

Managing knowledge and action in organizations; towards a behavioral theory of organizational learning

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Abstract: current theories of organizational learning tend to concentrate on the mental states of organization members. Knowledge management is a good example in case. In this article a number of objections are raised against this emphasis on mental variables, elaborated in a critical analysis of the concept of knowledge management. As an alternative, a behavioral theory of organizational learning is presented, based on the work of Bateson, Weick and Skinner. Central concepts in this theory are proto-learning and deutero-learning, which are outlined in general terms and applied to organization and management.

I. Introduction

In organizational theory and research the concept of organizational learning has gradually but unmistakably acquired a firmly established status (Miner & Mezias 1996). However, with the increasing currency of the concept, there has also been a sharp growth in the number and variety of conceptualizations, producing a “more and more dense and impenetrable organizational learning jungle” (Huysman 2000: 81). While conceptual proliferation may to some extent be an inevitable phenomenon in the fashion-ridden world of management, in the particular way most organization theorists conceptualize organizational learning there may be additional cause for such proliferation. Theorists predominantly consider learning in organizations to be a mental activity. Learning processes among managers and employees are mostly expressed in motivational, cognitive and attitudinal terms (e.g., Argyris & Schön 1978; Nonaka & Takeuchi 1995; Senge 1990).

The emphasis on mental states may be questioned on several grounds. First, because mental states are not directly observable, conceptualizations of such states may lead to “the temptation to create increasingly exotic mediating processes” (Weick 1991: 122). In fact, there are no logical limits to the number and nature of mental variables scientists may invent¹. Further, mental explanations of organizational behavior tend to lead to trivial, if not tautological statements, like ‘workers who are highly motivated, show a strong tendency to perform above average’. Finally, the link between mental state and overt behavior is usually ignored or assumed to be automatic in nature. However, in those psychological experiments in which the overt behavior has been observed independently from attitudes and cognitions, the correlations between mental variables and observed behavior were practically zero. This fact has been cogently illustrated in the ‘obedience to authority’ studies (Milgram 1974), the ‘simulated prison’ experiment (Haney et al. 1973) and the experiments on the effects of group pressures upon the modification and distortion of judgments (Asch 1952).

As an alternative to mental explanations, Karl Weick (1969: 32) has proposed to base organizational theory on observable behaviors:

Unless a concept refers to something that can be observed, one can never know whether a property is present or absent and in what amount. The only way to understand any thing is to watch it, and this means we have to know what 'it' is. Thus it is crucial that the terms used... refer to observables. An individual and his actions *are* observable. Thus, if group properties can be defined in terms of observable individual behaviors, there is a better chance that empirical research on groups can be made cumulative.

Weick adds that individual behaviors in organizations must be viewed as interdependent, i.e. in terms of interaction rather than individual action. The most important variables in organization theory are contingent response patterns (or double interacts).

In this paper I intend to formulate a theory of organizational learning along the lines Weick has formulated. As a first step, I will elaborate my critique of mental variables by critically analyzing current theories of knowledge management (section II). As a next step, in section III, I will present an outline of a behavioral theory of organizational learning, in both general terms and applied to organization and management. Finally, a summary and discussion is provided (section IV).

II. Knowledge management: a critical analysis

Knowledge management is generally regarded as one of the most important theoretical and practical developments of the last decades. To survive in this age of stiffening competition, globalization and information, knowledge may be a critical success factor for thriving companies and organizations. The companies that succeed in mobilizing, organizing and increasing their knowledge are generally believed to be the ones most likely to survive in the long run. However, the conceptualization of knowledge management is not without problems. In this section I identify and discuss two of these problems. First, definitions and theories of knowledge tend to be couched in vague and general terms. Second, knowledge is difficult to observe as an empirical phenomenon.

In the literature on knowledge management different definitions of knowledge may be found. Probably the most authoritative definition is provided by Nonaka, who defines knowledge as "justified true belief". He distinguishes between "explicit" knowledge and "tacit" knowledge. The first form of knowledge is formal, systematic and easily communicated and shared among individuals. Examples are product specifications, scientific formulae and computer programs. The second form, however, is highly personal, difficult to formalize and hard to communicate to others. Nonaka further distinguishes two dimensions of tacit knowledge: a technical dimension, consisting of skills and know-how, and a cognitive dimension, consisting of mental models, beliefs, values and perceptions (Nonaka 1991: 98; Nonaka & Takeuchi 1995; Nonaka & Konno 1998).

