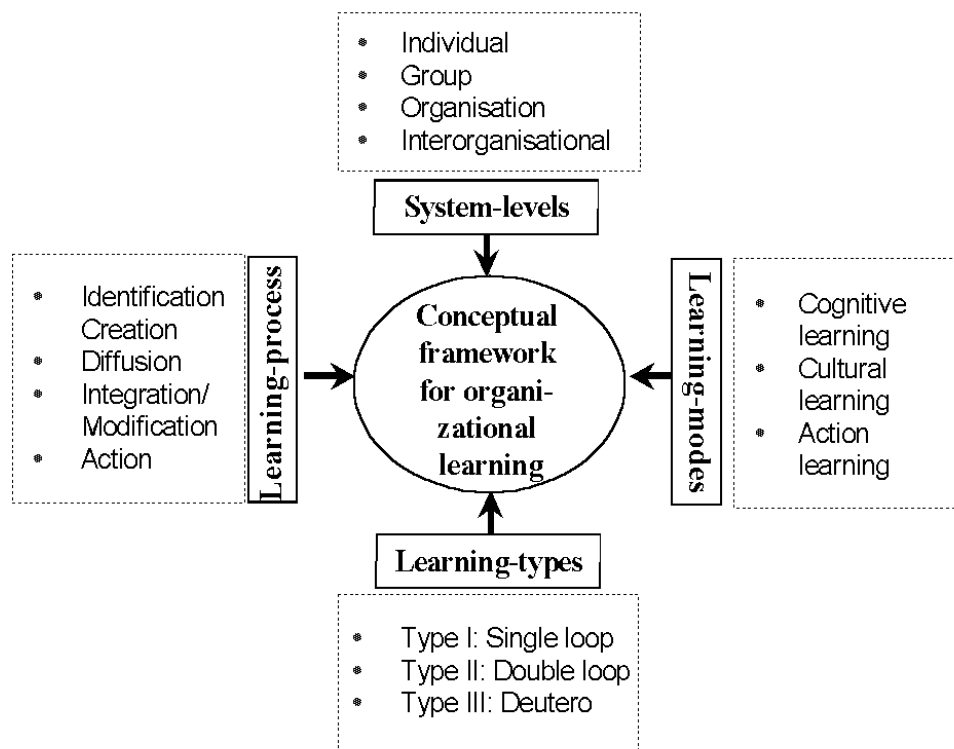


Fig. 4: Conceptual framework for the management of organizational learning

The management of organizational learning thus has to take into account different **system-levels** and their inter-connectiveness by learning to deal with complexity and interdependent variables on different system levels. Individuals with their learning capabilities and possible emotional defenses derived from anxiety and fear of uncertainty in unstable settings, teams as social systems that function according to very specific group dynamic laws, and knowledge networks of relations between the core organization members and external suppliers, customers, knowledge workers and many others.

Furthermore the management of **learning modes** is a crucial task in order to promote organizational learning. Here it is necessary for management to understand and act according to the insight that learning not only is a matter of cognitive, programmed learning, but also of emotions and behavior (see also Scherer/Tran in this volume). People have to understand new knowledge and feel that it is right to adopt new assumptions and routines—knowing, feeling

and acting has to be balanced. A learning culture therefore not only depends on the learning infrastructure of an organization and the investments into Human Resource Development, but essentially on the trust that members have towards another and to management e.g. not to become the victims of innovations they have created.

The third central issue in managing organizational learning is to take into account different **learning types**. What type of problem-solving process makes sense in which problem situation. The correction of simple action-outcome deviations (single loop learning—for example, adjustments to given standards—should be delegated as far as possible down in the organizational hierarchy, while action-outcome deviations that can have crucial effects on the organization⁹—in order to identify such situations system thinking again is important—call for reflective learning processes, where a variety of assumptions and views of organizational members are questioned.

