

**SOCIAL COMPLEX EVOLVING SYSTEMS:
IMPLICATIONS FOR ORGANIZATIONAL LEARNING**

Elena Antonacopoulou¹

GNOSIS
University of Liverpool Management School
Chatham Street
Liverpool, L69 7ZH
UK

Tel: 44 (0)151 795 3727

Fax: 44 (0)151 795 3001

E-mail: e.antonacopoulou@liv.co.uk

Ricardo Chiva²

Universitat Jaume I
Campus del Riu Sec
12071 Castellón
Spain

Tel: 34 964 728543

Fax: 34 964 728629

E-mail: rchiva@emp.uji.es.

Paper accepted for presentation at the OKLC 2005 Conference, Boston.

¹ The author would like to acknowledge the support of the ESRC/EPSRC Advanced Institute of Management Research under grant number RES-331-25-0024 for this research.

² The author would like to acknowledge the support of the Fundació Caixa Castelló Bancaixa under grant numbers P1-1A2002-18 and 04I007-35 for this research.

SOCIAL COMPLEX EVOLVING SYSTEMS: IMPLICATIONS FOR ORGANIZATIONAL LEARNING

ABSTRACT

This paper argues that some of the principles of Complexity Science may be very useful in our efforts to explore and more fully account for the evolving social complexity that constitutes learning practices in organizations. We review the main principles of complex adaptive systems, steeped in the new science of complexity, and we apply these principles to our analysis of the main dimensions that have been employed so far in studying Organizational Learning (OL). Our analysis provides a new way of conceptualising OL as a complex evolving social system emphasising self-organization, emergence and co-evolution as central dimensions. We compare this new perspective, the complex view of OL, to the two main dominant perspectives of Organizational Learning: the individual and the social view. We discuss the implications of understanding OL as a social complex evolving system for theory and practice. We outline directions of future OL research and propose a new framework for studying the dynamics of organizational learning: the **EMIC** (**E**ngagement, **M**ultiplicity, **I**nter-Connectivity) framework, which captures the contextual and self-organizing nature of organizational learning practices in social systems.

KEY WORDS: organizational learning, complexity science, social complexity

INTRODUCTION

The concept of Organizational Learning (OL) has experienced an important growth over recent years attracting the attention of both academics and practitioners. In spite of its consolidation and popularity, the OL debate has not progressed much beyond the conceptualisation of learning as an integral part of organizing.

Several recent contributions (Vince et al., 2002; Lyles and, Easterby-Smith 2003; Easterby-Smith et al., 2004) highlight a number of unresolved issues and point to new directions for research in the field. Some particularly important areas in need of addressing are the social and political forces that define OL and shape the learning practices and the way these emerge in the process of human action and interaction.

In this paper we argue that future research in OL can be usefully informed by the ideas of complexity science. According to Tsoukas (1998: 293) the sciences have historically set the tone in intellectual inquiry. Furthermore, there seems to be a fundamental human urge to want to understand both the nature and the society as a unified entity. Tsoukas (1998: 293) justifies the appearance of a new scientific approach, the complexity theory:

If nature turns out to be much less deterministic than we hitherto thought ...then perhaps our hitherto mechanistic approach to understanding the messiness we normally associate with the social world may be revising.

Tsoukas (1998: 291) states that the Newtonian style (mechanistic) is gradually receding in favour of the chaotic style (complexity), characterized by the ability to notice instability, disorder, novelty, emergence, and self-organization.

During the last decade, numerous researchers and practitioners started to use complexity science to better understand organizations (Dooley et al., 2003). Theoretical models and proposals emerged on organizational and managerial issues such as: strategic management (Stacey, 1993), strategic change (Stacey, 1995; Brown and Eisenhardt, 1997) innovation

management (Cheng and Van de Ven, 1996) and design management (Chiva, 2004).

Concerning these theories, Dooley et al. (2003: 62) state that:

A basic assumption within these theories is that organizations are complex adaptive systems (Anderson, 1999; Axelrod and Cohen, 1999), composed of semiautonomous agents that seek to maximize fitness by adjusting interpretative and action-oriented schema that determine how they view and interact with other agents and the environment.

In addition, Mathews et al. (1999) argue that the emerging complexity sciences have the potential for extending and enhancing principally our knowledge of organizational change and transformation processes, which is very closely linked to OL. For the future of research into OL, Miner and Mezias (1996: 95) point out the need to link OL with other convergent theoretical models, such as the science of complexity. Cohen and Sproull (1996) recognise that the literature on OL shows a certain affinity with the developments in the literature on these Complex Adaptive Systems (CAS), steeped in the science of complexity.

The main reasons for proposing the use of these systems are: firstly, organizations are considered to be CAS (Gell-Mann, 1994; Stacey, 1996; Anderson, 1999; Axelrod and Cohen, 1999); and secondly, that one of the most important characteristics of these systems is their capacity to learn (Gell-Mann, 1994; Stacey, 1995, 1996; Sherman and Schultz, 1998). Furthermore, previous work (Chiva, 2003) illustrated that CAS ideas are relevant in identifying the essential factors that facilitate OL.

Therefore, the notion of organizations as CAS might be crucial to the improvement of our understanding of OL and to resolving or clarifying some of the unanswered issues mentioned above. This article seeks to make a contribution to this debate by exploring the usefulness of a CAS perspective for the study of OL.

In pursuing this analysis, we first provide a brief overview of the main principles of CAS and their implications for organizations. We then discuss the main characteristics of social

complex evolving systems and subsequently apply the principles to our analysis and re-conceptualisation of OL. We extend current perspectives in OL research and present a complex view of OL and its main dimensions in the form of three premises which we discuss in relation to our view that social complex evolving systems (SCES) not only entail OL as a key dimension, but that OL too is a SCES. We discuss the implications of this re-conceptualisation of OL for future OL research. We draw particularly attention to some of the complex social forces that future OL could pay more attention to and propose a new framework for studying the dynamics of organizational learning. The **EMIC** (Engagement, Multiplicity, Inter-Connectivity) framework of OL captures the contextual and self-organizing nature of organizational learning practices in social systems. The EMIC framework carries connotations of emic versus etic research approaches (Headland et al. 1990) and reinforces the importance of contextually defined conditions which shape how organizing and learning emerge and co-evolve.

COMPLEX ADAPTIVE SYSTEMS AND ORGANIZATIONS

The so-called complexity science emerged in the sixties, although its true upsurge was not seen until the mid-eighties. Complexity science sets out to devise mechanisms to create and maintain complexity, and to produce tools for its description and analysis (Simon, 1996: 169-170). The concept of complexity science covers many fields of scientific research (such as chaos theory, the study of fractals etc.), amongst which the study of CAS is of major importance.

Sherman and Schultz (1998: 17) define a CAS as a system:

... composed of interacting 'agents' following rules, exchanging influence with their local and global environments and altering the very environment they are responding to by virtue of their simple actions.

According to several researchers (Gell-Mann, 1994; Coleman, 1999; Axelrod and Cohen, 1999), complexity science perceives organizations as CAS. However, the application of these

ideas, inspired by the physical sciences, can oftentimes be controversial. Tsoukas (1998: 293) understands that there are two approaches to it. Some authors draw analogies between organizations and organisms (Gregersen and Sailer, 1993; Stacey, 1995; Thietart and Forgues, 1995) and others have strong doubts about its applicability, because human systems are not like other systems in the physical world (Johnson and Burton, 1994). In contrast, Tsoukas (1998) understands that both views are wrong, because they are missing the point about what analogies are for. He explains that to affirm that organizations are CAS is not to make a factual statement about organizations, because one cannot be certain whether one has captured the nature of an object of study. But, rather, it is to say "try to imagine organizations as if they were complex adaptive systems and see what might be the consequences of this" (Tsoukas, 1998: 305). This is precisely our approach in this paper, to examine the usefulness of the CAS perspective for the study of OL. Therefore, our review of the literature focuses mainly on the specific complexity theory relevant to social systems such as organizations, and we describe the main principles of CAS with a greater focus on social complexity. We therefore, seek to draw on the principles of CAS to explore the main characteristics of **Social Complex Evolving Systems** (SCES). We introduce this differentiation to draw attention to two important dimensions: Firstly, the ongoing emergence and evolution of CAS (see Mitleton-Kelly, 2003) and secondly, the political dynamics that define social systems and learning (see Antonacopoulou, 2000, 2001; Vince, 2001).

