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**WHAT CAUSES ORGANIZATIONS TO LEARN?**

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## **Abstract**

Assuming that in order to foster Organizational Learning (OL), one has to supply organizations with occasions for learning, this paper undertakes a theoretical analysis of OL-causes. Assumptions contained in OL-concepts are classified and interpreted within the light of learning theory and cognition theory. Drawing upon constructivist theories of cognition, the paper shows that all assumptions can be formulated as 'differences which make differences'. In addition, a constructivist interpretation discloses that differences result from 'drawing distinctions'. Based upon these insights, strategies to improve OL are suggested and related to findings of current management research.

### **THE PROBLEM AND ITS SIGNIFICANCE**

The expectations are high: Organizational Learning (OL) is claimed to be indispensable; the "key to coping with change" (Garraat 1987a:61); at the "heart of

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organizational survival” (Garraat 1987b:38); or at least, the “only sustainable competitive advantage” (De Geus 1988:71). However, while there is widespread unanimity - among scholars as well as among practitioners - about the importance of OL, there are rather scattered views about what OL actually is, about the processes involved, and, about what makes organizations learn. Although the concept is looking back at more than thirty years of theoretical discourse<sup>1</sup>, the state of theory development resembles more a Babylonian confusion of languages, than a unified paradigm (Dodgson 1993, Fiol and Lyles 1985, Miner and Mezias 1996).

Given that, OL was an exclusively “generic” process (Huysman 1996), occurring rather naturally in every organization, all the time, the multiplicity of theoretical concepts would only be a problem with regard to analysis and explanation, i.e. a problem of science. Taking into account, however, that there are plenty of examples for organizations, which do not learn, do not learn enough, fast enough, good enough, or, which learn the wrong things, and therefore get into serious trouble (De Geus 1988:70, Dixon 1994:5), the diversity of theoretical explanations turns into a problem with regard to design, i.e. a problem of practice. The problem is, that managers have to design appropriate strategies for making their organizations learn, learn more, faster, better, the right things, while scholars cannot provide unequivocal, reliable and convincing advice.

This paper, therefore, attempts to cultivate a few acres of the ‘OL-jungle’. The territory, on which it concentrates, is outlined by the question: ‘What causes organizations to learn?’ There are two reasons, why, in our understanding, this question is fundamental with regard to the described management problem, i.e. with

regard to improving OL-performance by management interventions:

(1) OL is a systemic process. It is different from individual, management and group learning (Kim 1993:40, Shrivastava 1983). It refers to changes of the 'cognitive' basis of an organization (Argyris and Schön 1978, Fiol and Lyles 1985, Friedlander 1983), i.e. its programs and procedures, structures and strategies, traditions and norms, values and myths, which guide and instruct actions and decisions, and are preserved while members and managers come and go. Thus, the learning of individuals, managers or groups within an organization will not result in OL, unless it has consequences on the structures underlying organizational behavior. Although, the learning of an organization is mediated by the people working in it and although, structures, strategies and cultures do not change all by themselves, but are, sometimes consciously - sometimes unconsciously, changed by organization members, groups or managers, the learning of an organization is not simply the cumulative result (Hedberg 1981:6) of its members', managers', or groups' learning. In a strict, logical sense, it does not even require a foregoing learning process of employees or managers, driving the OL-process.

With regard to our problem, this means that providing organization members with new knowledge, or enhancing their individual learning capabilities through large scale educational programs, may not lead to improved OL. Increasing the learning-rate, -speed, or, -performance of an organization, instead, requires different strategies, operating at an organizational level.

(2) Learning is a self-organizing process. A process that cannot be 'managed', at least not from the outside. The very semantic meaning of the term 'learning' indicates

a process, which is organized and controlled by the entity doing it. In most languages, it is impossible to 'learn somebody something'. One can 'teach' him or her, but whether what is learned is congruent with what is taught, is more than doubtful. According to psychology, learning cannot even be observed. The process of learning happens within a learning entity and is invisible from the outside. What can be observed, are the results of learning - different behavior or different knowledge - but not the internal processes that produce them.

Concerning our problem, these considerations emphasize the futility of attempts to plan and control particular OL-processes. If 'learning' is a self-controlled, self-organized, and unobservable process, its course and its outcome cannot be designed - neither for individuals, nor for organizations.

Accepting the fact that OL cannot be directed, management strategies to improve OL must focus on designing favorable contexts, creating optimal conditions, or providing enlightened environments, in which OL is likely to happen. Therefore, one key lever must be seen in supplying organizations with occasions for learning, by stressing - not suppressing events that induce OL. This in turn, presupposes knowledge about what kinds of events these are, or in other words, about 'what causes OL'.

The purpose of this article is to contribute to a concerted understanding of the 'causes of OL'. We try to accomplish this goal by means of theoretical analysis, generalization and re-interpretation. Because OL-theories confront us with a discordant variety of assumptions about possible OL-causes, we gradually 'dig' through underlying layers of theory, to trace out common roots. Or, to put it even more pictorial: 'Flabbergasted' by the multitude of trunks within the OL-theory jungle,

we 'ascend' through the tree-tops of learning theories into the 'dizzy skies' of cognition theory, until we are able to 'see the forest for the trees'.

The article is organized into four major sections. In the first section, we put together a medley of potential OL-causes, as offered by different OL-theories. In the second section, we unfold what is supposed to cause 'learning' in general by two main lines of thinking within learning theory, and re-interpret our OL-level findings within this superior frame of reference. In the third section, we elucidate subsequent issues arising from this first step of integration, by examining them from a theory of cognition position. From that position, we further reconcile remaining divergence regarding OL-causes and formulate general propositions about 'what causes OL'. Finally, based upon these insights, we suggest directions for strategies to improve OL, in the fourth section, and relate it to findings of current management research.

