



Knitted patterns or contagious hotspots?

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or contagious
hotspots?

Linking views on knowledge and organizational networked learning

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Abstract

Purpose – This paper aims to propose a framework which connects perspectives on knowledge and learning to various approaches of social networks studies. The purpose is twofold: providing input for the discourse in organizational studies about the way different views on knowledge and networks drive design choices and activities of researchers, policy makers, and practitioners; providing relevant questions which can support researchers, (human resource) managers, policy makers and practitioners to reflect on their views and their endeavors to study, understand and facilitate knowledge and learning processes in organizational networks.

Design/methodology/approach – In exploring the conceptual connections the authors draw on distinctions made between views on knowledge and networked learning in the fields of organizational development, human resource development and social networks. The proposed framework is built from connections identified in the literature review.

Findings – The paper proposes a framework which identifies four different ways of studying and understanding the outcomes of learning and knowledge processes in organizational networks.

Practical implications – The framework supports researchers, policy makers, (human resource) managers and practitioners in their endeavor to study, understand and facilitate the relationship between knowledge, learning, networks and their outcomes. The four perspectives can be used in designing and evaluating interventions and policy which are intended to foster knowledge processes and learning in organizations.

Originality/value – Studies on knowledge processes and learning in organisational networks are increasingly based on a variety of knowledge theories, which are not always based on a clear academic synthesis. Often these views of knowledge remain implicit and do not fit approaches adopted for understanding or evaluating knowledge processes and learning in organisations. This paper proposes a framework which integrates different concepts of knowledge and approaches to network studies.

Keywords Social networks, Knowledge processes, Learning, Knowledge management, Networking

Paper type Research paper



Introduction

In the past decade social networks that foster learning are regarded central to learning organizations and communities, which emphasize relational processes of learning and the situated context in which it takes place (Davenport and Prusak, 1998; Engstrom,

2004; Rainbird *et al.*, 2004; Stacey, 2001; Wenger *et al.*, 2002). Subsequently, the analysis of knowledge and learning processes is no longer limited to the level of the individual and is being extended to the level of the intra-organizational network (group or community), or even to the levels of inter-organizational and organization-transcending networks (Krackhardt, 1992; Tynjala, 2008). Increasing numbers of studies into knowledge and learning processes within the fields of Organizational Development (OD) and Human Resource Development (HRD) adopt this extension to the network level (e.g. Henneberg *et al.*, 2009; Harrison and Kessels, 2004; Soo *et al.*, 2002).

Explanations for this growing interest can partly be found in the academic shift of attention from highly individual learning and knowledge transfer to learning as a social activity, related to conceptions of knowledge as a socially constructed entity (Hakkarainen *et al.*, 2008; Maula, 2006). The emerging learning society and knowledge economy forms another backdrop, as well as the interest in knowledge productivity and need for innovation. One of the views underlying the knowledge economy is that the application of knowledge adds more value than the traditional economic factors such as capital, raw materials and labor (Drucker, 1993). Many writers have commented on such a society and economy, using a variety of synonymous terms including: the “information society” (Giddens, 1994), the “learning society” (European Commission, 1995), the “network society” (Castells, 1998), the “learning economy” (Field, 2000; Lundvall and Borrás, 1997) and “economies of expertise” (Venkatraman and Subramaniam, 2002). Learning and collaboration are key aspects of all these concepts. Organizations must learn quickly, drawing on information from many sources, both external and internal, to enable them repeatedly to improve and innovate.

Studies of knowledge and learning processes in such organizational networks are based on a variety of knowledge theories (Borgatti and Foster, 2003; Cross *et al.*, 2003; Harrison and Kessels, 2004; von Krogh and Roos, 1995). Gaining a conceptual overview of these different concepts of knowledge will be pivotal in carrying out sound academic research and policy development (Kessels and Poell, 2004; Hakkarainen *et al.*, 2008). The aim of this article is to combine different perspectives on knowledge and network learning and to describe their implications for understanding and facilitating knowledge and learning processes in organizational networks. In exploring these conceptual connections we will draw on common distinctions made between views on knowledge and network learning in the fields of OD, HRD, and Social Networks. We will summarize our findings in a potential framework which serves two purposes:

- (1) Providing input for the discourse in organizational studies about the way different views on knowledge and networks drive design choices and activities of researchers, policy makers, and practitioners.
- (2) Providing relevant questions which can support researchers, (human resource) managers, policy makers and practitioners to reflect on their views and their endeavors to study, understand and facilitate knowledge and learning processes in organizational networks.