SOCIAL COMPLEX EVOLVING SYSTEMS

According to Griffin et al. (1998: 330) and Stacey (2003: 252), there are two perspectives on the nature of CAS. The orthodox perspective, typified by the views of Holland (1995) and Gell-Mann (1994), presents complex systems in somewhat mechanistic, reductionist terms and is modelled by an objective observer in the interest of predicting its behaviour. Self-organization/emergence is not seen to be a new ordering principle in the evolution of the

system. Evolution occurs through random mutation and competitive selection. The radical unpredictability of emergent new forms is not emphasised. The system is modelled as a network of cybernetic and cognitivistic agents: they represent regularities in the form of schemas or mental models; they store those representations in the form of rules and then act on the basis of those rules.

On the contrary the radical perspective is typified by the views of Kauffman (1995) and Goodwin (1994). From this perspective, self-organization, rather than random mutation, plays the central role in the emergence of new forms. Goodwin (1994) stresses the importance of participatory engagement for understanding the processes of emergence. Those new forms emerge and are radically unpredictable. Managers cannot control self-organization and emergence. However, some organizational literature (Morgan, 1997; Brown and Eisenhardt, 1997) on complexity assumes that self-organization can be controlled. They seem to take ideas from the radical perspective, although they are clearly orthodox.

Although emergence is unpredictable and uncontrollable, Griffin et al. (1998: 321) underline that it is intelligible, as we can perceive the pattern of their evolution. Consequently, not anything could happen: there is an immanent rationale as to how the system unfolds, a generative process at work that goes beyond the correlation of causes and effects.

Although our analysis will focus on the radical perspective, in terms of considering self-organization/emergence to be the principle in the evolution of the system and placing emphasis on the interconnectedness of a complex system, we will not reject concepts like schemas or models as these refer to micro dynamic practices in relation to knowing and doing that are central to OL. Consistent with current thinking reflecting the dynamic nature of routines (see Feldman and Pentland, 2003) we explore these schemas as diffused rules (see Scott, 2001).

The complexity principles we seek to draw particular attention to are: Interdependence,

Diversity, Modes of Interaction, and Self-Organization. Each of these principles are discussed in relation to how they reflect the evolving complexity embedded in social systems.

Interdependence

Firstly, SCES are made up of heterogeneous agents which inter-relate with each other and with their surroundings, and are unlimited in their capabilities to adapt their behaviour, based on their experience. In a social system interdependence also means that a decision or action by any agent (individual, group, institution etc.) may affect related individuals and systems (Mitleton-Kelly, 2003). Interdependence, also highlights that social actors and their structures are intertwined to the extent, that they reflect their fractal nature as both parts and wholes at the same time (see Stacey, 2003). It is therefore, important to understand the conditions that shape the inter-relationships that in turn shape interdependence between stakeholders (see Antonacopoulou and Méric, 2005).

Diversity

Secondly, in each social system, each agent is different from the others, and its performance depends on the other agents and the system itself, which influences its behaviour. The context therefore, takes on a vitally important role. Each agent carries out a function defined by its relationships (Holland, 1995). Complex adaptive systems can be formed in turn by other complex adaptive systems. Therefore, there are simultaneous levels or aggregates, determined by tagging (Holland, 1995) or by their relationships (e.g. cells, organisms, ecosystem). Diversity therefore, is an often neglected feature of social complexity yet, on reflection it is this very diversity that underpins the social dynamics that feed the complex social interactions.

Modes of Interaction

Thirdly, SCES are capable of anticipating the results of their actions, for which they develop schemas or models (Holland, 1995; Anderson, 1999; Stacey, 1996). The existence of these

schemas (shared models), together with the agents' individual models (diversity), opens up the possibility of changes to these rules through evolution and learning. A model (or schema) can be defined "as a set of rules that reflects regularities in experience and enables a system to determine the nature of further experience and make sense of it" (Stacey, 1996: 289). According to Stacey (1996), the rules are coded in the form of symbols such as mental images, numbers, colours, shapes and so on. In the case of a company, this would depend on the nature of the models – whether they are concerned with financial policy, strategic posture or product design.

According to Axelrod and Cohen (1999), models can be related to organizational routines, as these are recurring patterns of interaction among agents and artefacts. Routines arise, because interactions among agents increase the likelihood of later repetitions of the same interactions.

Agents scan their environment and develop models, which represent interpretative and action rules. To survive an organization needs to be constantly scanning the landscape and trying different strategies (Mitleton-Kelly, 2003). This point helps explain why models are constantly changing and evolving in response to internal and external interactions. Models change generally has the effect of making agents more robust (they can perform in the light of increasing variation or variety), more reliable (they can perform more predictably), or grow in requisite variety (they can adapt to a wider range of conditions). Therefore, model change implies learning in complex evolving systems.

Self-Organization

Fourthly, SCES continuously self-organise (Anderson, 1999; Axelrod and Cohen, 1999). In other words, new behaviour model patterns appear as a consequence of agent interaction and connections. No single programme or agent completely determines the system's behaviour, which is unpredictable and uncontrollable (Goodwin, 1994). SCES therefore,

emerge as a natural condition of creating new order and self-organization (Mitleton-Kelly, 2003).

Systems self-organise when they find themselves at the "edge of chaos" or "limited instability" (Anderson, 1999; Stacey, 1995, 1996; Kauffman, 1993; Gell-Mann, 1994). CAS are able to develop three types of behaviour: stable or controlled by negative feedback, unstable or controlled by positive feedback, and limited instability or tension between various forces which place it at the edge of chaos (see Figure 1). At the edge of chaos, the system is very complex, in the sense that the degree of the models or schema's extension required to define it is high (Gell-Mann, 1994), and an equilibrium between stability and chaos is produced, combining both negative and positive feedback (Stacey, 1996). The edge of chaos is a form of bounded instability found in the transition phase between the order and disorder zones of operation for a complex adaptive system (Stacey, 1996). According to Stacey (1995: 486), bounded instability in organizations implies a balance between a formal system (integrated hierarchy, bureaucracy, stability and negative feedback control systems) and an informal system (high cultural diversity, conflict, widespread political activity, dialogue, weakly shared vision, ambiguity).

INSERT FIGURE 1 ABOUT HERE (Self-Organization in Complex Evolving Systems)

Feedback is negative when agents or systems have some prior intention or target and then compare the outcomes of actual behaviour against the target, feeding the information on deviations back into the discovery-choice-action loop in order to remove the deviation. Feedback is positive when agents or systems feed back information into the discovery-choice-action loop in a way that amplifies and destabilises it. According to Stacey (1996: 65-66), at the edge of chaos both negative and positive feedback is combined to enable the agents and their organizations to learn: single loop learning (negative feedback) and double loop learning (positive feedback) (Argyris and Schön, 1978; Stacey, 1996; Antonacopoulou

and Papamichail, 2003).

These issues remind us that SCES continuously co-evolve (Anderson, 1999; Axelrod and Cohen, 1999; Boisot and Child, 1999), which means that organizations have a mutually adaptive relationship with their environment, such that they are not simply trying to adapt to a static environment, but rather the organization is learning to adapt to an environment that is itself adapting to the market (other organizations and industries). On this matter, Stacey (1996: 36) argues that:

As human agents and the systems they make up move around the behavioural loop of discovery, choice and action, they are clearly engaging in a co-evolutionary feedback process in which what one does affects the others and then returns to affect the first.

Co-evolution also happens between entities within a system, and the rate of their co-evolution (McKelvey, 1999) is worth considering. Mitleton-Kelly (2003) states that co-evolution in this context is associated with learning and the transfer of information and knowledge.

In understanding how 'the edge of chaos' manifests itself we need to be aware of the process of creative destruction, during which the general model is modified, due to the continuous interactions between the agents and their environment and to the level of diversity between the agents' models (Stacey, 1996; Axelrod and Cohen, 1999). When these aspects or parameters become acute, the situation changes from that of stability to the edge of chaos.

According to Gell-Mann (1994) this stage represents the 'highest effective complexity'. If effective complexity is defined in terms of the length of the model, then it is low when there is a high level of disorder and the environment is random, although the algorithmic information complexity is very high (Stacey, 1996: 96). A system which is trying to evolve or learn under these circumstances, will not be able to extract many regularities, nor will it be

able to predict a great deal in specific terms. Effective complexity is also low when a system operates in an environment that is highly orderly, in the sense that the systems which constitute it behave in a perfectly regular manner. In this situation very little happens and little learning or evolution is needed (Stacey, 1996: 96).

