

## **INFORMATION TECHNOLOGY AS A FELLOW PLAYER IN ORGANIZATIONAL LEARNING**

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### **ABSTRACT**

*Issues about the relation between information technology (IT), knowledge and organizational learning appear more critical as IT becomes an increasingly integrated part of organizational life. We believe that in order to understand the role of IT in organizational learning, we need to focus on the relation between learning theories and understandings of technology. This relation is often based upon the assumption that organizational learning is a process of knowledge acquisition, storage, application and diffusion in which IT is a primary enabler. We propose organizational learning to derive from participation in social work practices and to involve human existence and development. This brings forward an understanding of the role of technology to be a facilitator of the formation and maintenance of communities of practice within organizations – and not to be reduced to its information processing capacities.*

### **1. INTRODUCTION**

In recent years, knowledge creation, learning, and organizational learning have become prominent issues within the field of information systems. The discourse on organizational learning and how to support organizational learning within this field, however, seems to merely reflect learning as a process of acquiring, storing, applying, and distributing knowledge as if knowledge is a 'thing' or a commodity (Cook & Brown, 1999; Gherardi, 2000). In this understanding of IT-supported organizational learning, knowledge creation and learning can be compared to eating food; i.e. taking in knowledge that exists prior and independent of the knowing subject. The prevailing idea seems to be that IT-support may provide the organization with the capacity to search for, collect, acquire, and distribute knowledge as well as to create an electronic organizational memory (Brennan & Rubenstein, 1995; Masino, 1999; Neilson, 1997; Roth & Niemi, 1996). The consequence is that learning is viewed solely as information and knowledge processing and not as social processes of human interaction and development. In other words, the issue of learning and organizational

learning is dealt with only in its epistemological dimension leaving out the ontological dimension of learning.<sup>1</sup>

In this paper we introduce a perspective on organizational learning that goes beyond the information processing capabilities of IT-supported organizational learning. We suggest organizational learning to derive from access to and participation in the everyday organizational work and life. We argue that organizational learning occurs as members of organizations engage and participate in communities of practice (COP) (Brown & Duguid, 1991; Wenger, 1998). When organizational learning is viewed as a social process of access and participation in COP, organizational learning includes human interaction and development in organizations. Expanding organizational learning to include an ontological dimension, however, also means that the role of IT in organizations is changed from a tool to process information and knowledge to that of a more encompassing role in the organizational learning process. It further means that the understanding of organizations is changed from that of streams of information and knowledge to more complex social processes. In the paper we explore these issues at greater length by seeking answers to the following questions: How may the relation between IT and organizational learning be *conceptualized* when the claim is that IT-supported organizational learning is more than a matter of epistemology? What is *the role of IT* when an ontological dimension is included in organizational learning?

We begin by reviewing the literature on IT-supported organizational learning in order to show how the field of information systems has dealt with the issue of learning and IT. This is followed by an introduction to that part of the field of organizational learning that also takes the ontological dimension into consideration. The problem with the latter is, however, that the issue of IT is non-existent. This is the background for including theories of IT in an organizational context. We end the paper by proposing some implications for the results of our conceptual work.

## 2. IT-SUPPORTED ORGANIZATIONAL LEARNING

Literature on IT-supported organizational learning does not have a long history, and it is as if the knowledge management discussion to some extent have replaced the issue of IT-supported organizational learning before it really got started (Scarbrough et al, 1999). In the literature on knowledge management, IT is viewed as supporting knowledge management implying that organizational learning will follow as a consequence of implementing knowledge management systems (Alavi & Leidner, 1999). Turning learning into a question of knowledge acquisition, storage, application, and diffusion is, as mentioned before, not an unfamiliar conception in the literature on organizational learning. As early as 1983, *Shrivastava* in his review article on organizational learning systems talked about organizational learning as the development of a 'knowledge base'. Later, in 1991, *Huber* talked about four constructs related to organizational learning, these being knowledge acquisition, information distribution, information interpretation and organizational memory. Huber's definition on learning is that "an entity learns if, through its processing of information, the range of its potential behaviors is changed." An organization then learns "...if any of its units acquires knowledge that is recognized as potentially useful to the organization" (Huber, op. cit.: 89).

