THE LEARNING ORGANIZATION FROM THE PERSPECTIVE OF THE
EVOLUTIONARY EPISTEMOLOGY

Research-based paper M/O/T 2010

by

Thomas Steininger, Ing.
EVVA Sicherheitstechnologie GmbH – Senior Manager of Organizational Development
PEF Privatuniversität für Management – Master Student

Adress:  Jägerhausgasse 62/5/9
1120 Vienna
Austria
E-Mail:  thomas_steininger@aon.at
Mobile:  +43 664 421 45 81
ABSTRACT

Many authors have laid down a concept about organizational learning and the learning organization. Amongst them Chris Argyris, Peter M. Senge and James G. March. They contributed an explanation on how organizations learn and provided tools to transfer the theoretical concepts of organizational learning into practice. Regarding the present situation it seems, that organizational learning becomes even more important. This paper provides a complementary view on the learning organization from the perspective of the evolutionary epistemology. The evolutionary epistemology gives an answer, where the subjective structures of cognition come from and why they are similar in all human beings. Applying this evolutionary concept to organizations it could be possible to provide a deeper insight of the cognition processes of organizations and explain the principles that lay behind a learning organization. It also could give an idea, which impediments in learning, caused by natural dispositions, deduced from genetic barriers of cognition in biology are existing and managers must be aware of when trying to facilitate organizational learning within their organizations.

INTRODUCTION

More than 25 years ago Konrad Lorenz, Austrian physician, Nobel Prize winner and one of the main contributors to the evolutionary epistemology wrote, that human mind creates conditions, which are out of depth of human’s natural disposition (Lorenz 1983). Now managers and organizations are facing these new conditions in the kind of economic and ecological crises. Both academics and practitioners agree that organizations must learn to cope with these environmental changes in order to survive. As Argyris and Schön express it (1978, p. 125):

But in social organizations the requirement of double-loop learning and change becomes especially important, because the external environment tends to be dynamic and changing and because the internal environment is also basically unstable.

So organizational learning becomes more and more vital in a fast and vigorously changing environment.
Nature itself provides a good example of how to adapt to changing environments and what is to learn to survive. The evolutionary epistemology describes, why the cognition apparatus of animals and human beings fit so perfectly to the natural environment and come to its limits in a complex world of culture and technology. Illuminating the learning organization from these aspects it is possible to understand how knowledge is created in organizations and what could be the natural limitations of organizational learning.

**The Learning Organization and Organizational Learning**

The question on how organizations learn got academic attention in the late 1950s (Huber 1991; West, Burnes 2000) and at least in 1965 Cangelosi and Dill brought the term **organizational learning** to the management vocabulary. They analyzed the learning processes of a seven-man team and explained the mechanisms of adaption and learning within an organization (Cangelosi, Dill 1965). In the late 1980s and early 1990s the term **learning organization** was often used interchangeably with organizational learning (West, Burnes 2000). With his book *The Fifth Discipline* in 1990, Peter M. Senge was one the main contributor to the popularity of the term learning organization. Whereas the practice-oriented authors were using the term learning organization more often, the scholarly world preferred to speak about organizational learning (Argyris 1999).

Today the difference of these two terms is specified more precisely as Tsang pointed out (1997, pp. 74-5):

*Organizational learning is a concept used to describe certain types of activity that take place in an organization while the learning organization refers to a particular type of organization in and of itself. Nevertheless, there is a simple relationship between the two – a learning organization is one, which is good at organizational learning.*

Different authors have laid down a definition of organizational learning. Argyris and Schön introduced the term **theory-in-use** to define organizational learning (1978, p. 29):

*Organizational learning occurs when members of the organization act as learning agents for the organization by detecting and correcting errors in organizational theory-in-use, and embedding the result of their enquiry in private images and shared maps of organization.*
Fiol and Lyles define it as (1985, p. 803):

*Organizational learning means the process of improving actions through better knowledge and understanding.*

Probst and Büchel point out that it is hard to understand that organizations are able to learn because they consist of individuals (Probst, Büchel 1998). So they conceive organizational learning as (1998, p. 17):

*... the process of variation of the organizational basis of knowledge, the improvement of the problem solving and action competence as well as the variation of the corporate reference framework of and for members of the organization.*