A SCES can adapt only when effective complexity is sizeable, that is, in conditions that are intermediate between order and disorder (Gell-Mann, 1994: 116). However, Stacey (1996: 97) explains that effective complexity has to be supplemented by the notion of potential complexity, which is the potential that complex systems possess to create a great deal of new effective complexity (Gell-Mann, 1994: 70). An example of this is provided by Stacey (1996: 97) through the human genome (biological schema) that varies only slightly from that of apes but which has much greater effective complexity in terms of behavioural schemas. Gell-Mann (1994) showed that complex systems function when effective and potential complexity is maximal.

Thinking of organizations in these terms enables us to appreciate that as SCES they can remain competitive within their complex environment only if they develop the capacity to learn. Some commentators argue that learning is nothing more than seeing and responding to changes and finding ways of leveraging the things that make a difference (Sherman and Schultz, 1998: 30). Moreover, learning is said to occur when innovation, creativity and adaptation, as well as self-organization occur (Stacey, 1995: 490-491; 1996: 91).

When we consider the key principles of SCES we note that learning is a common underlying characteristic. Learning is central to interdependence as it is the driving force connecting the diverse and heterogeneous social agents. Learning maximises diversity by drawing on the distinctive qualities of individual social agents as a basis of identifying complementarities that can address their common agendas. Learning provides the energy for connections to be made and highlights the gaps that exist while it also provides the scope for bridging these

gaps. Moreover, learning shapes the emerging models that define the boundaries of action while it also opens up multiple modes of interaction. Modes of interaction are not only the emerging patterns of thinking and action, they are also the very social structures that are constantly evolving as social actors become sensitised to new possibilities for learning (see Antonacopoulou, 2005a). These new possibilities are also central to self-organization the inherent nature of social systems to renew themselves. This process of renewal, and on-going transformation is made possible because learning, like change is endemic to organizing. Therefore, what SCES emphasise is that learning needs to be better appreciated as a central feature of the social and its evolution. Moreover, learning is central to the systemic nature of social evolution because, it highlights the complex (the amalgam) of connecting forces and the conditions that support their interaction (Antonacopoulou, 2002). This perspective not only captures the fluidity that is so central to social systems, it also challenges us to explore learning as an integral part of what it means to be a viable system (see Beer, 1972). In other words, self-organization is an inherent mechanism for reaching internal consistency in relation to external forces. The distinction between internal and external does not only refer to the relationship between organization and the environment but also the relationships between individuals with different locus of power, accountability and control. This point is critical as it introduces a fundamental quality of SCES; their inherent political nature. This is a characteristic that the current complexity science literature does not fully account for.

Social (critical) theory (Clegg and Dunkerley, 1977; Foucault, 1977; Habermas, 1978; Knights and Willmott, 1989; Alvesson and Willmott, 1992, 1996) discusses extensively the ways power manifests itself in social systems (like organizations) and the role it plays in shaping interactions between social actors and the structures they create. There is a tendency however, in social theory to present these political forces by highlighting predominantly the role of self-interest as a driving force underpinning the role of power and control (Lawrence

et al., 2005). This perspective presents the inherent tensions when competing priorities interact and has been most valuable in understanding the 'internal dilemmas' social actors experience (see Antonacopoulou, 1998; 2001).

However, SCES also reflect that beyond self-interest what drives social interactions are collective interests. In the context of community, sharing common goals and mutual interests is reflective of the way the inherent diversity between social actors creates the possibility for something greater than just the sum of the individual parts. The notion of mutuality does not negate the existence of differences nor does it neglect the inequalities of power and control. What it does highlight instead, is that the tensions embedded in the socio-political dynamics underlying social complexity are a key source driving the *ex-tension* of a system as it evolves in directions and in response to the possibilities new connections between agents and structures create (Antonacopoulou and Graça, 2004).

This perspective we argue deserves more discussion and would be particularly relevant to our understanding of organizational learning.

ORGANIZACIONAL LEARNING AS SCES

The preceding paragraphs have already demonstrated the centrality of learning in social complexity. In this section we extend our analysis by exploring the contribution of SCES principles to understanding OL. Consistent with our focus in the previous section on social complexity and the evolution of social systems, we explore how the principles of SCES help us rethink some of the basic dimensions of OL. In pursuing this analysis we not only seek to examine how ideas of complexity science can help our investigation of OL, we also explore how OL theory can be further developed if OL were to be conceptualised as a SCES. To place the perspective we seek to explore in context, we first provide a brief overview of the main dimensions that the debate in OL has so far engaged with.

Our thinking about learning in organizations has unfolded over time highlighting through the

various perspectives that have dominated the debate, either the *behavioural* aspects (Cyert and March, 1963; Levitt and March, 1988), the *cognitive* issues (Duncan and Weiss, 1979; March and Olsen, 1975), the *socio-cultural* dimensions (Cook and Yanow, 1993; Lave and Wenger, 1991) and more recently the *practice-based* view (Nicolini et al., 2003). However, two main explanations seem to be offered in relation to how organizations learn (Cook and Yanow, 1996; Easterby-Smith et al., 1998; Gherardi, 1999; Easterby-Smith and Araujo, 1999; Chiva and Alegre, 2005): the individual and the social view. The individual view considers learning as an individual phenomenon and consequently understands that organizations learn through individuals; and the social view considers that learning is a social phenomenon and consequently understands that organizations learn through communities and groups.

We discuss the individual and social view of OL to distil the current conceptualisations which underpin our current understanding of OL. Our analysis will seek to highlight the underlying logic that informs our current understanding. We draw on Ford and Ford (1994) to unpack the distinctions between 'formal', 'dialectic' and 'trialectic' logic in the way we conceptualise learning. We argue that different logics capture aspects of social complexity to different degrees. We therefore, put forward a new perspective in relation to OL; namely the complex view of OL.

The individual and social views

When it comes to studying organizational learning, most authors have looked at how individuals within organizations learn (March and Olsen, 1975; Shrivastava, 1983; Simon, 1991; Dodgson, 1993; Antonacopoulou, 1998). The individual view understands organizational learning as individual learning in an organizational context. Researchers from this perspective consider organizational learning to be a type of individual learning carried out in organizations by key individuals whose learning is linked to possible organizational change. Individuals learn and then transfer to others what they know. OL models such as that of Huber (1991) are mainly based on this view, which understands the existence of

several phases (information acquisition – information dissemination – collective interpretation) originated by individual learning resulting in the change of organizational memory.

A 'formal logic' could be said to be implicit in the individual view (Ford and Backoff, 1988). Such logic is based on the assumption that learning is a product of a planned process which manages knowledge such that old knowledge is substituted with new knowledge. As Hedberg (1981) posits, unlearning is an essential element in order to learn.

The individual view of OL, therefore, is linked to psychological individual learning theories (behaviourist, cognitivist, humanist). Organizational learning is the efficient procedure for the processing, interpretation and improvement of representations of reality through knowledge. Consistent with this view much of the recent knowledge management literature, assumes that knowledge can be codified, stored and easily transmitted (for a review see Chiva and Alegre, 2005). When this transmission of knowledge occurs, or is embedded in rules and routines, then organizational knowledge is created (Cohen and Bacdayan, 1994). This conceptualization of learning, knowledge and their relationship within organizations is based on a positivist epistemology and fails to capture the multiple modes of knowing in action as social actors interact (Antonacopoulou, 2005b).

With the publication of studies by Lave and Wenger (1991) and Brown and Duguid (1991), the social view of OL emerged (Huysman, 1999: 70). This perspective understands organizational learning to be the product of social interactions, normally in the workplace, and poses an alternative to the dominant individual model that conceives the learning individual as someone who processes information and modifies his or her mental structures. The social perspective implies that individuals are social beings who together construct an understanding of what surrounds them, and learn from the social interaction within social systems such as organizations (Gherardi et al., 1998: 274-276).

According to the social perspective, learning can only be achieved through active participation (Blackler, 1993: 870), which is constantly being modified. As a result, this perspective focuses on change, rather than on order and regulations (Elkjaer, 1999: 80). Rather than attempting to understand what type of cognitive process or conceptual structure is involved in organizational learning, the social perspective sets out to explain which type of social context is most suitable for organizational learning, focusing on the group and the community, rather than on the mind of the individual (Gherardi et al., 1998). Therefore, as Elkjaer (2003: 50) argues learning is perceived as a continuous activity that cannot be controlled; only the context can be controlled, thus facilitating organizational learning to a greater or lesser extent.