#### **ORGANIZATIONAL LEARNING THEORY EXPLANATIONS**

Consulting some of the numerous OL-theories, which management literature provides, we receive almost just as many different answers to the question of 'what causes OL'.

March and Olsen (1975), for example, assume that organization members act upon individual cognitions and preferences. In sum, their actions constitute an organization's behavior. Responses by the outside world to this behavior, then, directly affect those cognitions and preferences, bringing forth different individual, and as a consequence, collective behavior. In this approach, OL means the adaptation of

an organization's behavior to its environment and is caused by individual experience of *environmental responses* on organizational actions.

Duncan and Weiss (1979) assume that OL means more than simple aggregation of individual learning, namely a process of growth or change of a specific organizational knowledge base. This process is stimulated by *performance gaps*, which the authors define as discrepancies between how the organization is performing and how it should be performing, in the eyes of its decision makers. Performance gaps indicate failures in the existing organizational knowledge base and stimulate a search for new knowledge that helps to reduce the gap.

Within the conceptual framework of Argyris and Schön (1978), organization members act upon an organizational theory-of-action with expectations of outcomes, that are either confirmed or disconfirmed by their subsequent experience. Mismatches of outcome to expectation indicate *errors* in the underlying theory-of-action. OL occurs when organization members, as a consequence, search, detect and correct these errors. In line with our assumptions regarding management strategies for improving OL, Argyris (1990) sees the key lever for facilitating OL in overcoming behavioral patterns that are used to coat errors within the organizational theory-of-action. Only when they are admitted and dragged into the light, and not covered by organizational defenses, such as 'skilled incompetence', 'defensive routines', and 'fancy footwork' (Argyris 1990:64), errors can stimulate OL-processes.

Summing up these first three encounters, one can say that, although varying with regard to their assumptions about 'what' is changed by OL ('individual cognitions' vs.



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‘organizational knowledge’) and the degree of consciousness, which is ascribed to OL-processes (‘affect’ vs. ‘search’), all of the above three concepts focus on *experience* as the ultimate cause of OL.

In a very early work, Cangelosi and Dill (1965) view OL “as a series of interactions between adaptation at the individual or subgroup level and adaptation at the organizational level” (Cangelosi and Dill 1965:200). They suppose that individual and subgroup adaptation produce divergence and conflict, which they call *disjunctive stress*. When this disjunctive stress passes beyond certain tolerance levels, it is likely to trigger total-system learning. The release mechanism for OL, thus, is a kind of intra-organizational conflict, arising from contrary courses of adaptation.

This assumption corresponds with Huff’s and Chappell’s (1994) view that OL results from the effective solution of *conflicts*. In contrast to Cangelosi and Dill, however, Huff and Chappell suppose that the conflicts in question arise from different parties’ different political interests. This is also similar to Kim’s (1993) assessment, that OL, which he regards as the development of “new shared mental models” (Kim 1993:44), requires *discrepancies* between individual and shared mental models, that have their origin in individual learning processes.

To sum up, one can say that, regardless of whether they name it ‘stress’, ‘opposing interests’, or ‘discrepancies’ of views, all of these three approaches definitely refer to some sort of *conflict* as the ultimate trigger of OL.

Proposing a model of organizations as interpretation systems, Daft and Weick (1984)

build up on the assumption that organizations are social systems, processing information from their environment. They seek information about trends, events, competitors, markets, and technological developments relevant to their survival and then base organizational action on that information. Although the authors do not explicitly make use of the term 'OL', they implicitly equal the entire process of information processing to it, when arguing that three stages "constitute the overall learning process" (Daft and Weick 1984:286) of an organization: The first stage, 'scanning', is defined as the process of monitoring the environment and providing environmental data. The second stage, 'interpretation', gives meaning to data and is defined as the process of translating events and developing shared understanding. The process is completed, at a third stage, by 'learning' (in a narrower sense), which in addition involves taking new actions based on the interpretations.

Quite similar, Dixon (1994) conceives OL as a process, by which organizations gain new understanding or correct current understanding, i.e. as a dynamic process of constructing and reconstructing meaning. She claims that OL-processes must be viewed as cycles consisting of (1) the generation of information, (2) the integration of the information into the organizational context, (3) the collective interpretation of the information and (4) the authorization to take action based on the resulting meaning.

Summing up once more, we can now identify a third category of OL-concepts (including Daft and Huber 1987, Huber 1991), which, by applying an information processing view of learning, assume OL to be 'kicked-off' by new *information*. Unfortunately, these approaches are not very specific about which kind of information is important for OL and which is not.

Peter Senge's (1990) design oriented work on learning organizations contains yet another possible trigger for OL. He assumes that the basic meaning of a learning organization is - "an organization that is continually expanding its capacity to create" (Senge 1990:14). The energy to create, he later argues, emanates from a gap - called 'creative tension' - between a company's vision and the reality it faces. The driving force of OL, therefore, is constituted by a shared *vision*, which an organization strives to put into reality.

It is interesting, that an empirical exploration of OL-processes, by Klimecki and Lassleben (1998), found evidence that both - *visions and problems* (the later used as a collective term for negative experience, e.g. 'performance gaps' or 'errors') operate as triggers for OL. Operationalizing OL as changes of the reality constructions, that are shared among organization members and serve as a basis for their actions (similarly Kim 1993), the authors could trace that a prevalent occupation with 'problems' favors the development of new shared insights about an organization's structures, while in the presence of a 'vision', a new collective thinking about strategic issues is likely to build up. In both cases, however, it is OL, which is taking place. As the observed processes differ with regard to spur as well as course as well as result, the authors claim to have uncovered two different 'modes of OL' (Klimecki and Lassleben 1998).