Crossan, Lane and White (1999, p. 522):

*Organizational learning can be conceived of as a principal means of achieving the strategic renewal of an enterprise.*

Deduced from the many different definitions of organizational learning it is apparent, that no consistent theory of organizational learning exists (Probst, Büchel 1998). Argyris and Schön (1978) developed a model according to the three levels of learning from Gregory Bateson (1972). The first level is the single-loop learning. It occurs when members of the organization detect and correct errors but maintaining the organizational theory-in-use (Argyris, Schön 1978). The second level, the double-loop learning, takes place when the organizational norms and thus the theories-in-use are changed (Argyris, Schön 1978). On the third level, the deutero-learning, members of the organization reflect of previous learning which means that the organization learns to improve its learning process. This leads to a modification of the values of the theories-in-use as well as the strategies and expectations (Argyris, Schön 1978, 2006).

Peter M. Senge (1990) explained the learning organization from a systemic point of few and defined five disciplines, which are essential in forming a learning organization. 1. *Personal Mastery* – developing the own personality. 2. *Mental Models* – deep engrained assumptions, which have high impact on how we perceive our environment and how we act. 3. A *Shared Vision* – the ability to create a common image of the future of the

Crossan, Lane and White (1999) developed a framework for organizational learning that pursuit a more holistic understanding based mainly on the work of March (1991). They place emphasis on the tension of exploration and exploitation and provide a so-called 4I *framework* that contains four related sub-processes which leads from individual to organization but also includes a feedback from organization to the individual (Crossan, Lane, White 1999). The four processes are: Intuiting, Interpreting, Integrating and Institutionalizing. Crossan, Lane and White understand organizational learning as a dynamic process (1999, p. 532):

> Not only does learning occur over time and across levels, but it also creates a tension between new learning (feed forward) and exploiting or using what has already been learned (feedback).

Despite of many different approaches to organizational learning there can be found five shared principles of most authors (Burnes 2009, p. 151):

- An organisation’s survival depends on its ability to learn at the same pace as or faster than changes in its environment.
- Learning must become a collective and not just an individual process.
- There must be a fundamental shift towards systems (or triple-loop) thinking by an organisation’s members.
- By adopting organisational learning, an organisation not only acquires the ability to adapt quickly and appropriately to changing circumstances, but it can also transform itself if necessary.
- As well as the ability to transform itself, an organisation can adapt to, influence and even transform its environment.

To compare and maybe consolidate the theories of organizational learning and the principles of the evolutionary epistemology it is necessary to point out which contributions to learning and knowledge have been made by the biological theory of cognition. The next chapter will discuss this topic.
THE EVOLUTIONARY EPISTEMOLOGY

According to Popper (1984) the term evolutionary epistemology was created by Donald T. Campbell to describe a new stream in epistemology, which incorporates the evolution theory by Charles Darwin. The idea that knowledge depends on the evolution of human phylum dates back to the end of the 19th century (Popper 1984) but it got attention mainly with the work of Konrad Lorenz (1941, 1943, 1973). He examined, why the categories of reality and those of our perception are matching and came to the conclusion, that the two categories fit together by the same reason the form of a horse’s hoof fits to the soil of the steppe (Lorenz 1943). Gerhard Vollmer says that the subjective structures of perception fit with the world, because they emerged in the course of evolution as a result of the adaption to the real world (Vollmer 1990). In simple words one can say that we are able to know what we know as an individual because of the biological evolution of the human phylum. All knowledge is based on the already approved perception (Riedl 1990). This is why the structures of perception are very similar with all human beings because they are genetic dispositions (Vollmer 1990).

This epistemology corresponds with the postulate of a hypothetic realism that assumes the existence of a real world (Vollmer 1990). This also means that wrong hypothesis of the real world were quickly eliminated by evolution (Vollmer 1990). The process of variation, selection and retention took place in an environment of mean dimensions, the so-called mesocosm (Vollmer 1990). Thus our cognitive structures had to prove themselves on mid-dimensional conditions. With this conclusion the evolutionary epistemology solves also a philosophical question of Immanuel Kant – does knowledge a priori exist. Because the perceiving structures are a product of evolution they are part of the genetic inventory of an individual. So they are independent of all individual experience and stand before all experiences (Vollmer 1990). This means, that the structures of perception are ontogenetic a priori but phylogenetic a posteriori (Vollmer 1990). In this sense an a priori knowledge exists for the individual.