In accordance with the social perspective, organizational learning is conceptualised as the process of social construction of shared beliefs and meanings in which the social context plays an essential role (Chiva and Alegre, 2005; Berger and Luckmann, 1967).

Many authors writing from the individual view deal with the political aspects of organizational learning, as if it were a persistent problem, which has to be eliminated if learning is to take place (Argyris, 1986). From a social perspective, this is utopian, as politics is a characteristic of social relations. If knowledge is socially constructed by individuals and groups, it is inevitable that particular interpretations will be supported by some and rejected by others (Coopey, 1994). Thus, the power relations in an organization will play a key role in the OL process as they expose competing perspectives and degrees of inequality in the way different degrees of knowledge are employed to support different interests. This could be related to Hegel's dialectics where the 'struggle' between internal opposing tendencies that start escalate to the point where they can no longer be maintained and a new synthesis is created (Ford and Ford, 1994). Therefore, the socio-political dynamics formed by the interplay of internal forces are a powerful source driving learning, as much as learning is driven by external forces.

In these terms, politics and power play a vital role in the social view of OL as they bring to the fore the role of conflict, internal contradictions and tensions between and within social actors. Power is a means of constructing social relations but not the only source of enacting the social reality.

The individual and social perspectives of OL are useful in that they encourage us to pay attention to different aspects of learning. This is precisely however, the problematic embedded in both perspectives. They only provide us lenses for seeing part of the picture. As we have argued in the previous sections in our view if OL is to be fully understood it is important to develop lenses for connecting the various aspects so that the complexity of the phenomenon can be more fully engaged with. We would argue therefore, for a complex view of OL promoting the need to understand the multifaceted nature of OL.

The complex view

Based on our analysis of the characteristics of SCES, we would argue for a complex view of OL. The complex view of OL does not dismiss the previous perspectives. It seeks instead to combine them in a way that it broadens the scope for developing new OL theory, as well as sensitizing us to a number of issues that can usefully inform our investigations of OL. The complex view of OL is based on the proposition that OL is a SCES as much as it is a critical element of the complexity of social systems such as organizations. We unpack the underlying characteristics of the complex view of OL by elaborating on three premises which capture the essence of social complexity of OL:

Premise 1: OL is a cause, consequence and context of a social self-organising and co-evolutionary process.

Premise 2: Inter-Connections in the way individuals and groups within and outside the organization interact are shaped by the political forces which are essential to OL.

Premise 3: Diversity in individual models and power bases is an endemic feature of organizing and a crucial part of the process of developing OL.

We explore each of these premises in more detail.

Premise 1: What would describe OL as truly organizational would be the self-organizing nature of learning as part of the stream of practices that constitute organization (Antonacopoulou and Dragonetti, 2005). These shared practices are reflected in routines (Axelrod and Cohen, 1999; Bechky, 2003); models (Stacey, 1996); strategies (Gell-Mann, 1994); organizational culture (Gell-Mann, 1994); or the dominant logic (Bettis and Prahalad, 1995). Reconfigurations in practices are a consequence of a process of self-organization and co-evolution. New shared practices appear as a consequence of individual and group interactions and also connections with the environment, which have a mutually adaptive relationship with the organization. OL therefore, can be re-conceptualised as a process and product of the on-going mutations in relation to the governing practices and the way these co-evolve in time and space in response to endogenous and exogenous forces. This systemic view understands that OL is a spontaneous consequence of interactions within the organization and between the organization and the environment (Mitleton-Kelly, 2003). Therefore, internal (endogenous) and external (exogenous) interactions are essential to the complex view of OL. These interactions as part of the ongoing evolutions of organizations reveal OL reflected in the inherent mutations that such interactions entail. OL however, does not only arise as a result of noticeable shifts (formal logic) in practices or re-integration of otherwise conflicting perspectives (dialectic logic). OL also arises as a result of learning that emanates from multiple possibilities previously not explored either because they were considered irrelevant or not possible. This view of OL adopts a trialectic logic of learning (Ichazo, 1976). Ford and Ford (1994) understand that trialectics as a logic is strongly related to the science of complexity.

In these terms, trialectics is an alternative logic beyond the formal and dialectic logic, which proposes that learning occurs through attraction to different possibilities. Learning, therefore, does not only result from a synthesis of potentially opposing perspectives as suggested in

dialectics. Instead, learning can also emerge as different connections and possibilities are explored. Learning therefore, emerges as a space/context where these possibilities can be contained and it is also a process and product of the multiplicity of connections (Antonacopoulou, 2002). This perspective also reveals the second premise of OL notably that OL is the emergent product of multiple connections.

Premise 2: The complex view of OL emphasises the importance of inter-connections among parts of the system that constitute learning (Kauffman, 1995; Axelrod and Cohen, 1999). Connections, dense and rich, enable the creation of meaning to take place among sub-units, and generate individual and shared models. Interactions are not simply the way in which an individual model is shared, as understood by frameworks put forward by Huber (1991), Kim (1993) and Crossan et al (1999). In line with the ideas of Oswick et al. (2000), interactions suggest that models are always co-evolving and changing and the reasons agents interact is to better understand what they mean, hoping to find new and more satisfying ways of being together (Deetz, 1995). Relationships and connections with the environment are also important, as the organization attempts to co-evolve with a changing environment. This approach implies an organization closely linked with other related systems within an ecosystem. In a social co-evolving ecosystem, each organization is a fully participating agent which both influences and is influenced by the social ecosystem made up of all related business, consumers, and suppliers, as well as economic, cultural and legal institutions (Mitleton-Kelly, 2003).

This point suggests that the institutionalisation of OL as a process is subject to the institution transforming itself through learning practices that are instituted by social structures. These very social structures however, are also constantly negotiated as diverse social forces (agents and structures) interact in embracing the heterogeneous nature of self-organization. This point also reflects the third premise of the complex view of OL; namely that complexity implies the co-existence of heterogeneous and different individual or group models (Gell-

Mann, 1994).

Premise 3: The complex view of OL embraces heterogeneity and diversity in the way individuals or groups scan and interpret their environment and develop models (Daft and Weick, 1984). These models are rationally bounded, observer-dependent, exist in multitudes, and compete for survival (Dooley, 1997). Within a context that accepts diversity and pluralism and the relationships between individual or groups, the shared model can be questioned and modified.

In SCES this diversity involves a balance between negative and positive feedback. Positive and negative feedback reflect the co-existence of antithetical perspectives in a way that these underpin the diversity of a social system. In other words, antithetical perspectives is what drives complex systems to a state of "limited instability" or "the edge of chaos". These states denote an equilibrium between stability and chaos, in the way the tension between competing forces drives the possible connections that can be productively created as a result of their interaction. In other words, the inherent diversity need not lead to a synthesis of perspectives (as per the dialectic view). Instead, the diversity needs to be maintained as this is a source of dynamism embedded in effective complexity.

The co-existence of antithetical perspectives is not new to organization theory nor to OL debates. Some researchers maintain that the most efficient organizations possess strategies, which place them in a situation of equilibrium between stability and flexibility (Weick, 1979), or between exploitation and exploration (March, 1991), or demonstrate a high degree of complexity (Miller, 1993). Weick and Westley (1996: 441) describe organizations as cultures, which are at the same time self-designing deposits and systems, thereby allowing them to put forward a theory of learning that suggests the importance of juxtaposing order and disorder. Therefore, in line with the principles of SCES, the tension between formal and informal, between exploitation and exploration is a central characteristic of OL. The double

existence of a formal, delimited structure, with regard to responsibilities and priorities, with greater communication, participation, heterogeneity, dialogue and creative liberty (Stacey, 1995, 1996) implies the basic organization and political system for learning. As described in the previous section, Stacey (1996: 110, 182) suggested that for stability autocracy or bureaucracy is needed (negative feedback). Whereas for chaos (positive feedback), anarchy or few people exerting power (power vacuum) may be the most appropriate. For complexity, a critical point is needed where one can find both containment of anxiety through clear hierarchical structures and directive forms of leadership, on the one hand, at the same time as there is freedom to engage in creative activity. The balance between positive and negative feedback implies a capacity to connect at a different level of interaction where engagement underpins interconnectivity. This view is consistent with Örtenblad's (2002) radical perspective on OL. Engaged interaction as opposed to instrumental transaction challenges conditions of power and control in organizations. This perspective implies that the learning space in the organization embraces different perspectives and engages social actors in a reflective and reflexive process of learning.