Pentland (1995) describes his typology of organizational learning as a 'knowledge system framework' that has similarities with Huber's typology of processes. But where the latter rests upon an 'objectivistic' epistemology in which knowledge is treated as an objective commodity to be acquired; Pentland emphasizes the socially constructed nature of knowledge (Pentland, op. cit.: 3-4). Pentland's knowledge processes include knowledge construction, organization, storage, distribution, and application.

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<sup>1</sup> We are aware that the ontological dimension of learning is not always present in general theories of organizational learning and the Learning Organization (see later). This fact may account for the focus on epistemology – information and knowledge processing – within the information systems field that deals with organizational learning.

In the literature that explicitly deals with IT-supported organizational learning, the importance of *knowledge* for organizational learning is even more distinct. Goodman & Darr (1998) defines organizational learning as follows:

Organizational learning is conceptualized here as the process by which one unit acquires knowledge from another unit in the same organization. (...) Organizational-level learning occurs when (1) the problem-solution exchanges and consequences are communicated and known by other organizational members (*broadcasting*), (2) there is some form of organizational memory that stores problem-solution exchanges and consequences (*memory*), and (3) there is a mechanism for organizations to share their interpretations about the problem-solution exchanges and to update the organizational memory about their experiences (*updating*). (Goodman & Darr, op.cit.: 419)

From this definition, we see that knowledge acquisition is the focus of organizational learning. Introducing IT, Goodman & Darr pose two questions, namely 1) How may specific features of computer-support enhance organizational learning? And 2) How may the organizational context influence computer-support in organizational learning? Their theoretical framework focus upon the necessity of organizational members' decision to contribute to and adopt knowledge in distributed environments. Goodman & Darr argue that computer-supported systems to enhance organizational learning share some features with traditional e-mail systems such as the ability to bridge time and space. But they also differ by having a memory part with index system and search possibilities.

Robey *et al.* (2000) define organizational learning as follows:

In this paper, we define organizational learning as an organizational process, both intentional and unintentional, enabling the acquisition of, access to, and revision of organizational memory, thereby providing direction to organizational action. (Robey *et al.*, op. cit.: 130)

Again, we see knowledge acquisition as central to organizational learning by way of an organizational memory. Robey *et al.* write about how different IT applications can be applied to support organizational learning. It is innovations such as data warehousing, expert systems and intranet/internet systems, which potentially include valuable components of an organizational memory. GroupWare and other organization-wide communication network, on the other hand, may facilitate access to and application of this joint organizational memory. The organizational memory is crucial to Robey *et al.*. It is a general term implying that knowledge can be stored in a manifold of repositories – both human and artifacts.

### 3. THE SOCIAL CHARACTER OF ORGANIZATIONAL LEARNING

Viewing learning as the processing of information and knowledge has, however, in recent years been criticized for focusing only on the epistemological aspects of learning, and for viewing learning merely as an individual phenomenon. The anthropologist *Jean Lave* has been one of the driving forces in introducing this critique (see e.g. Lave 1988; Lave, 1991 c. 1996; Lave & Wenger, 1991). One of the most interesting points in Lave's framework of learning is that she includes an ontological dimension in her learning theory. Lave argues that learning is also about becoming another person, about becoming another kind of member of a community. This means that learning also includes the issue of ontology, i.e. of humans' existence and development in the world through participation in several social worlds (see also Strauss, 1993). This is why Lave talks about learning as situated and as coming about through a trajectory – a move – from legitimate peripheral participation to full membership of a community (Lave & Wenger, op. cit.).

The situated character of learning and the inclusion of the ontological dimension in becoming a knowledgeable person have led Lave to develop a framework that consists of three stipulations. The framework is represented below in table 1.

<b>The telos of learning</b>	<i>What is the direction of learning?</i>
<b>The subject-world relation</b>	<i>What is the relation between the subject and the world?</i>
<b>The learning mechanism</b>	<i>How does learning come about?</i>

**Table 1:** Framework for understanding learning in organizations

The first stipulation is *the telos of learning*, which is the direction of learning, i.e. the purpose, content and development of knowledge creation and personal development issues in learning. This may in some sense be equated with the epistemological part of the learning process, which include questions like: What should be learned in organizations? And, With what purpose might we go about learning it? But for Lave – and for us – human existence and development are always parts of the issue of learning and knowledge creation.