Thus learning from the perspective of the evolutionary epistemology emerged in two levels: the onthogenesis and the phylogenesis. In the words of Konrad Lorenz life itself is a cognition gaining process (Lorenz 1941, 1973). Karl Popper defined learning in a more precise way as the variation of knowledge or disposition:
Every acquired knowledge, every learning consists of the variation (possible rejection) of any knowledge or disposition, which already existed; and finally in the variation of native dispositions (Popper 1990, p. 72).

According to Riedl and Kaspar (1980) there also exist two phases of learning. The first one is learning of the genetic material, which is amazing slow (Riedl, Kaspar 1980). That means that the gene itself is changed and learns to cope with challenges of the real world. The second phase of learning is learning of the individual. It is much faster but gets lost with the death of the individual. Only with communication and even more with scripture it is possible to save obtained knowledge for the species. In this way one can speak of a second evolution (Riedl, Kaspar 1980). This second evolution is of course based completely on the biological evolution and learning of the first phase. Both phases of learning operate within the same circle, which consists of expectation, prediction, experience and hypothesis (Figure 1). Every experience improves the hypothesis and every revised expectation improves the prediction. This leads to a spiral process in which knowledge is attained (Riedl 1990).

![Figure 1 (Riedl 1990)](image-url)
THE MISSING LINK

What is now a learning organization and how can its mechanism be explained by the evolutionary epistemology? For this purpose it is necessary to find the link between living organisms and organizations. As mentioned above learning from the perspective of the evolutionary epistemology consists of two phases, learning of the gene and learning of the individual. Edgar Schein suggests that: The learning culture must have in its DNA a “learning gene”, … (Schein 2004) but he does not explain what he assumes to be the DNA of an learning culture.

When we take into consideration the works of Chester Barnard (1938) and Niklas Luhman (1999, 1999a, 2006) then we can presume that social systems and therefore organizations do not consist of individuals but of communications and more exactly of the communication of decisions. The individuals are part of the environment of the system (Luhmann, 1999a). As a hypothesis we can define communication as the DNA of an organization and examine the conclusions for the learning organization from the perspective of the evolutionary epistemology.

1. Learning can be defined as the variation of communication, which already existed (Popper 1990). This corresponds with the definition of Probst and Büchel (1998). Argyris and Schön (1978) speak of modifying the organizational theories-in-use. Organizations are learning very slowly because variation of the gene takes a lot of time according to the first learning phase of Riedl and Kaspar (1980). The second learning phase is the variation of the communication of the individual, which is much faster than the variation of the organization’s communication but is based on the first phase. So to adapt an organization to a fast changing environment it is necessary to replace the gene of the organization, this means the character of communication. With a moderate turnover and thereby varying the communication degeneracy is avoided and knowledge is sustained (March 1991). Crossan, Lane and White (1999, p. 533) speak of:

   … destroying, or at least setting aside, the institutional order to enact variations that allow intuitive insights and actions to surface and be pursued.
2. The communication of an organization is the result of its evolution and a part of the genetic inventory (the communication) of the individual. This means that the phylogenetic “a posteriori” for the organization is an ontogenetic “a priori” for the individual. So one can say that the communication of the individuals is socialized to the organizational code (March 1991). Crossan, Lane and White (1999) speak in their 4I framework of feedback from the organization to the individual. This is why the communication of new members of the organization (“member” in the sense of Luhmann 1999) is assimilated very fast and impedes the assimilation of new learning for the organization (Crossan, Lane, White 1999).

3. There is no influence of an individual communication to the organization when it forms wrong hypotheses of the real world, which is constituted by the communication of the organization. The real world can be seen as the organizational maps (Argyris, Schön 1973), organizational code (March 1991) or cognitive maps (Crossan, Lane, White 1999). As in the biological evolution false hypotheses are quickly eliminated. (Vollmer 1990) - as well as incorrect communications in organizations.