The complex view of OL offers a perspective that not only reflects many of the characteristics of SCES. It also highlights the importance of learning both as a central element of social complexity as well as a central force supporting the dynamics that shape the multiplicity of interactions and connections that underpin the evolution of SCES. Table 1 summarises the three premises of the complex view of OL and compares these with the individual and social views of learning.

INSERT TABLE 1 ABOUT HERE (OL views: individual, social and complex)

DISCUSSION AND IMPLICATIONS FOR FUTURE OL RESEARCH

The ideas of SCES and the complex view of OL present an alternative perspective in the way we conceptualise OL. In this final section we discuss the implications of the complex view of

OL for future OL research. At the most basic level the view of OL as a SCES sensitises us to the importance of multiple levels of learning. The interactions among multiple levels also emphasises the need to integrate endogenous and exogenous forces and to pay greater attention to the dynamics such interactions create both internally and externally. In other words, co-evolution reflects the way organizations create and recreate their internal and external environment. Co-evolution is also the complex set of interconnections that are shaped by the socio-political dynamics underpinning the interactions between social agents the social structures internally and externally. The multiplicity of interactions leads to a multitude of possibilities as part of the on-going self-organization. We discuss further each of these issues and their implications for future OL research.

The multiple levels of learning

Perhaps one of the most debated issues in OL research has been the unit of analysis, which best serves our understanding of OL. Adopting a SCES perspective encourages us to seek a more holistic understanding of learning as a process created in the process of interaction across multiple levels (individual, group, organizational, environment). In other words, adopting a more integrative view enables us to combine the various levels and units of analysis and acknowledge that it is the interrelationships between levels and units of analysis that ought to be our focus, thus enabling us to better understand how units of analysis constitute each other and form part of the whole (Antonacopoulou, 2005c). This holistic view is represented diagrammatically in Figure 2. Consistent with the logic of complexity SCES can be formed by other SCES, creating different levels or aggregates: individuals, groups, organizations, sectors (Stacey, 2003).

INSERT FIGURE 2 ABOUT HERE (The multiple levels of learning and their interaction)

Moreover, OL as a SCES highlights the co-existence of both individual and group or organizational (shared) models, as it opens up the possibility for learning. It is in the

interaction between these individual and collective models that learning resides and from which it evolves and emerges. Therefore, SCES principles stress both the importance of the individual agent learning and the relationships underpinning the social aspects of learning.

The importance of the internal and external environment

OL as a SCES highlights the importance of the relationships between heterogeneous agents. Diversity and heterogeneity are achieved by the relationships between agents and by the internal agents' or individuals' relationships with the outside world. The latter aspect is not emphasised in the literature on the social perspective, as it is understood that OL comes out of social interaction in the workplace, without reference to the environment. The reason why this aspect is not covered in this perspective could be that the environment is used in the individual view as the main catalyst for OL (Duncan and Weiss, 1979; Shrivastava, 1983), given that it is based on the psychological stimulus-response paradigm (Weick, 1991).

However, in SCES the relationship agents enjoy with their environment forms the basis for their learning, as in this way, agents achieve heterogeneous individual models, which cause, amongst other things, the effective complexity of the system and the emerging self-organization. The existence of the shared models, together with the agents' individual models (diversity), opens up the possibility for changes to these rules, or in other words, evolution and learning. Therefore, OL as a SCES reinforces the importance of endogenous and exogenous connections drawn as the internal and external environment interact. It is critical therefore, that future research in OL explores both the endogeneity and exogeneity of learning as different sets of relationships create both the need and the context for learning. Equally fundamental is the need to explore the dynamics resulting from the relationship between internal and external factors as they interact. This approach is more likely to provide scope for exploring the mutually adaptive relationship between the organization and the environment. The internal and external environment is dynamic and permeable not least because of the socio-political dynamics that constitute it.

Power and political dynamics

OL as a SCES reinforces the importance of politics as a central characteristic of social complexity. Politics are the relationships and negotiations between agents with different or opposite interests. Power is the medium through which conflicts of interests are ultimately resolved (Morgan, 1997). Power influences who gets what, when and how. According to Morgan (1997: 156) when we summon terms like autocracy and democracy to describe the nature of the organization we are implicitly drawing parallels between organizations and political systems. In each of these words the suffix *-cracy*, which derives from the Greek *kratía*, meaning power or rule, is coupled with a prefix that indicates the precise nature of the power or rule employed.

The essence of learning in the context of SCES resides in the co-existence of both individual and shared models, which implies diversity and heterogeneity. In acknowledging that politics are central for SCES it is not enough to accept that politics is a characteristic of the social process. Conflict does not always lead to a synthesis. Reconciling competing perspectives is not what produces the dynamism that underpins social complexity. Instead, we would argue that social complexity is underpinned by the ongoing negotiations that are embedded in the emergent connections resulting from the attraction and collaboration between diverse perspectives.

Trialectics propose that learning occurs by virtue of the attraction of one point to other possible points. Ford and Ford (1994), state that this perspective is very similar to the idea that people will work toward the accomplishment of a vision by which they are inspired. Trialectics offers a vocabulary of relationship and possibility. The set of relationships determine the attraction to any particular future, which is simply one of a multitude of possibilities. The challenge is to create a context in which learning is attractive to people so that they can be more engaged in exploring ways in which they can contribute to the fulfilment of that future. Engagement is thus, an essential element of the complex view of

OL.

Complex social systems are networks in which agents relate to each other in a non-linear manner (Griffin et al., 1998: 330). This view suggests that agents participate in the network they constitute in a self-organizing manner and in so doing continually produce emergent patterns of relationship across the network. They co-create the reality into which they are acting and that reality includes themselves. When such networks evolve in the dynamic context known as the edge of chaos they are able of producing novel forms. OL therefore, can be conceptualised as much the process by which such networks create the connections among and between social actors as it could be at the same time the context and consequence of the interactions between social actors. Conceptualising therefore, OL as a SCES opens up a multitude of possibilities for rediscovering learning, organising and organization across levels and units of analysis, in the relation to the multiplicity of possibilities that the connections between them can create.

We integrate all the above points in a framework of OL which we define as **EMIC: Engagement, Multiplicity (Diversity) and Inter-Connectivity (interdependence)**. This framework also carries connotations of emic vs. etic research approaches (Headland et al., 1990) and we indirectly emphasise the importance of situated, subjective and contextually defined conditions which shape the way OL emerges. Figure 3 represents the EMIC framework of OL diagrammatically.

INSERT FIGURE 3 ABOUT HERE (the EMIC framework of OL)

CONCLUSION

The OL debate appears to have reached a point of stagnation where little progress seems to be noticeable in terms of some of the prominent questions that still remain unresolved. Although there seems to be some agreement that emotion, power and politics are part of the

OL process and support learning in the presence of diversity (Lawrence et al. 2005; Vince et al., 2003; Easterby-Smith et al., 2000) there is still lack of agreement about how OL takes place and the mechanisms or processes involved, what factors facilitate its development, or what aspects to look for when we investigate OL.

This paper contributes to the ongoing OL debate by providing a new perspective for re-conceptualising learning based on the principles of complexity science. The analysis firstly extends current conceptualisations of organizations as complex adaptive systems by drawing more attention to the characteristics of social complexity. Based on the principles of social complex evolving systems distilled, a new view – the complex view - of OL is presented. The complex view of OL contributes to our understanding of some of the neglected aspects of OL including: self-organization, co-evolution, emergence, diversity and interconnectivity.

Following on Tsoukas's (1998) we invite the OL research community to try to imagine organizations as if they were social complex evolving systems and see what might the consequences of this be for OL. Equally, we invite the research community to rethink OL as a SCES itself. The complex view of OL integrates different levels of learning and emphasises the importance of the emerging space for learning in the way internal and external interactions between agents and their structures co-evolve. Moreover, this co-evolution is underpinned by the socio-political dynamics that feed the new possibilities social actors seek to engage with as multiple and competing priorities are constantly negotiated.

This perspective seeks to provide a more holistic conceptualisation of learning in relation to organising. The proposed EMIC framework captures ways in which these ideas can be receive more attention in future research in ways that the dynamic, complex nature of social forces underpinning OL can be more fully engaged with.