Exploring ways to understand knowledge

Views on knowledge

Several methods of distinguishing dominant views on knowledge are used in the OD and HRD fields. In OD, a distinction is frequently made between three epistemologies:

the cognitivist, the connectionist and the autopoietic (von Krogh and Roos, 1995; Maula, 2006; Sveiby, 2001). Each of these three views is used to understand knowledge and learning in organizations. The cognitivist view primarily considers only one truth, and regards knowledge as an objective “out there” reality. In the connectionist view, experts define what the truth is and knowledge is again considered to be an objective “out there” reality. In the autopoietic view, truth is what people believe it to be at a specific moment, and knowledge is regarded as a subjective, socially created reality. Such knowledge has a self-referential nature in which individuals autonomously create their own unique knowledge during a process of constant interaction with their (social) contexts (Maturana and Varela, 1987). Knowledge and learning within organizations can be analyzed from each of these three views. Table I summarizes the main three different views on knowledge.

In the HRD field, a related but slightly different distinction is described (Harrison and Kessels, 2004). Four views on knowledge are distinguished within the organizational context: knowledge as control; knowledge as intelligence; knowledge as a commodity; and knowledge as relationships. “Knowledge as control” refers to the image of the organization as a machine in which knowledge is the engine enabling the machine to be controlled. It represents the view on knowledge developed in the early theories of management and organization, similarly to “scientific management” and “administration theory”. “Knowledge as intelligence” refers to the image of the organization as a brain or organism in which knowledge is regarded as intelligence that enables adaptation to the environment. This notion is derived from theories such as “cognitive theory” and “open systems theory”, and relates to a cognitivist view on knowledge. The notion of “knowledge as commodity” refers to the idea that knowledge can be extracted from people, and can subsequently be transferred, shared and used. This view is also described in the “resource based theory”. “Knowledge as relationships” displays a constructivist view in which knowledge is socially constructed. This view stems from notions in which the world is described as socially constructed, and incorporates

Cognitivist	Connectionist	Autopoietic
Knowledge represents the pre-given world. It enables problem-solving	Knowledge represents the pre-given world. It enables problem-solving	Knowledge is created; it is not just a representation. It enables problem definition
Knowledge is equated with data and information. Knowledge is developed according to universal rule	Knowledge is created through “information processing”. Knowledge is developed according to context or task-related (local) rules. Knowledge resides in connections of experts	Knowledge is “private”, based on distinction making through observation and experiencing. It is self-referential, embodied in individuals and shared in their social relations
Knowledge can be transferred	Knowledge can be transferred	Knowledge can be communicated, but cannot be transferred like a commodity, since it always requires personal interpretation

Table I.
Three views on
knowledge

Source: Based on von Krogh and Roos, 1995; Sveiby, 2001; Maula, 2006

elements of the connectionist as well as the autopoietic view on knowledge. In this context, theories on situated learning and communities of practice offer relevant examples. Table II summarizes each of the four notions of knowledge.

Comparing the views on knowledge in Tables I and II, we note that cognitivist and connectionist views on knowledge (see Table I) relate to the notions of knowledge as control and knowledge as intelligence (see Table II). Knowledge is viewed as an objective “out there” reality, which can be acquired through information processing and can be shared. At first glance, both “knowledge as commodity” and “knowledge as relationships” appear to relate to the autopoietic view described in Table I, since in this view knowledge is not regarded as an objective “out there” reality. However, researchers (Harrison and Kessels, 2004) argue that “knowledge as commodity” is still framed in aspects of the early view of “knowledge as control”. Although emphasizing the value of the personal tacit knowledge and the social knowledge creation process, this view still treats knowledge as a commodity, with tacit knowledge able to be extracted from individuals and shared in explicit forms. Many of the current approaches to knowledge management relate to this view, and treat knowledge as a transferable and storable commodity, which enables the control of organizational life. The notion of “knowledge as relationships” appears to refer best to the autopoietic view, as they share the idea that knowledge requires personal interpretation, and therefore cannot be transferred in the same way as a commodity (Harrison and Kessels, 2004; Polanyi, 1958, 1974).