Davenport and his co-workers are less determined about their definitions. They offer a tentative, working definition of knowledge: "knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the mind of knowers. In organizations, it often becomes embedded not only

in documents or repositories but also in organizational routines, processes, practices and norms". As key components of knowledge they regard experience, complexity, judgment, rules of thumb, intuition, values and beliefs (Davenport & Prusak 1998: 5ff; Davenport et al. 1996; Marsick & Watkins 1999).

The Dutch management scientist Weggemans regards knowledge as a critical production factor on the same level as labor and capital. Knowledge as such is a property of individuals and defined as "a (personal) capability that should be regarded as the product of information, experience, skills and attitudes a person possesses at a given moment: $K = I \cdot ESA$ " (Weggemans 1997: 34; translation MV). The I (information) corresponds to explicit knowledge, while the ESA (experience, skills and attitudes) constitute the more implicit, tacit dimension of knowledge.

When reviewing the various definitions of knowledge, it may be concluded that they are not only different from one another, but also that they are formulated in quite broad and general terms. One gains the impression that all concepts, used in psychology to characterize mental processes (like intuition, beliefs, values, perceptions, judgment, attitudes, etc.), are part of the concept of knowledge. When combining these definitions, knowledge would refer to almost every possible human mental state! Obviously, these general and unspecified definitions do not help much in researching or managing knowledge in organizations.

The broad and vague nature of definitions of knowledge may result from the second problem to be discussed in this section, i.e. the fact that knowledge as an empirical phenomenon is difficult to observe.

In general the authors on knowledge management argue that knowledge may appear in two forms. In its first, explicit form, knowledge may be observed in manuals, information systems, computer programs and product specifications, all the physical embodiments to which Zack (1999) refers as 'knowledge management architecture'. Through these systems knowledge is being codified for further use and application in organizations.

Various authors, however, argue that knowledge should not be solely regarded as a physical object. Nonaka (1991), for example, views such an approach to knowledge as typical for the Western management culture, in which quantitative data, formal procedures and universal principles play a central role. Instead, Nonaka (1991: 97) argues, "[knowledge management] depends on tapping the tacit and often highly subjective insights, intuitions and hunches of employees." Fahey & Prusak (1998) even consider it a 'deadly sin of knowledge management' to see knowledge as a stock, as something that exists predominantly outside the heads of individuals.

In this second, tacit form, knowledge may be observed in behavior. Almost all authors emphasize the close connection between knowledge and behavior. Knowing and acting are seen as closely intertwined. Often a causal connection is being hypothesized between the two: knowledge directs behavior through cognitive models (Blackler 1995; Davenport & Prusak 1998; Nonaka 1991; Nonaka & Takeuchi 1995; Nonaka & Konno 1998; Weggeman 1997; Zack 1999).

In an empirical sense, the existence of tacit knowledge is determined indirectly, i.e. as a function of observable behavior. By imitating the behavior of a person or by ob-

servicing the course and results of his or her actions one acquires information about the knowledge that person possess. However, on this empirical base it cannot be scientifically determined that knowledge causes or directs behavior. The reverse may as well be correct, i.e. that knowledge constitutes a reflection, a mental correlate of the behavior performed. Referring to experimental evidence by Bem (1972), Weick (1979: 92) has observed that "...meaning is often retrospective, not prospective. Actions occur for any of several reasons, and only when the actions are completed is it possible for a person to review them and know what decision was made or what intention was present." We emit a certain behavior and only afterwards we attribute a meaning or label to it.

III. Towards a behavioral theory of organizational learning

The theory I propose is largely based on the work of the English anthropologist Gregory Bateson, with some additional insights from B.F. Skinner's behavior analysis and Weick's theory of organizing. It takes its starting point in Weick's (1969: 33) proposal to base organizational science on observable (inter)actions:

Given that interdependence is the crucial element from which a theory of organizations is built, *interacts* rather than acts are the crucial variables that must be specified. The unit of analysis is contingent response patterns,... in which an action by actor A evokes a specific response in actor B which is then responded to by actor A. This is the pattern designated [as] a 'double interact'.