The contribution of this perspective is that it challenges us to rethink the very basic epistemological and ontological assumptions that underpin our definitions of learning,

organization and organizational learning. This paper is first step in this direction.

REFERENCES

- Alvesson, M. and Willmott, H. (1992) (Eds.) *Critical Management Studies*, London: Sage.
- Alvesson, M. and Willmott, H. (1996) *Making sense of Management: A critical introduction*, London: Sage.
- Anderson, P. (1999) 'Complexity theory and organization science', *Organization Science*, 10 (3), 216-232.
- Antal, A.B., Dierkes, M., Child, J. and Nonaka, I. (2001) 'Organizational Learning and knowledge: Reflections on the Dynamics of the field and Challenges for the Future'. In Dierkes, M.; Ariane, B.A.; Child, J. and Nonaka, I. (Eds.) *Handbook of Organizational Learning and Knowledge*. New York: Oxford University Press.
- Antonacopoulou, E.P. (1998) Developing Learning Managers within Learning Organizations, in M. Easterby-Smith, L. Araujo and J. Burgoyne (Eds.) *Organizational Learning and the Learning Organization: Developments in Theory and Practice*, 214-242, Sage, UK.
- Antonacopoulou, E.P. (2000) 'Employee Development through Self-development in three Retail Banks', *Personnel Review*, Special Issue on 'New Employee Development: Successful Innovations or Token Gestures?' 29(4): 491-508.
- Antonacopoulou, E.P. (2001) 'The paradoxical nature of the relationship between training and learning', *Journal of Management Studies*, 38(3): 327-350.
- Antonacopoulou, E.P. (2002) 'Learning as Space: Implications for Organizational Learning', *Manchester Business School Research Paper series*, No. 443.
- Antonacopoulou, E.P. (2005a) 'Working Life Learning: Learning in *Practise*'; in Antonacopoulou, E.P., Jarvis, P., Andersen, V., Elkjaer, B. and Hoeyrup, S. (Eds) *Learning, Working and Living: Mapping the Terrain of Working Life Learning*, London: Palgrave.
- Antonacopoulou, E.P. (2005b) 'Modes of Knowing in Practice: The Relationship Between Learning and Knowledge Revisited' in Renzl B., Matzler, K. and Hinterhuber, H.H. (eds) *The Future of Knowledge Management*, Palgrave, London.
- Antonacopoulou, E.P. (2005c) 'The Relationship between Individual and Organizational Learning: New Evidence from Managerial Learning Practices' – under review.
- Antonacopoulou, E.P. and Dragonetti, N. (2005) 'The Challenges of Learning in Practice: Strategy and Organizational Theory Revisited', Paper to be presented at the *Academy of Management Conference*, Hawaii.
- Antonacopoulou, E.P. and Graça, M. (2004) 'In Search of Connectivity: A conversation between Organizational Learning and Actor Network Theories', Paper presented at the

20th EGOS Colloquium, 39th Sub-theme - *Epistemological foundations of organizational knowledge and knowing*, Ljubljana, July.

- Antonacopoulou, E.P. and Méric, J., (2005) 'From Power to Knowledge Relationships: Stakeholder Interactions as Learning Partnerships', in M. Bonnafeous-Boucher and Y. Pesqueux (Eds) *Stakeholders and Corporate Social Responsibility - European Perspectives*, London: Palgrave.
- Argyris, C. (1986) 'Reinforcing organizational defensive routines: an unintended human resources activity', *Human Resource Management*, 25 (4), 541-55.
- Argyris, C. and Schön, D. (1978) *Organizational Learning: a theory of action perspective*. Reading, Mass. Addison-Wesley.
- Argyris, C. and Schön, D. (1996) *organizational Learning II. Theory, method and practice*. Reading, Mass: Addison-Wesley.
- Axelrod, R. and Cohen, M.D. (1999) *Harnessing complexity*, New York: The Free Press.
- Bechky, B. (2003) 'Sharing meaning across occupational communities: The transformation of understanding on a production floor'. *Organization Science*, 14(3): 312-330.
- Beer, S. (1972), *Brain Of The Firm*, London: Penguin.
- Berger, P.L. and Luckmann, T. (1967) *The Social Construction of Reality*, London: Penguin.
- Bettis, R.A. and Prahalad, C.K. (1995) 'The dominant logic: Retrospective and extension', *Strategic Management Journal*, 16, 5-14.
- Boisot, M. and Child, J. (1999) 'Organizations as adaptive systems in complex environments: the case of China', *Organization Science*, 10 (3), 237-252.
- Brown, J.S. and Duguid, P. (1991) 'organizational Learning and communities-of-practice: Toward a unified view of working, learning, and innovation', *Organization Science*, 2 (1), 40-57.
- Brown, S.L. and Eisenhardt, K.M. (1997) 'The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations', *Administrative Science Quarterly*, 42: 1-34.
- Cheng, Y.T. and Van de Ven, A.H. (1996) 'Learning the innovation journey: Order out of chaos?', *Organization Science*, 7 (6), 593-614.
- Chiva, R. (2003) 'The Facilitating Factors for organizational Learning: bringing ideas from Complex Adaptive Systems', *Knowledge and Process Management*, 10 (2): 99-114.
- Chiva, R. (2004) 'Repercussions of complex adaptive systems on product design

- management' *Technovation*, 24: 707-711.
- Chiva, R. and Alegre, J. (2005) 'Organizational Learning and Organizational Knowledge: towards the Integration of two Approaches', *Management Learning*, 36:49-68.
- Clegg, S. and Dunkerley, D. (1977), *Critical Issues in Organizations*, London: Routledge.
- Cohen, M. (1999) 'Comentary on the Organization Science special issue on complexity', *Organization science*, 10 (3), 373-376.
- Cohen, M.D and Sproull, L. (1996) *organizational Learning* (introduction of the Editors).California: Sage Publications.
- Cohen, M.D. and Bacdayan, P. (1994) Organizational routines are stored as procedural memory: Evidence from a laboratory study. *Organization Science*, 5(4): 554-568.
- Coleman, H.J.Jr. (1999) 'What enables self-organizing behavior in business', *Emergence*, 1 (1), 33-48.
- Cook, S. and Yanow, D. (1996) Culture and OL. In Cohen, M. and Sproull, L. (Eds.), *organizational Learning*, pp. 430-459. California: Sage Publications.
- Coopey, J. (1994) 'Power, politics and ideology'. In J. Burgoyne, Pedler, M. and Boydell, T. (Eds.): *Towards the learning company*, pp. 42-51. London: McGraw-Hill Book Company.
- Coopey, J. and Burgoyne, J. (2000) 'Politics and organizational Learning', *Journal of Management Studies*, 37 (6): 869-885.
- Cyert, R.M. and March, J.G. (1963) *A Behavioural Theory of the Firm*. Englewood Cliffs, N.J.: Prentice Hall.
- Daft, R.L. and Weick, K.E. (1984) 'Toward a model of organizations as interpretation systems', *Academy of Management Review*, 9 (2), 284-295.
- Deetz, S. (1995) *Transforming communication, transforming business: building responsive and responsible workplaces*. Cresskill, NJ: Hampton Press.
- Dooley, K. A (1997) 'Complex Adaptive Systems Model of Organizational Change', *Nonlinear Dynamics, Psychology and Life Science*, 1 (1), 69-97.
- Dooley, K.J, Corman, S.R., McPhee, R.D. and Kuhn, T. (2003) 'Modeling high resolution broadband discourse in complex adaptive systems'. *Nonlinear Dynamics, Psychology, and Life Sciences*, 7 (1), 61-85.
- Duncan, R.B. and Weiss, A. (1979) 'organizational Learning: Implications for organizational design'. In B. Staw (Eds.) *Research in organizational behavior*, 75-123. Greenwich,

CT: JAI Press..

Easterby-Smith M., Crossan, M. and Nicolini, D. (1999) 'organizational Learning: debates past, present and future' *Journal of Management Studies*, 2000, 37 (6), 783-796.

Easterby-Smith, M. and Araujo, L. (1999) 'organizational Learning: Current debates and opportunities'. In Easterby-Smith, M., Burgoyne, J. and Araujo, L. (Eds.). *organizational Learning and the learning organization*, 1-21. London: Sage Publications.