The second stipulation represents the specific ontological dimension. It is called *the subject–world relation* and describes the general specification of the relation between the learner and the social context of learning. This involves the specific legitimacy of the learner’s affiliation with the social world. This is especially important for organizational learning as a learner’s power relations and position in the organization may enhance or inhibit learning. The latter is often the case for subordinated employees who may only have access to certain kinds of organizational information and knowledge, and, as such, be limited in their possibilities for learning and development. The third stipulation in Lave’s framework is called *the learning mechanism* and describes the actual process by which learning comes about, i.e. how is or should the learning processes be organized?

In order to understand learning in organizations as a social phenomena we need to re–evaluate the subject–world relation, we need to ask: What is the social world and how are we a part of it? Only by understanding the specific circumstances by which social beings construct the context of learning can a valid image of the learning activity be made (Gherardi et al, 1998). The context of learning thus has to be considered as a social and historical product that continuously develops over time as participants engage in different social practices. Through this engagement, participants develop their identities in relation to the specific circumstances and social structures of which they are a part (Wenger, op.cit.). The subject–world relation within this learning perspective is relational by focusing on the dialectical relation between subjects and their being–in–the–world of other subjects, activities, and artifacts.

Viewing learning as an integrated part of the social practices in organizational life inevitably leads to the formation of different social communities. In 1991, when Lave & Wenger introduced their concept of *communities of practice*, they emphasized the unity of the social practice and the communities that emerge as people engage in the practice. They defined COP as follows:

It (communities of practice) does imply participation in an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their communities. (...) A community of practice is a set of relations among persons, activity, and world, over time and in relation with others tangential and overlapping communities of practice. (Lave & Wenger, op. cit.: 98)

As the definition implies, COP should not be reified as isolated social worlds. Compared to seeing the organization as a stream of information and knowledge as was the case in the information processing approach, working with COP introduces a quite different perspective on organizations. An organization consists of a complex of intertwining, overlapping and emerging COP that to some extent share artifacts, tools and discourses.

According to Wenger (1998), three dimensions are crucial for the coherence of a community. These are: *mutual engagement*, the sense of relationship and membership evolving as the participants engage in practice; *joint enterprise*, the process by which the participants negotiate meanings of what they are doing, what matters and so on; and *shared repertoire*, the shared history, discourses, artifacts and stories that have developed over time. The notion of COPs should, however, not be confused with the issue of organizational teams. COPs are emergent and based upon the principle of voluntariness as opposed to teams, which are deliberately put together to solve a specific problem or task (Wenger & Snyder, 2000).

As an alternative to an epistemological approach to learning, Lave & Wenger have developed an analytical concept, *legitimate peripheral participation* (LPP), where learning is understood as access to and participation in COP. Learning essentially involves becoming an ‘insider’ (Brown & Duguid, op. cit.: 48). To view learning as an integral and inseparable part of social practice implies that learning comes from

actually engaging in the process of performance. And through this, the learners not only acquire skills and knowledge – they also change and develop as individuals in order to become full members of the COP.

Applying the concept of LPP changes the locus of learning from taking place in the individual mind, to take place within a framework of participation. This means that the differences in perspective among the co-participants are instrumental in generating learning. According to this definition it is the community that learns. However, Lave & Wenger argue that the learning process does not overlook the individual, but the individual is always part of a community. So, the learning process involves learning an identity and a profession or skill in addition to a sense of belonging to an organization. To put it in the words of Brown & Duguid: “The central issue in learning is *becoming* a practitioner not learning *about* practice” (Brown & Duguid, op. cit.: 48).

In sum, the *learning mechanism* is to get access to and participate in a social practice as well as to move from a peripheral position to become a full member of a community of practice. The *telos* of learning is dependent upon the actual community of practice, and what is needed to become a fully integrated member of the particular community of practice. The *subject–world relation* is included in the community of practice, i.e. the community of practice is both the context of the co-participants as well as the actual practice taking place here.

#### 4. INTEGRATING INFORMATION TECHNOLOGY AND LEARNING

The framework for learning presented above however has not given any explicit attention to how IT may be a mediator or act as a tool to support organizational learning. Orlikowski (1992) has been a source of inspiration in our pursuit to include technology to support organizational learning. She argues that there are two important aspects of technology applied in organizations: 1) The *scope* of technology: What is defined as comprising technology? And 2) The *role* of technology: How is the interaction between technology and organization defined?