In the theory proposed here I wish to clarify the nature of contingent response patterns by specifying the contingencies of reinforcement, inherent in any interaction and subject of *proto-learning* by the interactants. Further, I intend to extend the notion of double interact by pointing to the patterns in these contingencies, which are *deutero-learned* by participants in interactions.

The terms proto-learning and deutero-learning were first coined by Bateson in a number of papers between 1942 and 1969 (mainly collected in Bateson 1972). In his thinking on learning, Bateson adopts the ground rule that all biological systems (organisms and their social or ecological organizations) are capable of adaptive change. Such change depends upon feedback loops, provided by natural selection and by individual reinforcement. Inherent in these loops is always trial-and-error and a mechanism of comparison. Trial necessarily involves some error, which is biologically and psychologically expensive. It follows that adaptive change always must be hierarchic. Since such change involves learning, it also follows that learning must be hierarchic. Learning processes can be ordered at different levels, of which Bateson distinguishes four. For the purpose of this article, two levels are especially relevant: proto-learning and deutero-learning².

Proto-learning

Proto-learning (alternatively named simple learning, operational learning or learning I by Bateson) may be defined as the adaptation of behavior in response to contingencies of reinforcement. This learning occurs in all classic and instrumental conditioning experiments inside and outside the psychological laboratories.

Fundamental in these experiments is the distinction between two forms of behavior: respondent and operant. Respondent behavior occurs as a direct response to a definite stimulus, either conditioned or unconditioned. It is reflexive in nature, to the extent that the response invariably appears after administering the (unconditioned) stimulus. For example, the sight of meat powder makes Pavlov's dog salivate automatically. When other stimuli are consistently administered together with the unconditioned stimulus, they will in time evoke an identical response. When the offering of meat powder (unconditioned stimulus) is consistently accompanied by the ringing of a bell (conditioned stimulus), the dog will after some time salivate after hearing the bell alone. It has learned to associate the bell with the food (Pavlov 1927).

Operant behavior is non-reflexive in nature. It does not occur as a direct response to a stimulus, but it is spontaneously emitted by the organism from time to time. Operant behavior has an effect on the organism's environment, to the extent that there are consequences attached to that behavior. These consequences in their turn determine the likelihood of reoccurrence of the previously emitted behavior. When this behavior increases in frequency, the consequence is called reinforcement, of which two forms may be distinguished. Positive reinforcement increases the likelihood of an event through the presentation of some valued stimulus following a response. For example, the dog is presented food upon responding in a way desired by the experimenter. Negative reinforcement increases the likelihood of an event by removing some aversive stimulus following a response. E.g., the exposure of the dog to electric shocks or loud noises is terminated after the desired response. When the behavior decreases in frequency, the consequence is called punishment. This may involve either presenting an aversive stimulus or withdrawing an expected positive stimulus following a response (Holland & Skinner 1961; Skinner 1993).

The relation between the consequences, the stimulus upon which a response occurs and the response itself is regarded as probabilistic or contingent and generally referred to as the contingencies of reinforcement. In this scheme stimuli do not elicit responses. Instead they control responses by signaling to the organism that a certain response-reinforcement contingency is in effect, which in the past has led to reinforcing consequences. Since these stimuli enable the organism to distinguish (or discriminate) a reinforcing situation from a non-reinforcing one, they are called discriminative stimuli. Further, the relation between response and reinforcement is also contingent, depending upon various schedules of reinforcement (Rachlin 1991).

For proto-learning to occur, it must be assumed that the context of learning can be repeated at time X and time $X + 1$. Without this assumption, all learning would be necessarily of the zero kind, i.e. fully genetically determined². To account for contextual change, Bateson (1972) introduces the term 'context marker', denoting a signal that informs an organism that context [A] of stimulus [a] is different from context [B] of stimulus [a] and therefore elicits a different response, even though the stimulus remains the same. For example, the announcement of a suicide plan is responded to differently whether it occurs in the context of a theater play or in the context of one's immediate neighborhood.