Easterby-Smith, M., Snell, R. and Gherardi, S. (1998) 'organizational Learning: Diverging communities of practice?', *Management Learning*, , 29, 259-272.

Easterby-Smith, M., Antonacopoulou, E.P. Lyles, M. and Simms, D. (2004) 'Constructing Contributions to organizational Learning: Argyris and the New Generation', Special Issue 'From Chris Argyris and Beyond in organizational Learning Research', *Management Learning*, 35(4): 371-380

Eisenhardt, K.M. and Brown, S.L. (1998a) 'Competing on the edge: Strategy as structured chaos', *Long Range Planning*, 31 (5): 786-789.

Eisenhardt, K.M. and Brown, S.L. (1998b) 'Time pacing: Competing in markets that won't stand still', *Harvard Business Review*, March-April, 59-69.

Elkjaer, B. (1999) 'In search of a social learning theory'. In Easterby-Smith, M.; Burgoyne, J. and Araujo, L. (Eds.) *organizational Learning and the learning organization*, pp.75-91. London: Sage Publications.

Feldman, M. S. and Pentland, B. T. (2003) 'Reconceptualizing organizational routines as a source of flexibility and change', *Administrative Science Quarterly*, 48 (March): 94-118.

Fiol, C. M. and Lyles, M.A. (1985) 'Organizational Learning', *Academy of Management Review*, 10, 803-813.

Ford J. and Backoff (1988) 'Organizational Change in and out of dualities and paradox'. In Quinn, R. and Cameron, K. (Eds.) *Paradox and Transformation: toward a theory of change in organization and management*, pp. 81-21. Cambridge, MA: Ballinger.

Ford J. and Ford L.W. (1994) 'Logics of Identity, contradiction, and attraction in change', *Academy of Management Review*, 19 (4): 756-785.

Foucault, M. (1977), *Discipline and Punish*, London: Allen and Unwin.

Gell-Mann, M. (1994) *The quark and the Jaguar. Adventures in the simple and the complex*. New York: WH Freeman.

Gherardi, S. (1999) 'Learning as problem-driven or learning in the face of mystery?'

- Organization Studies*, 20 (1), 101-24.
- Gherardi, S. (2000) 'Practice-based theorizing on learning and knowing in organizations', *Organization*, 7 (2), 211-223.
- Gherardi, S., Nicolini, D. and Odella, F. (1998) 'Toward a social understanding of how people learn in organizations', *Management Learning*, 29 (3), 273-97.
- Gregersen, H. and Sailer, L. (1993) 'Chaos Theory and its Implications for Social Science Research', *Human Relations*, 46(7): 777-802.
- Griffin, D.; Shaw, P. and Stacey, R. (1998) 'Speaking of complexity in Management Theory and Practice', *Organization*, 5 (3): 315-339.
- Goodwin, B. (1994) *How the leopard changed its spots: the evolution of complexity*. London: Weidenfeld and Nicholson.
- Habermas, J. (1978), *Knowledge and Human Interests*, London: Heinemann.
- Headland, T. N., Pike, K. L. and Harris, M. (1990) *Emics and Etics: The Insider/Outsider Debate*, Newbury Park, Ca.:Sage
- Hedberg, B. (1981) 'How organizations learn and unlearn' In Nystrom and Starbuck (Eds.) *Handbook of Organizational Design*. New York: Oxford University Press.
- Holland, J.H. (1995) *Hidden order. How adaptation builds complexity*. Reading: Addison-Wesley publishing company.
- Ichazo, O. (1976) *The human process for enlightenment and freedom*. NY: Arica Institute Press.
- Johnson, J.L. and Burton, B.K. (1994) 'Chaos and complexity theory for management: caveat emptor'. *Journal of management enquiry*, 3 (4), 148-155.
- Kauffman, S.A. (1993) *Origins of order: Self organization and selection in evolution*. Oxford: Oxford University Press.
- Kauffman, S.A. (1995) *At home in the Universe*, Oxford: Oxford University Press.
- Knights, D. and Willmott, H. (1989), 'Power and subjectivity at work: From degradation to subjugation', *Sociology*, 23, 4, 535-558.
- Lawrence, T.B., Mauws, M.K., Dyck, B. and Kleysen, R.F. (2005) 'The politics of organizational learning: integrating power into the 4I framework', *Academy of Management Review*, 30 (1): 180-191.
- Lave, J. and Wenger, E. (1991) *Situated learning: Legitimate peripheral participation*. New

- York: Cambridge University Press.
- Levitt, B. and March, J.G. (1988) 'Organizational Learning', *Annual Review of Sociology*, 14: 319-340.
- Levinthal, D. A. and March, J. G. (1993) The myopia of learning. *Strategic Management Journal*, 14: 95-112.
- Lyles. M.A. and Easterby-Smith, M. (2003) 'organizational Learning and knowledge Management: agendas for future research'. In Easterby-Smith, M. y Lyles, M.A. *Handbook of organizational Learning and Knowledge Management*. Blackwell Publishing.
- Mathews, K.M., White, M.C. and Long, R.G. (1999) 'Why study the complexity sciences in the social sciences?' *Human Relations*, 52 (4), 439-462.
- McKelvey, B. (1999) 'Visionary Leadership vs Distributed Intelligence: Strategy, Microevolution, Complexity'. In *Proceedings of EIASM Workshop*, Brussels, June.
- Miller, D. (1993) 'The architecture of simplicity', *Academy of Management Review*, 18 (1), 116-138.
- Miner, A. and Mezias, S. (1996) 'Ugly duckling no more: Pasts and Futures of organizational Learning Research', *Organization Science*, 7 (1), 88-99.
- Mitleton-Kelly, E. (2003) *Complex systems and evolutionary perspectives on organizations: the application of complexity theory to organizations*. London: Elsevier.
- Morgan, G. (1997) *Images of Organization*. Newbury Park: Sage Publications.
- Nicolini, D., Gherardi, S. and Yanow, D. (2003) 'Introduction: towards a practice-based view of knowing and learning in organizations', in D. Nicolini, S. Gherardi and D. Yanow (eds.) *Knowing in Organizations: A Practice-Based Approach*. 3-31 London: M.E.Sharpe:
- Örtenblad, A. (2002) 'organizational Learning: A radical perspective'. *International Journal of Management Reviews*, 4 (1): 87-100.
- Oswick, C., Anthony, P., Keenoy, T. and Mangham, I.L. (2000) 'A dialogic analysis of organizational Learning', *Journal of Management Studies*, 37 (6), 887-901.
- Scott, W. R. (2001) *Institutions and Organizations* (2nd ed.). Thousand Oaks, CA: Sage.
- Sherman, H. and Schultz, R. (1998) *Open Boundaries*. New York: Perseus Books.
- Shrivastava, P. (1983) 'A typology of organizational Learning systems', *Journal of Management Studies*, 20: 7-28.

- Simon, H.A. (1991) 'Bounded rationality and organizational Learning', *Organization Science*, 1991, 2 (1), 125-134.
- Simon, H.A. (1996) *The sciences of the artificial*. Mass.: Institute of Technology.
- Stacey (2003): *Strategic Management and Organizational Dynamics: the challenge of Complexity*. Essex: Prentice Hall.
- Stacey, R.D. (1993) 'Strategy as order emerging from chaos', *Long Range Planning*, 26 (1), 10-17.
- Stacey, R.D. (1995) 'The science of complexity: an alternative perspective for strategic change processes', *Strategic Management Journal*, 16: 477-495.
- Stacey, R.D. (1996) *Complexity and creativity in organizations*. San Francisco: Berret-Koehler publishers.
- Thiertart, R.A., and Forgues, B. (1995) 'Chaos theory and organization'. *Organization Science*, 6(1): 19-31.
- Tsoukas, H. (1998) 'Introduction: chaos, complexity and organization theory', *Organization*, 5 (3): 291-313.
- Vince, R. (2001) 'Power and emotion in organizational learning'. *Human Relations*, 54(10): 1325-1351.
- Vince, R.; Sutcliffe, K. and Olivera, F. (2002) 'Organizational Learning: new directions', *British Journal of Management*, 13: s1-s6.
- Weick, K. E. and Westley, F. (1996) 'Organizational Learning: affirming an oxymoron'. In Clegg, S.R., Hardy, C. and Nord, W.R. (Eds.) *Handbook of organizational studies*, pp. 440-458. London: Sage.
- Weick, K. E. (1991) 'The nontraditional quality of Organizational Learning', *Organization Science*, 2 (1): 116-123.
- Weick, K. E. (1979) *The social psychology of organizing*. Mass.: Addison Wesley.
- Wenger, E. (2000) 'Communities of practice and social learning systems', *Organization*, 7 (2), 225-246.
- Wenger, E.C. and Snyder, W.M. (2000) 'Communities of practice: The organizational frontier', *Harvard Business Review*, January-February, 139-145.
- Watzlawick, P., Weakland, J.H. and Fish, R. (1974) *Change: Principles of Problem Formation and Problem Resolution*, Norton. N.Y.