Knowledge as control	Knowledge as intelligence	Knowledge as commodity	Knowledge as relationships
Knowledge represents the pre-given world	Knowledge represents the pre-given world	Knowledge is created; it is not just a representation	Knowledge is created; it is not just a representation
Knowledge is acquired through information and communication processes and enables controlling organizational life and human performance	Knowledge is acquired through information processing and enables adaptation to the organizational environment	Knowledge is created and acquired through an interactive creation process in which tacit knowledge is made explicit and shared/ used among organizational members	Knowledge is socially created and sustained or changed by social interactions. Individuals make sense of organizational life in their specific situation
Scientifically acquired facts and formulae are generally applied to organizational contexts	Experts help to transfer and apply existing knowledge to other organizational contexts	Individuals make sense of their organizational context through a relational process of knowledge creation. Knowledge is extracted from people and is transferred like a commodity	Individuals make sense of their organizational context through a relational process of “knowing”. Knowledge cannot be transferred like a commodity

Table II.
Four notions of knowledge

Source: Harrison and Kessels, 2004

Exploring new ways to understand knowledge and learning in organizations

In the past decades views on knowledge and learning in organizations have evolved in various phases (Scharmer, 2001; Swan and Scarbrough, 2001). In the first phase views were mainly rooted in cognitivist and connectionist notions of knowledge, in which knowledge was treated as control, intelligence or commodity (Harrison and Kessels, 2004). They focused on tangible, explicit forms of knowledge that could easily be stored as information in databanks. Knowledge and learning in organizations revolved around managing and processing of such information. This view had an important impact on the rise of knowledge management in the early 1990s. In the second phase attention was drawn to less tangible, tacit forms of knowledge, which were embodied in human action (Nonaka and Takeuchi, 1995). The focus shifted to the process of knowledge creation, which revolved around the interaction between tacit and explicit knowledge, instead of merely focusing on explicit knowledge (Nonaka and Teece, 2001). This view connected to some of the autopoietic notions of knowledge, as knowledge was being considered as personal, embodied in action and shared in social relationships. However, in contradiction to the autopoietic view, knowledge was frequently treated as a commodity, which could be extracted from people, distributed and re-used (Harrison and Kessels, 2004).

At present, new views on knowledge are being explored in the fields of OD and HRD. Several of these views are rooted in the autopoietic paradigm, and question the distinction formerly made between tacit and explicit knowledge (Cross *et al.*, 2003; Maula, 2006). In these views the tangible, explicit knowledge is considered as information about the ability of another person, as it does not contain personal insights and capabilities itself. Access to such explicit knowledge only becomes meaningful to those who are competent at interpreting the given information and putting it into personal action. In the new views knowledge is not treated as an explicit, objective and universal entity, but as an embodied, subjective and personal capacity-to-act (Sveiby, 2001). This type of knowledge is based on personal interpretation, and is created in co-evolution with the environment. It is not transferable to other persons, because it depends on the personal interpretation within a specific context (Maula, 2006). At the social level, this knowledge is considered as embodied in individuals and shared in their social relationships. These recent views treat knowledge no longer as a commodity, but as relationships. Here the focus is not only on some kind of knowledge “product”, but instead on the activities and social processes in networks of social relationships, where the meaningful knowledge resides.

Connecting views on knowledge and networks

Reflecting these notions knowledge processes and learning in organizations are regarded as embedded in social networks with intricate ties, relationships and interactions. These network structures and patterns of relationships are often very different from the formal organizational structure; they are a direct result of social connections between individuals, and lead to the forming of networks (Daly, 2010). This network structure and the quality of relationships between network members can influence the development of knowledge and processes of learning on the level of the individual as well as the organization (Hakkarainen *et al.*, 2008; Kilduff and Tsai, 2003; Putnam, 1993). In distinguishing between different perspectives on studying social networks and their consequences, Borgatti and Foster (2003) developed an insightful

typology, which we will use to explore the connections with different perspectives on knowledge. In an extensive review of social network studies they found explanatory goals to differ in their focus on either (performance) variation or (social) homogeneity. In the mechanisms used in the studies to explain such variation or homogeneity, they found a distinction between structuralist and connectionist network perspectives.