From the assumption of repeatable contexts it also follows that for every organism the sequence of life events is in some way segmented or punctuated into contexts, which

may be differentiated or equated by the organism. The distinction between stimulus, response and reinforcement in an experimental setup here attains the status of a hypothesis about how the experimental subject punctuates that sequence: “in Learning I, every item of... behavior may be stimulus, response or reinforcement according to how the total sequence of interaction is punctuated” (Bateson 1972: 292; Bateson & Jackson 1968)³.

From an *organizational* proto-learning perspective, organizations may be viewed as pervasive controlling agencies, characterized by stated goals, structured interactions and a division of tasks, specifically designed to increase the probability of goal achievement. These characteristics imply that many specialized jobs are performed by different people, whose behavior must be coordinated and controlled by various social, formal and monetary contingencies of reinforcement. Task requirements and performance rates often change over time in response to changing environmental demands facing the organization. With the possible exception of direct monetary incentives, formal contingencies (e.g., job descriptions, wage and salary schedules) mostly are not flexible enough to support such change effectively. To supplement these factors, organizations almost always create management positions (Luthans & Stajkovic 1999; Rao & Mawhinney 1991).

The task of managers consists of creating and monitoring contingencies associated with employees' job descriptions and socially mediating reinforcements to obtain compliance of employees with these job descriptions. The manager acquires a relative power position by his ability to bestow social rewards (praise, attention, recognition), natural rewards (reinforcement of less-desired activities by using more-desired activities as reward), negative reinforcements (threats of dismissal or working over time) and punishments (disapproval, neglect, isolation, scolding, etc.). Effective management requires that the manager's rate of reinforcement delivery and the rate of employee performance be positively correlated, i.e. that the employee and manager show mutual reinforcement (Rao & Mawhinney 1991; Redmon & Agnew 1991).

Deutero-learning

Deutero-learning (also referred to by Bateson as learning II, learning to learn or Gestalt learning) refers to the changes in proto-learning as a result of ‘insight’ in the structure (or class) of the situation in which proto-learning takes place. Defined more precisely, deutero-learning involves “the change in how the sequence of experience is punctuated into contexts together with changes in the use of context markers” (Bateson 1972: 293).

Deutero-learning acquires particular importance in the field of human relations. Bateson emphasizes that such relations have no ‘thing’ quality in themselves. The relationship is immanent in the exchange of messages, “the messages constitute the relationship” (Bateson 1972: 275). Here deutero-learning implies the learning of characteristic patterns of contingency, or contexts of conditioning, in a relationship.

Context in a relation is introduced in two ways. First, a message sent by one person, sets the context for a certain class of response by the other person. Second, insofar that such messages are verbal, the non-verbal signs in interaction function as a context

marker of the verbal message, therefore as a 'context of context' for the other person. This setting of contexts is inevitable in interpersonal exchange, since in interaction the categories stimulus, response and reinforcement are never 'empty'. All behavior (verbal and non-verbal) occurring between persons who are conscious of each other's presence has behavioral effects, whether intended or not. Such effects have interpersonal message value, and thus are communicative in nature. It follows that in interaction it is impossible not to behave, and therefore impossible not to communicate (Bateson 1963; Haley 1963; Watzlawick et al. 1967).

Deutero-learning in human relations implies that subjects improve their ability to deal with contexts of conditioning. For example, a person who is reared under or prolonged subject to a situation of classic conditioning will increasingly expect a world (context) in which signs of future reinforcements can be detected, but nothing can be done to influence the occurrence of reinforcement. In mental terms such a person is likely to adopt an attitude of fatalism. Such experience with earlier contingency patterns in its turn leads to a habit of acting as if all new contexts exhibit the same pattern. This habit of expecting a certain punctuation of events tends to become self-validating (and hence self-fulfilling) by promoting certain behaviors and by discouraging others (Bateson 1958; 1963; Watzlawick 1984).