Far from being comprehensive, this brief analysis of some literatures demonstrates that there is no common understanding of the causes of OL. Instead, the assumptions are manifold. Even after a first plausibilistic classification, at least four

different categories of OL-causes remain: experience, conflict, information and vision. Undoubtedly, this 'state-of-the-art' of OL-theory provides only tottering ground to derive improvement strategies, which aim, as suggested before, on providing an organization with occasions for learning. The chance to find one's way through this jungle seems even poorer, when taking into account that: (1) In lack of empirical research, there is no evidence to determine which one, or two, or even more of the above listed causes, in deed and in practice give momentum to the learning of an organization. (2) At least an OL-theory confined analysis, evidently fails to unveil further interdependencies or commonalties between the four categories of causes. (3) Not knowing from which theoretical sources the assumptions about OL-triggers have been obtained, one cannot even judge whether the above enumeration is complete, i.e. whether or not, there are still other reasons that might cause an organization to learn.

To receive answers on those open issues and to further consolidate the four categories of causes, it seems befitting, to dig one layer deeper, i.e. to consult the home discipline of learning, psychology, to see what is supposed to cause learning in general.

#### **LEARNING THEORY EXPLANATIONS**

Unfortunately, in the absence of a unified theory of learning, psychology, too, cannot provide unequivocal answers. Instead, we encounter a variety of learning theories (for an overview see e.g. Biehler and Snowman 1986, Bower and Hilgard 1981, Lefrancois 1982), attempting to systematize and organize knowledge about learning.

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Some of them build up on, and incorporate, earlier ones. Others reject preceding ones and introduce different views, including different assumptions about the causes of learning. Complexity can be reduced, however, by discerning - as psychology does itself (Greeno 1980, Shuell 1986) - two main streams of learning theories:

(1) Behaviorist learning theories conceive learning as the establishment of new stimulus-response links. Putting aside what happens within the learning organism, they directly relate (explain) behavioral responses to (by) environmental stimuli. In this view, learning manifests itself as a change of behavior, behavioral repertoire or probability of behavior.

In principle, four different stimulus-response constellations are imaginable (Weick 1991): (a) When a same stimulus leads to a same response, there is no learning. (b) When a same stimulus leads to a different, normally improved, response, learning happens. It is typically expressed by the so-called 'learning-curve effect' and caused by skill development through 'repeated exercise'. (c) When a different (new) stimulus gets connected to a same, i.e. well-known behavioral response, there is also learning. This kind of learning is called 'classical conditioning' and caused by 'contiguity': A locally, temporally, logically or otherwise neighboring stimulus substitutes the original stimulus of a well-established stimulus-response chain. When this learning happens, successful behavior is transferred to new but similar situations. Finally, learning is also, (d) when a different (new) stimulus gets plugged into a different (new) response. This, by far most complex form of learning, is covered by the term 'operant conditioning', follows a try-and-error course, and is caused by 'contingency': Facing a new situation, a learner tries out new behavior, i.e. experiments. This behavior effects reactions in the environment, which feed back into the learner. If feedback is positive,

the stimulus-response association is strengthened. If feedback is negative, the stimulus-response bond is weakened, or ultimately extinguished. Subsequently, behavior is changed by new tries, until the intended results turn up.

In all of these cases, learning is necessarily bound to, i.e. released by, *experience*: According to behaviorist learning theories, one has to (b) undergo some exercise, (c) live through some contiguities, or, (d) suffer some punishment respectively enjoy some reward, in order to learn. Learning is, therefore, inevitably reactive and adaptive, as it is a function of preceding behavior and environmental stimuli.

Because OL is expected to enable organizations to better cope with changes in their environment, learning types (c) and (d) are of particular interest. The coping strategies they imply: (c) try out behavior that has proved successful in similar situations, and (d) try out any behavior and learn from what happens, i.e. particularly from errors, are certainly not very telling - especially to practitioners - as they are quite risky. It is, therefore, not surprising that only few OL-theories overtly refer to a behaviorist understanding of learning (March and Olsen 1975, Levinthal 1991, Lounamaa and March 1987), and that those who do, necessarily conclude that "learning is generally incremental" (Miner and Mezias 1996:88). Otherwise it would simply be too hazardous.

(2) The vast majority of OL-theories, in contrast, refers to cognitive learning theories. The main difference between behaviorist and cognitive comprehensions of learning is, that the latter conceive learning to transform knowledge, not behavior<sup>2</sup>. According to cognitive psychology, purposeful actions of a person rest on his/her image of him-

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/herself in his/her environment, i.e. on his/her knowledge. In this view, behavior is not controlled by environmental stimuli, but by "what is in the head" (Bolles 1978:192) - by images or plans, maps or schemes, or generally spoken, by cognitive structures and processes. Accordingly, cognitive learning theories commonly assume that learning refers to changes of the cognitive basis of action - that what is learned is knowledge and not behavior. Changes of behavior, then, are possible but not necessary outcomes of learning, while, on the other hand, learning is a indispensable condition for behavioral changes (Stevenson 1983:214).

The governing model for comprehending processes of knowledge change, i.e. learning, is one of information processing, and can be described in terms of (a) input, (b) computation, and (c) output: An organism receives (a) information from its environment. The received information is interpreted (b), that means, it is integrated into an existing body of knowledge - combined with information that is already at hand. The result of this 'computation' is stored in some sort of memory, and can be retrieved (c), on occasion to design purposeful actions. From a cognitive viewpoint, the process of learning is thus tantamount to information processing. The only peculiarity distinguishing the two is, that 'learning' is reserved for information processes, which leave a mark on knowledge: Learning enlarges (adds new), diminishes (removes wrong), or, alters (replaces existing) given knowledge - in short: it makes a difference with regard to knowledge.

Concerning our research question, we can now substantiate that, from a cognitive perspective - due to the underlying model of information processing - learning is always caused by *information*, which is 'put in' to a learning, i.e. information processing system. Primarily based upon that shift - from 'experience' to 'information'

as main source of learning - the scope of learning is extensively widened: Learning is 'freed' from the tight linkage to experience and 'opened' for processes of insight. It is allowed to be anticipatory (processing forecasts) as well as reactive; creative (processing 'ideas') as well as adaptive; fundamental (overthrowing large areas of knowledge)<sup>3</sup> as well as incremental.