The scope of technology in our research is the information system applied in an organization to support organizational learning (e.g. a particular Knowledge Management system). Regarding the role of technology, there are different philosophical standpoints as to what role technology plays in organizations, and we quote:

The early work assumed technology to be an objective, external force that would have (relatively) deterministic impact on organizational properties such as structure. In contrast, a later group of researchers focused on the human action aspect of technology, seeing it more as a product of shared interpretations or interventions. The third, and more recent, work on technology has reverted to a “soft” determinism where technology is posited as an external force having impacts, but where these impacts are moderated by human actors and organizational contexts. (Orlikowski, op. cit.: 399–400)

This quotation illustrates how the traditional camps between objectivism and subjectivism in Western philosophy are distinct within the field of information systems. We are, however, not concerned with the role of technology in organizations in general, but focus on the role of technology with relation to organizational learning. For this reason we expand Lave’s framework of learning by combining it with Orlikowski’s questions about technology in organizations.

<b>The telos of learning</b>	<i>What is the direction of learning?</i>
<b>The subject–world relation</b>	<i>What is the relation between the subject and the world?</i>
<b>The learning mechanism</b>	<i>How does learning come about?</i>
<b>The scope of technology</b>	<i>What is defined as comprising technology?</i>
<b>The role of technology</b>	<i>What is the role of technology in organizational learning?</i>

**Table 2:** Integrating IT and a social approach to organizational learning

The above reflections on social and situated learning implies that we have to broaden our understanding of IT-supported organizational learning as well as of IT in general. Clearly, viewing IT as an unproblematic

way of leveraging learning and knowledge creation in organizations does not encompass the complexity of the social context in which learning takes place. It is not adequate in an organizational learning context to view IT merely as a tool for information processing. Technology inevitably plays an important role in organizational learning, but only to the extent that IT relate to the social context (Brown & Duguid, 1998).

From a social learning perspective, IT is not viewed as an objective variable to be manipulated according to a specific learning curriculum in organizations. IT is an integrated part of the social world and thereby needs to be negotiated within the specific social context in order to become meaningful – IT is, in other words, equivocal (Orlikowski, op. cit.; Weick, 1990). Arguing that IT is an intertwined part of the social world could be equated with the dialectic notion of the subject–world relation in the social and situated learning theory. Orlikowski has – based on Giddens structuration theory – with her concept *the duality of technology* very convincingly described the interrelationship between technology and organization. She argues that technology is socially constructed as actors negotiate and attach meaning to it while using it in their daily work practice. However, as the technology is deployed it tends to become institutionalized and thereby appears to become part of the objective, structural properties of the organization (Orlikowski, op. cit.). Viewing IT and organizational learning in this manner has quite a few implications for the application of IT in organizations.

One important issue in this kind of application of IT in organizations is that it is oriented towards facilitating the COP rather than the formal structures or work descriptions of the organization. It is through the continuous interaction between the technology and the social work practices that the participants' identities as well as the communities evolves and develops (Mynatt et al., 1998). This make us return to the three characteristics of the COP presented by Wenger. We argue that these are the elements that need to be taken into account when integrating IT in the organizational learning processes.

For IT to become an integrated part in specific work practices, it must be able to create a virtual space for *mutual engagement* that substitute or supplements the physical space of interaction and engagement. Virtual and physical communities of practice are thus co-existing side-by-side and are in many occasions also overlapping each other (Mynatt et al., op. cit.). This means that the technology works as a forum for communication, interaction and creation of social relationships. Engaging in this computer-mediated work practices gives the participants' new opportunities for sharing experiences and exchanging 'war stories' (Orr, 1996). Their mutual engagement thereby continues to produce or reproduce the social practice as well as the social structure that holds the virtual community together.

Important issues in the mutual engagement are, however, that the technology gives participants the possibility to access and learn from experienced members in the virtual COP as well as access to community-specific information – it should be easy and legitimate to seek help in the virtual COP (Mynatt et al., op. cit.). The IT should support the formal communication, but equally as important is supporting the more informal and emergent interaction. Lately, it seems like more and more companies are trying to control the interaction within organizations by implementing strict rules about what is accepted and what is not e.g. on the corporate intranets or in the e-mail systems (Brown & Duguid, 1998). This might inhibit the computer-mediated interaction and could lead to a rejection of the technology as a meaningful tool in organizational learning.