It will be noted that all references to mental states can be redefined in terms of transactions between the person and his or her social and physical environment. Characteristics like fatalistic or superstitious do not exist in a vacuum, but characterize a relation between a person and somebody or something else. In such transactions one can readily discover contexts of proto-learning that bring about that deutero-learning to which the mental state refers. In relationships, stimuli, responses and reinforcements acquire meaning in contingency patterns of interaction. These patterns are defined by the participants as certain characteristics of the relation, depending upon their subjective punctuation of events. For example, when in ongoing interaction person A always provides stimuli and negative reinforcements or punishments and person B only responds to A, one could characterize the relationship between A and B in terms of dominance and dependence (Bateson 1963; 1972; Bateson & Jackson 1968).

From an *organizational* deutero-learning perspective the impossibility of not behaving and not communicating acquires special relevance. In social and organizational contexts, all behavior that is emitted in the presence of others has an effect on those others, whether intended or not. Those effects, describable in proto-learning terms as reinforcing or punishing consequences, are mutual and continuous. After some time organization members start to deutero-learn, i.e. they come to discern regularities or patterns in the numerous consequences they experience in the course of their working days. In the relation between managers and employees this organizational deutero-learning has been empirically documented in at least two forms, the 'Pygmalion' effect and the 'unwritten rules of the game'⁴.

First, following experiments in schools showing evidence of a so-called 'Pygmalion' effect, it has been researched whether raising manager expectations improves subordinate productivity. A series of field experiments in the Israeli army have tended to answer this question in the affirmative. When superiors are told that their subordinates are especially

able and qualified, they will behave more supportive, more task-oriented and more confident towards their subordinates than superiors not having this 'information', even though the 'able' subordinates are in fact picked at random from the enrollment lists. In their turn, the subordinates receiving the more supportive management approach show higher performance rates and more job satisfaction than the subordinates receiving the standard treatment. The Pygmalion-effect has been obtained for both individuals and groups, but seems to have a greater impact on men than on women (Dvir et al. 1995; Eden 1984; 1990).

A converse Pygmalion-effect is found in the 'set-up-to-fail' syndrome, in which negative manager expectations decrease employee performance. The syndrome is typically set in motion by a triggering event, either in the performance of the employee or in the attitude of the manager, which causes the latter to increase and tighten supervision of the former. The subordinate senses the lack of confidence and either starts to distance him or herself from the work situation or strenuously attempts to regain superior confidence by setting unrealistic goals and by overachieving. In both cases the manager interprets these reactions of the employee as a confirmation of earlier suspicions and further increases supervision, including even routine assignments. The manager increasingly will let his or her dissatisfaction and frustration publicly known to which the subordinate reacts with signs of insubordination and further loss of confidence. As a result, the superior now becomes convinced of his or her earlier judgments and openly and intensively controls the employee's performance. The latter in turn irrevocably withdraws him or herself from the work situation emotionally and probably also physically, by reporting sick or by leaving the organization (Manzoni & Barsoux 1998).

Both the Pygmalion-effect and the set-up-to-fail-syndrome become understandable as deuterio-learning, i.e. the learning of patterns in mutually shown behavior or interaction. For example, in the set-up-to-fail-syndrome manager and employee gradually become involved in a symmetrical pattern of interaction, in which both persons attempt to determine the definition of their relationship. The manager increasingly regards the subordinate as incompetent and defines the relation in terms of tight control and supervision. The employee increasingly views the superior as intrusive and overbearing and defines the relation in terms of dependence and distrust. Attempted solutions of the conflict on both sides have the net effect of intensifying the problems. The singular punctuations of events by the contestants operate as self-fulfilling prophecies in the conflict: the manager controls because the employee withdraws, the employee withdraws because the manager controls, and so on.

Second, deuterio-learning is involved in the learning of the 'unwritten rules of the game' (Scott-Morgan 1994). The 'written rules' of a corporation (remuneration, job descriptions, organizational charts, reporting lines, performance measures, etc.) specify formal signs of the contingencies of reinforcement that may be expected from top management. In proto-learning terms they constitute discriminative stimuli signaling possible reinforcements and punishments. It depends upon the actual behavior of the top managers (i.e. the reinforcements and punishments they actually apply in practice) in what forms these written rules will be disseminated down the organizational pyramid. If written rules and actual management practices deviate from each other or when the written rules are internally conflicting, then employees will mold from the rules and man-

agement behavior a set of parallel unwritten rules that govern their daily behavior on the work floor. This molding constitutes deuterio-learning, since the employee comes to discern patterns (or rules) in the numerous reinforcements and punishments daily meted out by the managers.