Variation or homogeneity. Looking at the explanatory goals, Borgatti and Foster (2003) considered the (performance) variation perspective to be present in most of the social capital studies (e.g. [Burt, 2000, 2005](#)). The possibilities for action that social relationships provide for the individuals in the network are emphasized. These studies tend to be predominantly evaluative, focusing on the benefits of positions in the social network. The subsequent performance variation is mostly evaluated in tangible forms of knowledge, such as explicit (Nonaka and Takeuchi, 1995), encoded (Zuboff, 1988), embrained ([Argyris and Schon, 1978](#)) and procedural knowledge (Zander and Kogut, 1995) The notion of “knowledge as control” seems dominant, because studies of this kind often are treated as a source of power and serve the goal of evaluating and controlling organizational life and human performance.

The homogeneity perspective is primarily found in diffusion studies focusing on how networks influence network members that are part of them (For a detailed review see: Borgatti and Foster, 2003). In these studies, more attention is given to the process by which practices spread in the network (e.g. de Jong, 2010). The network environment is considered to shape individuals’ beliefs, attitudes or practices. In this perspective, the environment plays a more dominant role than the individual. The view of “knowledge as relationships” prevails, because knowledge is considered as embodied in individuals and shared in social relationships. In relation to this view homogeneity is often evaluated in less tangible forms of knowledge inextricably connected to individuals and their context such as tacit and personal (Polanyi, 1967, 1958, 1974), embodied (Nonaka and Takeuchi, 1995), not-yet-embodied (Scharmer, 2001) and embedded knowledge.

Structuralist or connectionist. Regarding the explanatory mechanisms, Borgatti and Foster (2003) describe how network studies differ from each other in the way they treat relationships and their function. In the structuralist approach network relationships are treated as “roads”. In this view, the focus is on the structure of the network and patterns of network connections. It is argued that individuals’ will be influenced by their positions in the network structure. Outcomes of knowledge and learning processes are explained from the network structure and the structural positions of the individual network members.

In contrast, the connectionist network approach focuses on the network “traffic”. Here, ties are treated as conduits through which resources, such as information and knowledge flow. In this view it is argued that the relational exchange process in the network influences the individuals involved. Outcomes of knowledge and learning processes are explained from the nature and quality of the relationships among the network members.

Borgatti and Foster (2003) used these differences in goals and mechanisms to describe four different types of network studies: “structural capital”, “social access”, “environmental shaping”, and “contagion”. We will illustrate each of these types with a short example of the way knowledge and learning processes are studied in organizational networks.

Structural capital. In this type of network studies, explanations are sought from a structuralist network approach focusing on outcomes in terms of (performance) variation. An example is: examining a highly dispersed network of district managers in which interventions focused on collaborative practice are conducted and which evaluate outcomes in terms of increased knowledge exchange and innovative practice on the district level (Daly, 2010).

Social access. In this type of network studies explanations are sought from a connectionist network approach focusing on outcomes in terms of (performance) variation. An example is: examining the ability of project teams to access relevant knowledge of other units and evaluate their performance in terms of the time of completion of projects (Hansen, 2002).

Environmental shaping. In this type of network studies, explanations are sought from a structuralist network approach focusing on outcomes in terms of (social) homogeneity. An example is: examining the environment of trust among staff members and administrators in a health clinic and evaluate the outcomes in terms of the willingness of units to share relevant information needed for providing effective patient care (Cross and Parker, 2004).

Contagion. This type of network studies focuses on outcomes in terms of (social) homogeneity and explanations are sought from a connectionist network approach. An example is: examining so-called energizing relationships among employees and evaluate the outcomes in terms of adopting the vision of the most energizing employees (Cross and Parker, 2004).

Table III summarizes these four types and their connections with perspectives on knowledge in relation to organizational networked learning. We propose this quadrant as a potential framework for studying and understanding knowledge and learning processes in organizational networks.