Regarding the expectations that are tied to OL - enable an organization to cope with changing environments - it is certainly attractive and seductive to think of a 'way of learning', which does not require to make errors first; especially as in economic contexts making errors always means losing money. It should not be surprising, therefore, that the majority of OL-theories applies a cognitive notion of learning, when developing their concepts of OL. The problem is, however, that in doing so, they either end up with a cognitive reformulating of experiential learning (Argyris and Schön 1978, Duncan and Weiss 1979), or, with a description of OL - so broad, that it can hardly be distinguished from information processing in general (Daft and Weick 1984, Daft and Huber 1987, Dixon 1994, Huber 1991). What is needed, in our view, is an OL-theoretical framework, that goes beyond 'learning from experience' - yet remains specific about learning. An identification of the elementary causes, which provoke an organization to learn, could provide a building block for such an undertaking.

In addition to the prospect of delineating OL as an insight-based - instead of only error-based - process, there are at least two more reasons which let us, too, pursue the cognitive path on our further investigation into the causes of OL:



(1) Considering OL to be a genuinely systemic process and not simply the cumulative result of individual learning processes, it is certainly more auspicious to build on a model of organizations as information processing systems, than to search for some kind of organizational analogy to a nerve center, where incoming stimuli are plugged into available responses. Capitulating ahead of this dilemma, OL-theories, committed to a behaviorist notion of learning, cannot but devise OL as a secondary effect of the learning of organization members (March and Olsen 1975).

(2) Even avoiding a detailed discussion of the assessment, that the disagreement between behaviorist and cognitive explanations marks a paradigm shift within learning theory, it can easily be seen that the cognitive approach is of an extended explanatory capacity: It does not reject the possibility of learning from experience, but is able to incorporate it (learning from information about the consequences of one's own actions), while allowing for other forms and sources of learning as well. 'Observational learning', for example, can be interpreted as learning from information about other people's practices and experiences<sup>4</sup>, 'inferential learning' as learning from information which is itself the outcome of combining other 'bits' of information, and, 'generative learning' as learning from information which is provided by imagination, not reality.

Looking down from this learning theoretical tree-top on our OL-theoretical findings, we can consolidate the four categories of OL-causes into two, by subsuming experience and vision as unlike 'sisters' under the 'parental' category of information. That both are legitimate children is certified by the OL-authors themselves: When Argyris and Schön (1978) claim that *information* about errors guides the rebuilding of an

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organization's cognitive basis, they provide a perfect cognitive re-interpretation of learning from (negative) experience. And, when Senge (1990) alleges that the creative shift of the corporate mind is *informed* by its shared vision, he spells the idea of 'generative learning' in cognitive letters and transfers it to an organizational setting. Despite this family-reunion, however, one 'orphan' is still standing apart: 'conflict'. It cannot be seen how, without violation, 'learning from conflict' can meaningfully be integrated into a cognitive learning framework as another type of learning, caused by another kind of information. This means, we are still left with at least two categories of assumptions about the causes of OL. Furthermore, we are still not able to judge whether the newly arranged compilation is complete. The problem has, at best, been transferred, but not resolved. The question now is: 'What kinds of information are especially relevant for OL'? Information about errors (Argyris and Schön 1978) or performance gaps (Duncan and Weiss 1979)?; information contained in a company's vision (Senge 1990)?; information about an industry's best practices (Garvin 1993)?; information about trends, events, competitors, markets, technological developments (Daft and Weick 1984)?; other, different kinds of information?; or, even, any kind of information, that finds its way into the organization (Daft and Huber 1987)? Finally, reflecting upon the provisional answer to our research question (that it is information which causes OL), on the background of the underlying problem (strategies to improve OL), more and new questions arise. They are, for example: (1) What can be done to make sure, that the relevant information gets into the organization, and (2) What can be done to make sure, that this information is correctly processed.

To achieve some more clarity about those open issues, we continue our investigation, and dig one layer beneath 'cognitive learning theories' into 'theories of cognition',

expecting to gain some insights there on the essence of information, its generation and processing, and its relevance to knowledge and learning.

### **THEORY OF COGNITION EXPLANATIONS**

Upon engaging with theories of cognition, we are again confronted with two opposing parties:

In traditional epistemological approaches, and in every-day understanding, *knowledge* is seen as a 'reflection' - a 'mirror' of an external, objective reality. It is composed of information. *Information* denotes messages, which describe conditions of the world. It is treated like a substance or a commodity. It can be 'collected', 'processed', 'stored', 'transferred', even 'traded'. To acquire knowledge, information from 'outside' must somehow - through the senses or by way of communication - get into the knowing subject, where it has to be arranged, by means of *learning*, into configurations, i.e. models, which correspond to the outside world (Heylighen 1995, Varela, Thompson and Rosch 1992:133ff, von Krogh, Roos and Slocum 1994:59f).

To put it more figurative, one can compare knowledge, in this understanding, to a completed 'puzzle', displaying a correct portrait of the world, or at least, of a section of it. Bits of information act as puzzle pieces, which together yield the complete picture. Learning, then, means nothing more than puzzling, i.e. putting the pieces together, so as to form a true copy of reality. Because the pieces are 'input' from outside, and, because there is only one correct way in which they fit together, this approach suggests an 'instructionist' view of learning (Heylighen 1995).