Finally the management of **learning processes** along the phases outlined above, is the backbone of organizational knowledge management (see Pawlowsky et al. chapter on organizational learning Tools in this handbook). In order to promote the learning process phase of identification a number of questions have to be dealt with in organizations such as: Who collects which information about the environment, which environmental fields are most important in the light of the corporate strategy and which persons and groups have access to which information and knowledge? Similarly the phase of creation needs specific attention by defining which knowledge (experiences) exists in the core business and how this experience can be combined in order to generate new knowledge. Further solutions have to be developed on how previous experiences are documented such as memos, learning histories, data-warehouses etc. With respect to the diffusion of knowledge it is necessary to analyze how information and knowledge flows through the organization and in consequence to promote important links, depending on different types of knowledge and information. Questions to be answered here are for example : Which channels are available for communication processes (horizontal, vertical and temporal) and what type of communication dominates (Instruction, discussion, dialog)? The modification and integration phase of organizational learning refers to the process by which new knowledge is integrated into the

⁹ As an example for a standard operating procedure to ensure different learning types the company Gore has defined different categories of decisions. Decisions that are “under the water line” of the organizational vessel and therefore can have crucial consequences for the organization have to be handled with special caution. Here the “learning” procedure is linked top a collective security net.

organisational memory and into existing theories-in-use or frames of references. Therefore it is a prerequisite to question existing theories in use and to reflect on the assumptions that are guiding peoples everyday behavior in the organization and to modify these assumptions according to new insights. With respect to important issues such as the core business strategy it may be useful to check and question these assumptions frequently or at least if the outcomes show a significant deviation from expected developments. In some business areas it may make sense to promote the development of alternative paradigms or paradoxes (Handy 1995 , 1997) in order to invent new futures for the organization (see also Galer on scenario-planning in this volume). Finally, in some cases even though new knowledge seems plausible, assumptions and routines are not modified according to new insights, either because there are blockages such as fear of committing faults or because possibly the existing incentive system in the organization does not reward innovativeness. Maybe the members of the organization, teams and the organization as a whole might have adopted new knowledge but this does not lead to behavioral consequences. Attitudes may have changed, teams may have developed new insights and the organization has proclaimed new standard operating procedures, but people do not behave accordingly. Here organizational defenses and a culture of resistance may be the reason and management should question the implicit norms that people act on.

5. Conclusion

Looking at the initial question, which solutions management science can offer practitioners in order to cope with the challenges of information society, what can be said? Starting with the general conception of organizational change in management literature we looked into the contributions on organizational learning and derived five distinct theoretical perspectives on organizational learning: the decision-making perspective, the system-theory perspective, the cognitive perspective, the culture perspective and the action learning perspective. Besides the differences in theoretical foundations of these perspectives there are a number of conceptual similarities that reappear in most perspectives and make up the core architecture of a conceptual model on organizational learning. By projecting the different theoretical assumptions on this conceptual framework it is possible to outline the relevant dimensions for the management of organizational learning. Management of organizational learning thus should take focus on - system levels, learning modes, learning types and learning phases - by adopting a systems-thinking view on learning, by considering different learning modes, such as cognitive, cultural and action learning, by selecting appropriate learning types that are useful under different learning circumstances and by managing the learning processes in organizations, taking into account different blockades and pitfalls of learning along the process.

With regard to the scientific development of management science the discipline has clearly started to recognize the new territory of the information and knowledge society. The contributions also show that there are quite a few assumptions on ways to move in this new environment. But although these directing guidelines are grounded in a rudimentary theoretical framework there is hardly any empirical evidence, that gives us confidence that the direction taken and the decisions made according to these new rules contribute significantly to organizational success. Therefore besides refining the conceptions of organizational knowledge systems and knowledge processes in organizations, research is needed on the relevance of learning processes and knowledge for economic success. Currently there is a great variety of assumptions about the determining factors of organizational learning but almost no knowledge about the effects or consequences for organizations. The dependent variables of our models on organizational learning clearly need more attention in order to understand the economic necessity and value of learning and knowing that we are so convinced about.

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