Summary and discussion

To summarize: this paper started with the observation that current theories of organizational learning tend to concentrate on the mental states of organization members. A number of objections have been raised against this emphasis on mental variables, elaborated in a critical analysis of the concept of knowledge management. As an alternative, a behavioral theory of organizational learning has been presented, based on the work of Bateson, Weick and Skinner. Central concepts in this theory are proto-learning and deuterio-learning, which were outlined in general terms and applied to organization and management.

I conclude with a short discussion. An important point, often raised in conjunction with behavioral approaches, pertains to the (non)observable status of mental variables. Most psychologists will argue that these variables are in fact made observable through the use of attitude scales, questionnaires, verbal reports and the like. From a behavioral point of view, however, a distinction must be made between the actual behavior and the verbal reports of that behavior. The reports are under the control of different environmental contingencies than the behavior they supposedly reflect, in particular of contingencies inherent in an interview or psychological test situation (Skinner 1993).

For this reason, learning processes are best studied in their natural organizational environment, in which the researcher acts as a participant observer. Although surveys are the dominant method of research nowadays, the fallibility of questionnaires and the importance of direct observation has been long recognized in the social sciences. This recognition has found a cogent formulation in the following words of an early Chicago sociologist, Eduard Lindeman (quoted in Madge 1962: 118-119), with which this paper ends:

If... you wish to know what a person is doing, by all means refrain from asking *him*. His answer is sure to be wrong not merely because he does not know what he is doing but precisely because he is answering a question and he will make the reply in terms of you and not in terms of the objective thing he really is doing... Thus,... if you wish to know what a person is *really* doing, watch him (don't ask him).

Notes

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¹ To illustrate this point, Skinner (1993: 228-229) has made the following compilation of 69 mental variables: “In the traditional mentalistic view,... a person is a member of the human species who behaves as he does because of many internal characteristics or possessions, among them sensations, habits, intelligence, opinions, dreams, personalities, moods, decisions, fantasies, skills, percepts, thoughts, virtues, intentions, abilities, instincts, daydreams, incentives, acts of will, joy, compassion, perceptual defenses, beliefs, complexes, expectancies, urges, choice, drives, ideas, responsibilities, elation, memories, needs, wisdom, wants, a death instinct, a sense of duty, sublimation, impulses, capacities, purposes, wishes, an id, repressed fears, a sense of shame, extraversion, images, knowledge, interests, information, a superego, propositions, experiences, attitudes, conflicts, meanings, reaction formation, a will to live, consciousness, anxiety, depression, fear, reason, libido, psychic energy, reminiscences, inhibitions, and mental illnesses.”

² At the bottom level Bateson posits ‘zero-learning’. Some entity shows minimal change in its response to a repeated item of sensory input. This may, for example, occur in cases of completed learning, habituation, genetically fixed responses or in simple electronic circuits. Zero-learning simply involves “the receipt of a signal... not subject to correction by trial-and-error” (Bateson 1972: 248, 287). At the fourth level Bateson proposes ‘trito-learning’, or ‘learning III’. It refers to learning about the contexts of the contexts of proto-learning. Trito-learning probably involves a profound redefinition of a person’s character, the aggregate of his past deutero-learning. Such change is mostly only attained in psychotherapy, but also may result from important reconstruction of life (courtship and marriage, initiation, etc.). Change of this kind, however, almost exclusively is dealt with at the unconscious levels and only afterwards given a rationale (Bateson 1963; 1972).

³ This point is nicely expressed in a cartoon, that shows a well-dressed laboratory rat, comfortably holding office in a Skinner box and talking on the phone to a colleague: “Oh, not bad. The light comes on, I press the bar, they write me a check. How about you?”

⁴ The attentive reader will miss references to the scientists who introduced the concept of deutero-learning in the fields of organization and policy science, Argyris & Schon (1978; Schon 1975). One reason for this omission is that they base their theory on Bateson, to which I refer directly. Another reason is that Argyris & Schon adopt a mental model of deutero-learning, whereas I propose a behavioral theory.

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