This reflectionist view of knowledge shines through the information-centered OL-concepts of Daft and Weick (1984), Daft and Huber (1987) and Huber (1991). It is almost perfectly expressed in their demand, that organizations have to 'scan' environments for trends, events, competitors, markets, and technological developments (Daft and Weick 1984:285). On following this notion of information, two issues turn up: The first concerns its practical consequences, the second its integrative capacity: Concerning practicability, one may justifiably warn that a reflectionist position does not provide criteria for an organization to determine, which information is relevant, and which not. Accepting that environments of organizations are getting ever more interconnected and complex, one can easily imagine that an 'at random' collection, without pre-selection, of information can easily yield an information 'overkill' ('the puzzler being drowned by puzzle-pieces'). Whether Huber's (1991) and Daft and Huber's (1987) solution to this problem, i.e. increasing the information processing power of the organization, suffices to master the dilemma, can, at least, be questioned. The second issue concerns this paper's efforts to unite assumptions about OL-causes. Even, if we re-interpret errors and performance gaps as 'indicators' of wrong or outdated puzzle-pieces, stimulating re-sensing and subsequent replacement, and, if we 'bend' visions and benchmarks to broad versus narrow 'search criteria' for OL-relevant information, we find ourselves still not able to integrate conflict, stress and divergence. Induced by this 'performance gap', we turn towards another 'information about information':

Constructivist approaches towards cognition assume that *knowledge* is a 'construction' of reality, i.e. an 'invention' of a cognizing subject (von Foerster 1984a,

Watzlawick 1984). This invention, however, is the only possible cognitive basis of a person's world view and actions. As there is no perception or understanding, independent of the perceiving or understanding subject, it can never be known, whether one's knowledge of reality matches 'true' reality. We can, at best, experience that it 'fits' reality in that it allows the successful execution of purposeful actions (Ford and Backoff 1988:53, von Glasersfeld 1984, von Glasersfeld and Cobb 1983). Accordingly, constructivist reasoning also objects the idea, that information is 'input' (Maturana and Varela 1980). In contrast, cognitive systems are presumed to be informationally closed. Hence, *information*, must not be seen as a cargo, taken in from the outside, but as a systemic product. According to Heinz von Foerster (1984b), information is a process - "the process by which knowledge is acquired" (von Foerster 1984b:19). This, in turn, implies that it is identical to what we commonly understand by *learning*; and, not enough, also to the process of cognition, at least in many constructivist theories. As our research interest is aimed at the causes of learning, and as our preliminary results revealed that information plays an important role thereby, we can, however, not be satisfied with this 'hotchpotch', but have to insist on some further elucidation.

Constructivist approaches, in general, find it hard to locate 'information' within their explanatory systems. Usually, they get along without 'information' (Maturana 1986:4)<sup>5</sup> in building theoretical frameworks of cognitive development, i.e. knowledge construction. On the one hand, this certainly has to do with the fact that the term 'information' is almost indissolubly connected to an instructionist input-output device. On the other hand, it is typical for constructivists to explain the results of cognition, i.e. knowledge, solely (if not 'solipsistically') by the process of cognition.

There are, however, routes, that do not require to throw 'information' onto the 'dung-hill' of theory history, but instead, are able to recycle it in a constructivist form. One such way is shown by Gregory Bateson (1981). According to Bateson, "what we mean by information - the elementary unit of information - is a difference which makes a difference" (Bateson 1981:453). One could also say: a significant, i.e. consequential, meaningful difference. It is important to note that only this coupling of two differences constitutes the process of information. Lacking one, there is no information. To repeat it: 'Information' is a two-stroke process (Baecker 1996:65): a difference (1st stroke) which makes a difference (2nd stroke).

What this re-definition of information implies, regarding knowledge construction, can, at best, be illustrated by an example provided by Bateson. To grasp the implications of the example, we have to recall, that cognitive (knowledge) structures of humans - in management contexts, particularly: managers - but also organizations, are often compared to 'maps' (Langfield-Smith 1992, Weick and Bougon 1986). In his example, Bateson asks:

“‘What is it in the territory that gets onto the map?’ We know, the territory does not get onto the map. That is the central point about which we here all agreed. Now, if the territory were uniform, nothing would get onto the map except its boundaries, which are the points at which it ceases to be uniform against some larger matrix. What gets onto the map, in fact, is difference, be it a difference in altitude, a difference in vegetation, a difference in population structure, difference in surface, or whatever.

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Differences are the things that get onto a map.” (Bateson 1981:451)

It are differences (1st stroke), that spur a cartographer to make differences (2nd stroke), i.e. to paint some spots of the map blue (water) and some not (land); some spots red (settlements) and some not (wasteland); some spots green (valleys) and some not (mountains); and so on. Transferred to knowledge and learning, this is to say: It are differences in what we observe (1st stroke), which make a difference to what we know (2nd stroke): It are differences, which cause us to learn! (assuming that ‘learning’ refers to ‘changes’ of knowledge, and assuming that what we call ‘change’ is “difference which occurs across time”; Bateson 1981:452). All things being equal, no differences in space and/or time, the whole universe, a single, infinite black hole, ever since - nothing could be known and nothing could be learned!

Back to earth, we are now able to re-arrange all of the remaining (having farewelled the behaviorist version of experience and the representationalist version of information) assumptions about OL-causes: As will be seen, all of them can be brought into the form of a ‘difference making a difference’:

When Argyris and Schön (1978) affirm that errors cause OL, they indicate that differences between expectations and outcomes of organizational actions make a difference to the organizational theory-of-action. When Duncan and Weiss (1979) affirm that performance gaps cause OL, they indicate that differences between an organization’s targeted and actual performance make a difference to its knowledge base. When Senge (1990) affirms that shared visions cause OL, he indicates that differences between the aspired and the actual condition of an organization make a difference to the corporate mind. When Garvin (1993) affirms that benchmarking is an

appropriate tool for OL, he indicates that differences between an organization's practices and its competitors' practices make a difference to organizational procedures. When Cangelosi and Dill (1965) affirm that disjunctive stress releases total-system learning, they indicate that differences between organizational groups' ways of doing things make a difference to the organization's course of action. When Huff and Chappell (1994) affirm that party politics contribute to OL, they indicate that differences of interests make a difference to an organization's positions. And, when Kim (1993) affirms that divergence between individual and organizational mental models causes OL, he indicates that differences between individual and collective worldviews make a difference to organizationally shared reality constructions.