... because the language and logic that form the collective mindset of the organization and the resulting investments in assets present a formidable fortress of physical and cognitive barriers to change (Crossan, Lane, White 1999, p. 533).

4. The communication of an organization fits to the real world, because it is an adaption to it. This means that an organization will only learn (vary its communication) when the environment changes. So change management can never be successful when the real world does not initiate the variation. This is even more important when we take into consideration the genetic defined forms of intuition that limit the possibility of cognition of similar but different entities.

As a summary we can say that from the perspective of the evolutionary epistemology a learning organization is defined as a system, which varies its communication. In this sense “learning” is a neutral term like the evolution itself.
When communication is defined as the gene of an organization it is clear, why changes take such a lot of time and are only possible when the environment changes. This is a necessary but not a sufficient condition as the next chapter will show. Organizations can learn in the same way the phylum of a species do. And as a species depends on the living individual the organization also does. As gained cognition is conserved in the gene of a species in biology, knowledge is conserved in the communication of an organization, which represents the DNA.

**FORMS OF INTUITION AND IMPEDIMENTS IN LEARNING**

One of the main issues of the evolutionary epistemology are the inherent forms of intuition. They are a product of the phylogenesis and define the limits of human cognition. Immanuel Kant was the first who discussed this topic in 1781 in his work *Critique of Pure Reason* and formed the idea of the a priori. Rupert Riedl (1980, 1990) extended this concept with the evolutionary aspect and defined six forms of intuition from which four could be relevant for the learning organization. They can explain the impediments that limit the possibility of organizational learning.

The first form of intuition is the hypotheses of the apparent truth. It is the expectation that similar incidents occur under similar circumstances (Riedl 1990). This disposition is essential for learning. Without a certain confidence of reproducibility neither individuals nor organizations could learn. In a complex, fast changing system, as represented by the current economic and environmental situation, organizations are not able to distinguish if circumstances are similar to already experienced and therefore expect invalid incidents.

The second form is the hypothesis of the comparable. It describes the tendency to graduate disparate but similar objects (Riedl 1990). In human cognition this means that one can identify an apple as an apple regardless of it is green and small or red and big. Applied to organizations it is an explanation why changes in the environment are detected so slowly because they have the tendency to counterbalance different but similar situations.

The hypothesis of the cause is the third form of intuition. It states that similar entities have the identical cause (Riedl 1980). This phylogenetic disposition pretends a causality chain and neglects the retroactivity of the effect to the cause (Riedl 1990). This is why
organizations cannot see the impact of their actions to the environment. Argyris and Schön (1978) define causality as the reason of defensive thinking in organizations, which leads to a limited-learning system. System thinking is therefore essential for learning organizations (Senge 2008).

The fourth disposition is the hypothesis of the functionality. This form of intuition suggests that similar entities will serve the same function (Riedl 1990). Although this disposition is essential for organizations in carrying out exploitation in the sense of March (1991), it also inhibits the probability of exploration that is important for adapting to a changing environment.

**IMPLICATIONS FOR RESEARCH AND MANAGEMENT**

This paper can only set a small light on the implications of applying the evolutionary epistemology to the concepts of organizational learning. But it is pointed out that the biological theory of cognition could provide explications of some aspects of the different theories of organizational learning. Further research has to follow to show if it is possible to find other affinities. So it could be possible to build a framework under which a unified theory of a learning organization can be developed.

A next step will also be the examination of implications to the theory of population ecology and vice versa which was discussed by Nelson and Winter (1982), Hannan and Freeman (1989) as well as Aldrich (2007) and Aldrich and Ruef (2006). The evolutionary aspects of the population of organizations can also provide a deeper insight in the evolution and learning of a single organization.

An aspect for researchers and managers alike are the forms of intuition, which can be seen as natural impediments in learning. From the perspective of the evolutionary epistemology these dispositions are the product of the phylogenes sis and influence all actions carried out by humans but also, as shown, by organizations. Managers must be aware of that these dispositions impede organizational learning and have lead to the situation we are now facing. They also have to pay attention to the fact that all actions of individuals or organizations carried out under the proposition of a meccosomic world. This is why it is so challenging, not to say impossible, to foresight the consequences of the own activities in a complex and fast changing environment.
REFERENCES