FIGURES and TABLES

Figure 1: Complex Adaptive Systems.

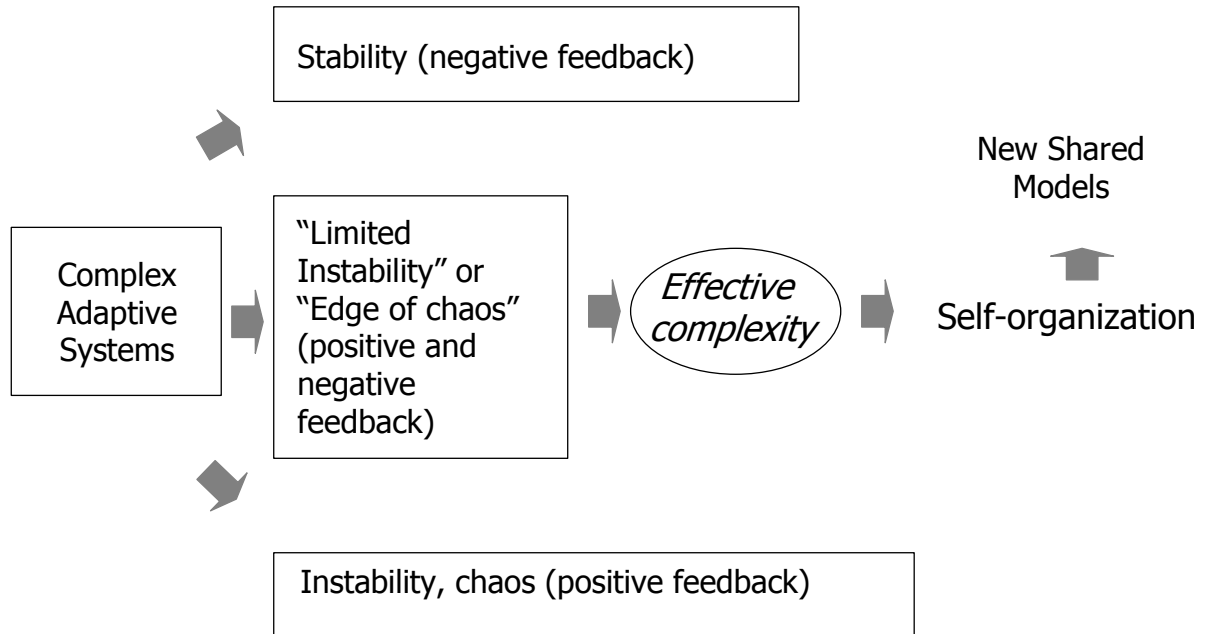


Table 1: Organizational Learning views: Individual, Social and Complex

	Organizational Learning views		
	Individual	Social	Complex
<i>Disciplines</i>	Individual learning theories (cognitivism, behaviourism, humanism).	Social learning, Politics.	Complexity Science - SCES.
<i>Focus (levels of learning)</i>	Individuals.	Communities, groups.	Social complexity: Individuals, groups, communities, environment (holism)
<i>Logic of Change</i>	Formal logic (Aristotle)	Dialectics (Hegel)	Trialectics (Ichazo)
<i>Organizational Learning Process</i>	Individuals learn (and unlearn) and then transfer to others; if organizational knowledge changes, then organizations learn.	People in communities and groups interact and participate. Social construction of reality.	When effective complexity is maximal (diversity, connections within and with the outer environment) then self-organization. A new shared model emerges.
<i>Role of the Environment</i>	Catalyst for individual learning: stimulus-response paradigm.	None; focus on the community, group.	Co-evolution: Importance of connections with the internal and external environment.
<i>Role of Politics</i>	Limited role except in relation to the motivation to learn.	Politics is a characteristic of the social process. Focus on conflict.	Politics is a characteristic of the social process. Focus on engagement.

Figure 2: The Multiple Levels of Learning and their Interactions (Antonacopoulou, 2005c)

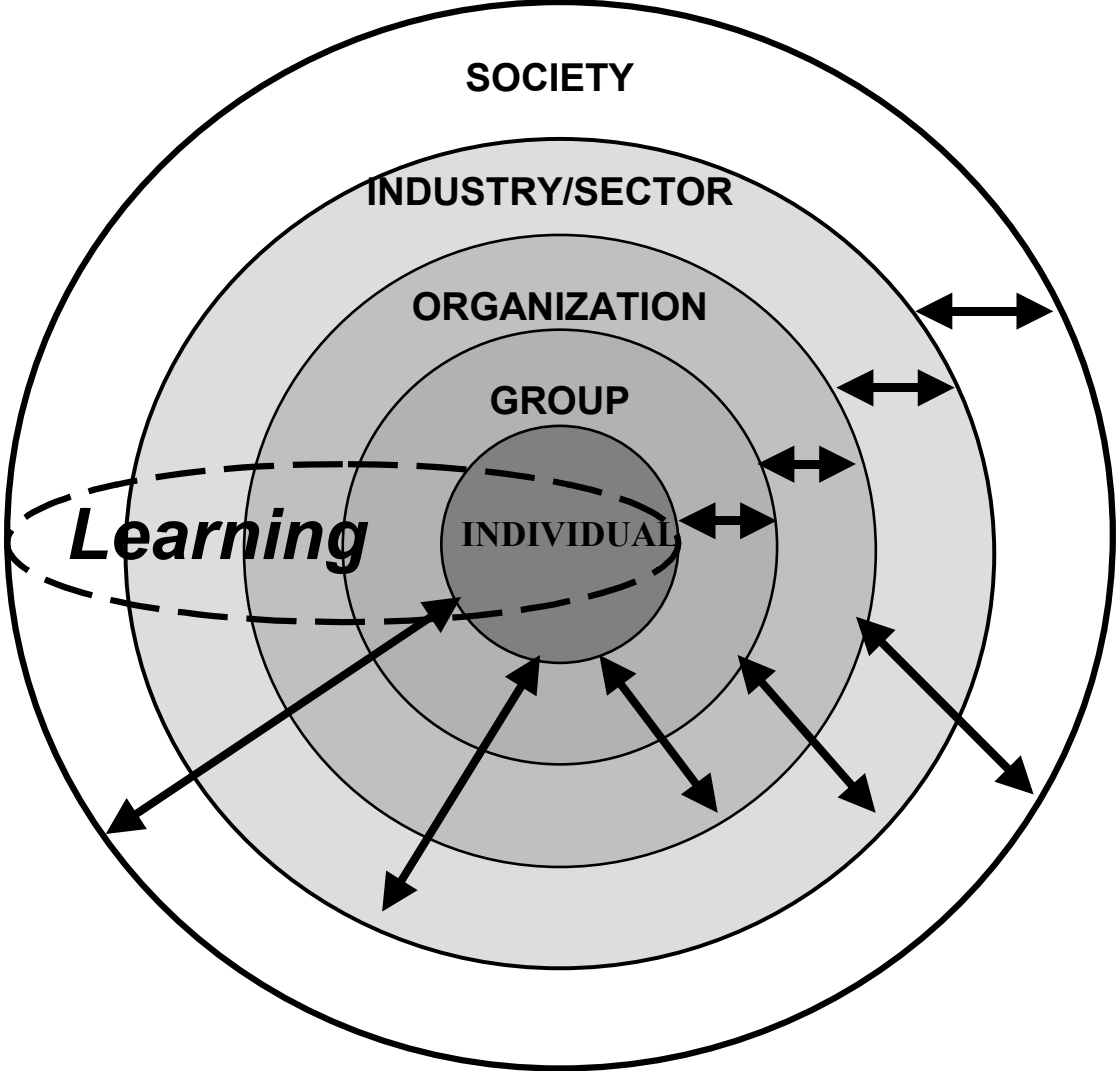


Figure 2: The EMIC Framework of Organizational Learning