To prevent misinterpretations: This is not to say, that (these) differences always make differences, i.e. always cause learning. There are, quite sure, more examples for instances, where knowledge is untouched by differences, where differences between expectation and outcome, targeted and actual performance, aspired and actual condition, and so on, do not result in changes of organizational procedures, courses of action, positions, and so forth. But then, there is no learning, too! All of the above statements about 'differences making differences' refer to successful OL-processes. So, what we say is, that if an organization's theory-of-action, its knowledge base or reality constructions change due to learning - it always starts with a difference. Of course, it would be serviceable, to study what it is, that prevents differences from making differences, that obstructs construction, that thwarts organizations from learning. Certainly not without reason, each of the cited OL-theories provides statements about OL-impediments and how they can be dealt with. In doing so, they investigate the 'conditions of OL', the circumstances under which differences are



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likely to make differences. As we, however, have set out to examine the 'causes of OL', we will not join their inquiry of how 'differences *make* differences' but uphold emphasis on the 1st stroke, i.e. on the '*differences* which make differences':

Ensuing a constructivist turn on information - as 'differences which make differences' - we have now identified a common denominator for the majority of assumptions about OL-causes. Yet, we have but passed half the turn. We still do not know, which state of affairs 'differences' denominate, i.e. what exactly 'differences' are, so that they can make differences, i.e. cause learning. This is especially important, as, within a constructivist frame of reference, we must exclude that differences 'represent' some truly given 'unlikeness', or some objective "degree or amount by which things differ in quantity or measure" (Webster's 1995:280). But, what then, are differences?

In order to find an answer to this question, and, to complete the constructivist recycling of information, we return to another ancestor of constructivist thinking: George Spencer Brown. His work "Laws of Form" (Spencer Brown 1969) starts with the request: "Draw a distinction" (Spencer Brown 1969:3). Drawing distinctions, Spencer Brown declares, is THE form of construction, i.e. the basic form-building, i.e. in-forming operation (Luhmann 1995:167). Its result is a 'difference' which then can make a difference to the one who draws the distinction. Without drawing distinctions, there are no differences, and hence, there is no information; without drawing distinctions, the world would seem "like shifting sand beneath our feet" (Spencer Brown 1969:v). It is upon this reframing, that the system, instead of the environment, becomes author of information, as drawing distinctions is an act that can only be performed by an observing system. Information, thus, finally converts into an intra-systemic

accomplishment, and learning to 'construction' instead of 'instruction'. Following this constructivist redesign, we understand that one must draw distinctions in order to produce differences that make differences, i.e. one must distinguish in order to get informed, i.e. one must differentiate in order to learn.

Let us pick up the above 'map'-analogy to illustrate the implications of this 'Spencer Brown addendum': If a cartographer distinguishes [water/not water], his map will contain rivers, seas, lakes, islands and mainlands. If he does not draw this distinction, his map cannot contain this information. To make it less trivial: If a 'political' cartographer observes the world along the distinction [belonging/not belonging to a country], his map will contain the territories of states. If an 'ecological' cartographer distinguishes [rare species living/not living], when contemplating on our earth, his map will contain information about the living space of dying out species. If, finally, an 'industrial' cartographer differentiates the globe with regard to [mineral resources present/not present], his map will provide knowledge about the global distribution of mineral resources. The point is, which we have to understand, that in neither case, the information is already 'out there', waiting to be collected. Instead, it is in any case the act of distinguishing, which only first creates it. As long as no one distinguishes (or 'cares about'), for example, [polluting/non-polluting behavior], there is no 'destruction of environment' - at least, in the world of our minds, which is the only world we 'know'. As long as no one draws this distinction, no one has information about it, no one knows about it. In order to learn about it, one has to draw the distinction - first. We leave it to philosophers to argue about whether it (e.g. pollution) is 'there', though!

Instead, we come back one more time to the assumptions about 'OL-causes'. Having completed our passage through cognition theories and assembled a constructivist understanding of information, we can round up our discoveries, as follows: In order to learn from important differences, as expressed by 'errors, gaps, tensions, benchmarks, stress, conflict or divergence', organizations must draw corresponding distinctions. Only, if the proper distinctions are applied upon observing themselves in their environments, organizations get access to differences that can inform them:

Only, if an organization observes the consequences of its actions along the distinction [expected/not expected], it can infer differences, as expressed by 'errors and performance gaps' (Duncan and Weiss 1979, Argyris and Schön 1978) and let them make a difference to its knowledge, i.e. it can learn from experience. Only, if an organization differentiates [where it is (from) where it wants to be], it can infer differences, as expressed by 'creative tension' (Senge 1990), and let them direct (make a difference to) its strategic decisions, i.e. it can learn generatively. Only, if an organization observes its environment by distinguishing [our practices and their outcomes (from) other organizations' practices and their outcomes], it can infer differences, as expressed by 'benchmarks' (Garvin 1994), and let them guide (make a difference to) the design of its policies and procedures, i.e. it can learn from observation. Only, if an organization reflects upon itself, applying the distinction [what some in the organization do-want-think/what others do-want-think], it can infer differences, as expressed by 'stress, conflict or divergence' (Cangelosi and Dill 1965, Huff and Chappell 1994, Kim 1993), and let them make a difference to its shared routines, objectives and worldviews, i.e. it can learn from internal contradictions - learn dialectically.

If an organization does not draw either one of these distinctions, it has no access to the differences this distinction might yield, i.e. it has no information about false assumptions, better practices, alternative problem solutions, or ways to accomplish a vision. It does not know and cannot learn until it distinguishes.