The two rows of the framework describe from what views the knowledge and learning processes in the network can be described and explained, i.e. from the nature of the network structure (“roads”) or its relationships (“traffic”). The two columns describe from what views the outcomes of the knowledge and learning processes can be determined, i.e. evaluating the outcomes in terms of performance variation or social homogeneity. The four quadrants (structural capital, social resource access, environmental shaping and contagion) that originate from these distinctions describe four possible views of looking at an organizational network and the kind of knowledge and learning processes that take place. Each quadrant presents:

- characteristics of the particular view from which the knowledge and learning processes in the network are described;
- a view on knowledge that is (consciously or unconsciously) adopted and the kinds of knowledge that are used for evaluation of knowledge and learning processes; and
- main implications that the views in the particular quadrant have for knowledge and learning processes in organizational networks.

Looking at the different views on knowledge in this framework (see Table III), we conclude that cognitivist and connectionist views on knowledge seem to relate best to network approaches emphasizing a structural capital or a social access perspective and that autopoietic views on knowledge seem to relate better to approaches that study

	Performance variation	Social homogeneity
Structuralist (metaphor of "roads")	<p><i>Structural capital Characteristics</i> Network structures explain variation in performance outcomes Individuals exploit network positions <i>Perspective towards knowledge</i> Cognitivistic Knowledge as control Explicit, encoded, embrained and procedural knowledge <i>Implications for networked learning</i> Individual learning through knowledge transfer Learning reflects performance improvement</p>	<p><i>Environmental shaping Characteristics</i> Networks structures explain common attitudes and behaviour Comparable structures evoke similar behaviour <i>Perspective towards knowledge</i> Autopoietic Knowledge as relationships Tacit, embodied, not-yet-embodied and embedded knowledge <i>Implications for networked learning</i> Learning through socialization Emphasis in processes on context and culture, not the individual Learning based on communication process</p>
Connectionist (metaphor of "traffic")	<p><i>Social resource access Characteristics</i> Access and use of social relations Relationships as a vehicle for accessing information and knowledge <i>View on knowledge</i> Connectionist Knowledge as control and as a commodity Explicit, encoded, embrained and procedural knowledge <i>Implications for networked learning</i> Learning through use of relationships which provide access to resources of other network members</p>	<p><i>Contagion Characteristics</i> Network is self-creating and co-evolving based on dynamic and organic principles Relationships are based on intrinsic motivations <i>View on knowledge</i> Autopoietic Knowledge as relationships Tacit, embodied, not-yet-embodied and embedded knowledge <i>Implications for networked learning</i> Learning is a relational process of engagement based on intrinsic drivers Individual network members learn through a process of social interaction</p>

Table III.
Connecting views on knowledge and organizational networked learning

Source: Based on Borgatti and Foster, 2003

networks from a convergence or contagion perspective. Each of these views has its own merits and implications. On the one hand, the main focus in understanding knowledge and learning processes from a structural capital or a social access network approach is on outcomes in explicit forms of knowledge. Such explicit forms of knowledge are fairly easy to articulate, and are often readily available for research or evaluation. On the other hand, the main focus in understanding knowledge and learning processes from a convergence or contagion network approach is on outcomes in tacit and intangible forms of knowledge. These are much harder to articulate, and not easily retrieved and captured.

This framework can be used to support researchers, policy makers, managers and practitioners in their endeavor to understand the relationship between knowledge, learning and organizational networks. They can use the four perspectives from the framework as a guide for designing, understanding and evaluating interventions and policies, which are intended to foster knowledge and learning processes in organizations. This framework can support in reflecting on the underlying views on knowledge of their initiatives and whether these views fit the approaches they adopt for understanding or evaluating knowledge processes and learning in organizations. For example, if organizations set out policy from a “contagion” perspective to foster innovative environments in which people can informally meet, build relationships and a network can organize itself organically then the evaluation of this policy should match the view on knowledge that is inherent of this perspective. In the evaluation of such policy one should focus more on studying personal, embodied forms of knowledge and relational learning processes. A mismatch would occur when this policy would be merely evaluated by means of explicit performance indicators, like a written test for employees or the policy’s short term financial return on investment.