As COPs are organized around important issues for the community, the community members engage in negotiating a *joint enterprise*. Apart from creating a virtual space for mutual engagement and negotiation of the joint enterprise, IT also plays a central part in achieving the objective in the communities. Community members continuously develop different kinds of tools, which mediate the subject's interaction with the work practice in order to achieve certain objectives – IT is one among many mediating tools.

Once again it is, however, important to emphasize that the technology is not 'given' and should not be treated as such. This means that not only is the joint enterprise constructed through the use of technology, the technology is also constructed in the negotiation of the joint enterprise. The technology should therefore be integrated and negotiated into the natural flow of work. This can only be done from within a specific COP. Technology has to be flexible in order to continuously be tailored according to the local needs. It is therefore extremely important that it is the COP itself that decides what technology issues are important to the COP

and how technology should help achieve the objectives of the COP. As Kuutti argues: “(...) the ultimate computer support for work is reconstruction of the work by creating computer artifacts for the work by workers themselves” (cited in Bratteteig & Gregory, 1999: 169).

Finally, engaging in computer-mediated as well as in ‘real’ COPs should create a *shared repository* of stories, discourses, norms and so on, within the specific COP. Thus, at the same time as the technology creates a medium for interaction and communication, the technology also works as a medium for building a community memory. The concept of memory used here is, however, not to be confused with the ‘container’ metaphor for storing and retrieving information that has been the widespread conception within the information processing perspective. First of all – as the name implies – the concept community memory is oriented towards a specific community. It is the COP that decides the content of the community memory. This prevents the repertoire from becoming abstract and useless. Secondly, besides containing meaningful factual information, the community memory emphasizes the informal character of interacting. This means that as community members engage in negotiating meaning with the computer-mediated work practice, they develop ways of communicating, ways of interacting, different kinds of stories, discourses, routines and so on, which all get stored in the computer-based community memory. This, in turn, implies that the community memory represents central aspects of the existing social structure of the COP.

The ongoing use of IT – whether it is as a medium for mutual engagement or as a tool for engaging in the joint enterprise – then constitutes or reproduces the social structures of the COPs as well as forms the identities of the community members.

## 5. CONCLUSIONS

Building on the existing literature on organizational learning, this paper offers insights into the role that IT plays in organizational learning processes. Implementing and applying IT in an organizational context is a complex matter, which has quite a few implications for the way we understand IT-supported organizational learning. The relation between learning theory and understandings of technology has been the focus of attention in this paper.

Traditionally, this relationship has centered around the assumptions of an epistemological and knowledge-based learning theory in which learning involves the process of acquiring, storing, applying, and distributing reified ‘bodies’ of information and knowledge. The organization has been seen as a stream of information and the role of IT has primarily been to support the learning processes by acting as an organization-wide electronic organizational memory, which enables individuals to store, retrieve, acquire, and share information within the organization.

We have, however, argued that it is not enough to understand organizational learning as merely an epistemological phenomenon. We have to understand the context of learning as learners engage and participate in different social worlds. This focus is the result of applying an ontological dimension to the understanding of learning. As organizational members engage in daily work practices, they form social relationships and COPs emerge. It is within these COPs that organizational learning unfolds.

Introducing a social learning theory raises the issue of how to understand IT in organizations. When learning takes place within COPs, the technology should be oriented towards developing these. We have tried to broaden the role of IT in organizations by including three features oriented towards facilitating learning in COPs. These are:

- The technology should be a medium or a forum for communication, interaction and mutual engagement.
- The technology should be a tool that is integrated in and mediates the natural flow of the work practice and the negotiation of the joint enterprise.
- The technology should be a medium for the accumulation of a community memory of shared stories, discourses, routines and so on.

IT is not just some static artifact acting as an 'add on' to an existing work practice. Through negotiation, community members attach meaning to the technology and thereby participate in the formation and development of the COPs. Additionally, it is in the interaction between individual, technology and the community that organizational learning comes about and the identities of community members are continuously constructed and reconstructed.

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