To our mind, this 'show-down' on OL is important and consequential, especially when taking into consideration, that the dominant observation mechanisms of organizations are 'fixed' to numbers. Organizations seem to prefer observing earnings over errors, shareholder values over shared visions, prices over practices, and costs over conflicts. However, observing numbers, too, only yields information, when differences occur. To produce differences, therefore, one has to distinguish, e.g. [this quarter's earnings (from) last quarter's], [this year's revenues (from) last year's], [one company's prices (from) one other company's], or [one unit's costs (from) one other unit's]. The problem is, that the differences, generated by those distinctions, are numbers, again. As such, they rather 'indicate' than 'inform'. The mere statement of a decrease in sales or revenues or earnings can, at best, indicate that 'something' went wrong. It can, however, not inform about what this something was, i.e. about which assumptions were false and led to the poor performance. Instead, the search for information, then, only has to begin. 'Observing the world by counting only', one may therefore count, 'will not lead to its understanding!'

Arriving at the end of our journey, which lifted us through OL-theories and learning theories into the 'observation' platform of cognition theories, we can sum up now what we saw, and how the trees lined up to a forest. The question, which we headed for, was: 'What causes organizations to learn?' The answers, we received from OL-

theories were manifold, ranging from 'errors', to 'conflict', to 'information', to 'vision', and more. Consulting learning theories, we again received different answers: 'experience' and 'information'. As the later proved able to accommodate the former, we decided to follow it. Still having one alien ('conflict') in tow, and no idea about how to specify 'OL-triggering information', we turned to cognition theories. There, again, we were confronted with opposing lines of thought. Instructivism could not help us, neither with accommodating 'conflict' nor with specifying 'OL-relevant information'. At the end however, from constructivist theories of cognition, we received answers that solved our problems. The insights, we gained, can be brought into the form of general propositions about the 'causes of OL', which then, read as follows:

**P1:** *Organizations learn by observing differences.*

According to OL-theories, these are primarily differences between expectations and outcomes of actions, targeted and factual performance, vision and reality, own practices and those of others, as well as differences between alternative routines, objectives, interests, or worldviews of the organization's units or members.

**P2:** *Organizations observe differences by drawing distinctions.*

Differences, which give rise to OL, are not simply 'there' - or, perhaps are 'there' (taken that e.g. every organization acts upon expectations that are principally confirmed or disconfirmed by factual outcomes) but not attainable. Instead, their organizational appearance is subject to the organization's drawing a respective distinction. Putting it more prosaically: Errors are inferred by comparing expectations

and outcomes - not by contrasting vision and reality. The later produces creative tension - not benchmarks. They, in turn, result from differentiating 'our way' from 'their way'. Finally, to disclose different objectives, interests, or worldviews inside itself, an organization must pay attention to what its members do, want or know. Not using one of those distinctions yields no differences and hence no OL - at least no experiential, generative, observational or dialectical.

Taken together, these findings disclose that the causes of OL are 'self-made', that OL is an entirely - from beginning to end, from causes to results - intra-systemic process, and that whether or how an organization learns lies in its own hands, as it depends upon the distinctions it draws.

Reflecting upon OL-theories now, in the light of these findings and on the background of the experiences we gathered on our journey, we further conclude:

(1) The fact that we are facing a multitude of different OL-theories in management literature must not necessarily be taken as an indicator of a dispersed search for, or a combating dispute about the true nature of OL. Instead, the situation might also resemble the one of the six blind men in the ancient Indian tale (Westerlund and Sjöstrand 1981). Just like each of them touches a particular fraction of an elephant and subsequently draws different conclusions on its overall appearance, existing OL-theories probably grasp different edges of an ample and multifaceted phenomenon which is called OL. The fact that we were able to incorporate their different assumptions about the causes of OL within a constructivist framework of learning produces evidence for this hypothesis.

(2) In close connection to this hypothesis, we conclude, that a general theory of OL has yet to be developed: One that is able to fully integrate the different types of OL: experiential, generative, observational, dialectical, and, most probably, other more. The identification of differences as starting points of OL could serve as a starting point itself for the construction of such an overall OL-framework. However, the causes of OL are but one brick to this framework. To complete it, we need to learn more about the processes, the conditions for their success, their respective results, and, most important, about what 'at all' it is, that is to be changed by OL, i.e. what organizational knowledge is, and where it resides.

Our way to develop a joint understanding of the causes of OL, was to pay attention to (to observe) the differences between OL-theories. As this is - like we have shown above - one way of learning, it might prove successful for the remaining tasks as well.

#### **IMPLICATIONS ON STRATEGIES TO IMPROVE OL**

As stated at the beginning, this attempt to consolidate different assumptions about the 'causes of OL' was not meant as an end in itself. Instead, we 'cultivated' the theoretical ground, in order to 'grow' design strategies on it, which aim at improving OL through supplying organizations with occasions for learning.

The analysis of the 'soil' has informed us that OL sets out when organizations draw appropriate distinctions and infer pertaining differences that inform them about - their errors, ways to accomplish their visions, approaches to improve their practices, or,

alternative views of problems and solutions slumbering within themselves.

Based upon these findings, we conclude that design strategies to improve OL must, above all, be directed towards the production of OL-relevant information, i.e. at the utilization of the above distinctions.

To that end, organizations may, for example, establish obligatory evaluation processes to systematically contrast intents and results of their activities, programs and strategies (experiential learning). They may, as another example, set up controlling systems that monitor their paths towards accomplishment of their visions by constantly relating actual to ideal positions (generative learning). They may, as well, continually engage in benchmarking projects, or anchor in their members' heads the importance of comparing what they see at customers' and suppliers' sites with what they practice 'at home' and communicate the findings (observational learning). Or, they may, as a final example, install regular internal audits, to increase the awareness about different perspectives or standpoints hold by organizations members, or transform the organization's culture, so that divergence is honored as a source of learning and not defeated as a sign of disintegration (dialectical learning).