We have formulated a number of relevant questions for research, policy as well as practice corresponding with the views in each of the four quadrants of the framework in Table III. These questions may support professionals in research, policy and practice in reflecting on the different views on knowledge and networks in relation to their own situations, activities and goals.

Structural capital

- *Research*: does the position an individual takes in a network have an impact on the kind of product he or she produces?
- *Policy*: how do we identify the key players who are in the best position to lead the required knowledge development?
- *Practitioner*: what positions do we offer individuals to increase their access to relevant information?

Social resource access

- *Research*: what are the critical characteristics of the relationships in networks that give access to relevant knowledge?
- *Policy*: how can we increase the number and quality of contacts between organizational members, so that they can benefit from the knowledge that the network gives access to?
- *Practitioner*: how can we put a team together that has the best access to relevant knowledge?

Environmental shaping

- *Research*: what characteristics of the network structure influence the social fabric and the related learning processes?
- *Policy*: what conditions favor the development of network structures that enable continuous learning and knowledge development?
- *Practitioner*: what can we learn from the social culture of successful teams?

Contagion

- *Research*: what elements constitute the reciprocal appeal between network members that facilitate their participation in knowledge work?
- *Policy*: how do we create room for team members to connect on the basis of personal engagement and intrinsic drivers?
- *Practitioner*: what does team members help to communicate their intrinsic drivers, share common engagement and interact in a conducive way?

Conclusion and discussion

The aim of this article was to explore the implications of adopting different views on knowledge for understanding and fostering knowledge and learning processes in organizational networks. We have developed a framework which describes four distinctly different views on understanding and facilitating knowledge and learning in organizational networks (see Table III). Overall, we conclude that for understanding and fostering knowledge and learning processes in organizational networks an awareness of the four different views in this framework is required; goals and activities in research, policy and practice should be consistent with the adopted views on knowledge and networks or a mismatch will occur which will lead to unintended outcomes. We observed that such mismatches are often not recognized in organizational practice and result in lower returns on investment, lower innovative capacity and lower levels of learning. In our current global knowledge economy and rapid changing societies these results are for many organizations crucial competitive factors. Therefore we recommend researchers, policy makers and practitioners to use this framework and the kind of reflective questions that we have described to guide their goals, designs and activities.

From reviewing the literature we learned that new notions of knowledge are currently being adopted in the fields of OD and HRD. These new views build on insights from the autopoietic paradigm (see Table III: quadrants “environmental shaping” and “contagion”), and consider knowledge as an embodied subjective, personal ability, which is shared in social relationships. In such views knowledge is regarded as highly personal and is viewed as an intertwined process of knowing and doing (Maturana and Varela, 1987; Maula, 2006). Here, knowledge is mainly a capacity to act (Sveiby, 2001), and could be treated as a personal capability (Kessels, 2001). In a network context, this capability is shared through a process of social interactions in which language is the main vehicle (Maturana and Varela, 1987). We wonder what the implications of such “social” views on knowledge will be for understanding and facilitating knowledge and learning processes in organizational networks. For example, these views may imply that when the social context changes, the knowledge which is embedded in the network also changes as it is inherently relational, nurtured by social interactions. Ultimately, when such a network falls apart, the social process of knowing will stop as well and the constructed knowledge will dissolve; individual members may keep memories of their previously shared capacity to act in the network, but the actual developed capability will have disappeared. In new networks, new learning processes will take place in which autopoietic processes of knowing will emerge again. In this way production, transformation and regeneration of knowledge will continue as long as the network exists. We hypothesize that such social processes

of knowing may even help the network to overcome difficulties, to improve and innovate, and thus strive for sustainability.

Another implication of the social, autopoietic turn in knowledge might be that mere financial performance is not any longer treated as the main purpose of knowledge development in organizations (Eijkman, 2011), but instead individual drivers such as passion, ethics, democratic and environmental values (see Keursten *et al.*, 2006). This may lead us into a future in which knowledge and learning processes are not determined or constrained anymore by organizations, but are driven by dynamic social networks in which individual learners participate and collaborate. We presume that in this approach organizational architectures should evolve from their pre-designed knitted patterns to contagious “hotspots” in which individuals can interact, collaborate and lead knowledge development based on intrinsic drivers, reciprocal appeal and mutual attractiveness.

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