To prevent misunderstandings: These are just randomly selected and constructed examples. They are not meant to be comprehensive. They shall only indicate that and how - through instruments (systems, procedures, etc.), structures (projects, task assignments, etc.), persons (trainings, awareness, etc.) and cultures (values, role models, etc.) organizations can ensure that distinctions are in use, which generate OL-relevant information.



Of course, there are situations, in which organizations are well advised to concentrate on one of those distinctions. Without yet having systematically studied the characteristic results of the different types of OL (see above), we insinuate that experiential learning predominantly improves effectiveness ('doing right things'), while observational learning mainly fosters efficiency ('doing things right'), that generative learning primarily touches strategic performance, while dialectical learning results in innovativeness and creativity, in the first place. Dependent upon the particular need of an organization, it may make sense, therefore, to concentrate on a particular learning source: Given that, an organization is good at creating new ideas (creativity), however bad at transforming them into marketable solutions (effectiveness), it should certainly focus on the systematical evaluation of its activities (experiential learning), while an organization which is highly efficient, but lacks strategic profile, should pay special attention to the creation and realization of a distinctive vision (generative learning) - respectively vice versa.

In general, however, we suggest that organizations should try to simultaneously apply all of the OL-relevant distinctions. They should, at the very same time: (1) Observe whether outcomes and expectations of their activities differ, (2) watch out what their competitors do and relate it to their own practices, (3) bear in mind a vision and set reality off against it, and, (4) take care of the differences residing within themselves. To support this recommendation, imagine what happens, when using an 'old-fashioned' black and white film with a modern camera. The camera cannot but deliver black and white pictures<sup>6</sup>. Why? Because the film only handles one distinction: The distinction [black/not black]. In operating this distinction, it infers differences in the

portion of black in all objects, the lens focuses. A color film, in contrast, additionally distinguishes all elementary colors, i.e. [red/not red], [blue/not blue], [yellow/not yellow]. Consequently, it infers differences in the portions of these colors in all objects, too. The resulting information, when applying all these distinctions simultaneously, then, is a bright-colored, 'authentic' picture of the aimed at motif. Transferring the message of this example to organizations that strive to learn, this is to say: The more distinctions they use on observing the world around them, the more differentiated and 'realistic' the pictures get, that they construct of it. In other words: The more distinctions an organization uses, the more differences it generates, the more informed it becomes, the more it can learn.

At the very end, however, we consider it necessary to run a special plead in favor of one of the OL-candidates: dialectical learning.

While there is wide-spread acceptance<sup>7</sup> of the assessment that innovations mean an important competitive advantage to organizations in today's rapidly changing business environments, the management practices of most organizations are still directed towards producing conformity instead of diversity - homogeneity instead of heterogeneity. Taking into account that almost every innovation starts as a minority position - as a deviation from what is valid and known - a dilemma becomes obvious: Although yearning for innovations, organizations methodically 'castrate' their own innovativeness. Relating this dilemma to our findings about OL-causes, we suppose that particularly the fourth of the identified types of OL - organizations learning dialectically from their own diversity - is systematically underutilized. We therefore suggest that design strategies to improve OL should place special emphasis on the

distinctions, inducing dialectical OL. This is to say, they must provide that differences in opinion, perspective, approach, or style, etc. are appreciated and exposed, i.e. put on the table and not swept below the carpet. This may perhaps involve a major change of the governing management paradigms (Thomas and Ely 1996). It is, however, an unalterable precondition for learning dialectically and, hence, to our mind, for creativity and innovativeness.

Support for this assumption comes from a considerable amount of research and literature, currently piling up. It addresses and discusses the effects of diversity and heterogeneity, predominantly with regard to team composition (e.g. Krishnan, Miller and Judge 1997, Milliken and Martins 1996, Watson, Kumar and Michaelson 1993, Wiersema and Bantel 1992). In our point of view, the positive consequences reported by those studies (performance increase, strategic change, etc.) are the effects of dialectical learning. The studies but also point out that allowing for diversity as a source of learning is not without risk. It rather resembles a 'ride on a ridge'. The organization may learn and flourish, but it may fall apart, as well. A lot of research needs to be done to find out under which conditions the one or other is likely to happen. To relinquish the benefits it may yield is, to our mind, not an acceptable solution.

When reflecting upon further management research on the background of this last thesis, we encounter additional findings, which indicate that dialectical OL is not at all confined to diversity within groups, but may also result from an overall diversity of workforce (Thomas and Ely 1996), a diversity of strategies (Burgelman and Grove 1996), a diversity of (sub)cultures (Sackmann 1992), and - most certainly - other

more. Turning these insights into design recommendations, then, means to plead for admitting diversity and heterogeneity on various levels and in various domains of organizations. At the very end, then, this means to plead for a 'pluralistic organization'. Sounds strange? Indeed! But has not recent history impressively shown that pluralistic systems are more successful than autocratic ones? May be, they are simply better learners.

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- 1 One of the first systematical elaborations of the notion is included in R. Cyert's and J. March's (1963): "A Behavioral Theory of the Firm".
  - 2 "The important innovative idea in this development was the conceptualization of learning as discrete changes between states of knowledge rather than as change in probability of response" (Greeno 1980:716).
  - 3 A kind of knowledge change, i.e. learning, for which Kuhn (1970) has coined the expression 'paradigm shift'.
  - 4 A kind of knowledge change, i.e. learning, which is referred to as 'benchmarking' in modern management literature.
  - 5 "... giving up any attempt to make use of the term information, thereby taking a leave of any, even hidden, conception of instructive determination ..." (Maturana 1986:4; *translated by the authors*).
  - 6 Of course, black and white photography is 'charming', when seen from an artistic point of view. This is, however, not the focal point regarding the intent of this example.
  - 7 See for example the 'Special Topic Forum on the Management of Innovation' in AMR 21 (4), 1996.