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Workplace Learning from the Organizational Point of View

Päivi Tynjälä

Introduction

This chapter reviews past and present research on workplace learning from the organizational point of view and raises some emergent perspectives as well. When learning is examined on the organizational level, two main streams can be identified: organizational learning and learning organization. At first glance, these concepts look similar, but there are actually certain differences between these two lines of research (Chiva & Alegre, 2009; Örtenblad, 2013; Tsang, 1997; Visser, 2016; Watkins & Marsick, 2003). The concept of organizational learning is often associated with normative, prescriptive and practice-oriented approaches aiming at developing learning organizations, while the latter concept usually refers to more scientific and descriptive approach, directed at analyzing characteristics of learning organization. In this chapter, the main focus is on research on the concept of the learning organization. Furthermore, studies representing other theoretical frameworks will be reviewed. Learning at the organizational level has been conceptualized with several additional and more specific concepts, such as that of knowledge creation in companies (Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998), expansive learning (Engeström, 1987, 2011), and innovative knowledge communities (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004). Recently, the concepts of ecologies of learning (Barnett & Jackson, 2019; Kemmis & Heikkinen, 2012) and ecosystems of learning (e.g., Virolainen & Heikkinen, 2019) have emerged as new ways to describe the interdependence between social practices related to learning in different contexts, such as learning in organizations. These different conceptualizations and their interrelationships are examined and discussed in this chapter.

The concept of Communities of Practice (CoP) by Wenger (1998; see also Lave & Wenger, 1991) has had a remarkable influence on research concerning learning taking place in organizations. The interpretations and meanings of the concept have several nuances (see Cox, 2005), but originally it referred to social communities with shared goals, mutual engagement and joint ventures. These communities are described as informal in nature. In early studies of informal communities of practice, the focus was on employees' identity development (Wenger,

1998), while, in more recent works, the CoPs have also been seen as a tool for management in organizations (Wenger, McDermott, & Snyder, 2002). However, the concept of communities of practice itself does not refer to organizations per se, which, by definition, imply a formal structure, rules and practices. Therefore, in this chapter, the discussion will skip over the studies on CoPs. Despite this, it is worth keep in mind that this concept has been useful for research on workplace learning (Cairns, 2011), and it can be seen as a bridge from cognitively and individually oriented learning research toward studies where learning is seen as participation in social practices. This, in turn, is also at the core of the concept of the learning organization—although discussed in different terms.

The first prominent works related to learning at the organizational level were published by Argyris and Schön (1978, 1996), Senge (1990) as well as Watkins and Marsick (1993), and all of these have had a remarkable impact on subsequent studies. In the next sections, these origins of organizational learning research are briefly reviewed. After that, other theoretical frameworks related to learning in organizations and between organizations are discussed, followed by conclusions and a glance toward the future.

Learning at the organizational level: Argyris & Schön and Senge

Among the first authors investigating learning at the organizational level were Argyris and Schön (1978, 1996). In their seminal work, organizational learning was seen as "the detection and correction of error". Here, an error refers to a problematic situation. Learning starts when action strategy fails to produce the kind of outcomes or consequences expected. This discrepancy leads to a problematic situation, which calls for collaborative reflection and inquiry by the members of the organization (Argyris & Schön, 1978, 1996). In order to bring about change throughout the whole organization, not only in individuals, it is important that organizational rules, practices, procedures, policy plans and strategy statements are in line with supporting corrective actions, and guide daily actions. Organizational learning also requires media by which individual ideas or personal perspectives are shared, and public maps and organizational memory are constructed. In this way, individual and organizational learning become linked. Argyris and Schön (ibid.) made a distinction between what they called *single-loop learning* and *double-loop learning*. The former refers to learning where people in an organization correct errors by using a new strategy without questioning governing variables, that is, the underlying rules or values of the activity. In the latter, people subject the underlying beliefs, values or rules to critical scrutiny, which may lead to a transformation of the policies, norms or objectives of the organization. In other words, in single-loop learning, the organization's values, norms and strategies are taken for granted, whereas, in double-loop learning, they are questioned and transformed if needed. Readers familiar with Mezirow's (1991) theory of transformative learning may see a similarity between double-loop learning the underlying premises and worldview of an individual. The concept of transformative learning is typically used in research relating to adult learning at the individual level, while both single- and double-loop learning relate to the perspectives of organizations.

Intervention studies focusing on how organizations can bring about double-loop learning have identified different learning climates within organizations. In organizations where a so-called *Model O-I learning climate* (Argyris & Schön, 1978, 1999) dominates, collaborative reflection and learning are often inhibited by routines, blocked communication, blame for errors, and a lack of trust and respect between employees and managers. In contrast, the *Model O-II learning climate* within an organization encourages open communication, trust and respect, and a decorous attitude toward errors (see also Visser & Van der Togt, 2016). Argyris and Schön (ibid.) see the latter learning climate as a prerequisite to double-loop learning. Subsequent and more recent studies on collaborative climate (e.g., Sveiby & Simons, 2002; Thamhain, 2013) and trust (e.g., Kramer & Tyler, 1996; Seppänen, Blomqvist, & Sundqvist, 2007) have confirmed this assumption about the significance of the atmosphere for learning in organizations.

While the tools for converting individual learning into organizational learning in the model by Argyris and Schön include collaborative reflection, shared maps and organizational memory, Senge (1990) adds *systems thinking* to the core of what constitutes a learning organization. In his book—*The Fifth Discipline*—Senge (1990) presents the five central elements or "disciplines" of a learning organization:

- Personal mastery, which refers to individuals' proficiency in their work and includes the continuous clarifying and deepening of their personal vision, focusing their energies, developing patience, and trying to see reality objectively.
- 2) Mental models, that is, our assumptions and generalizations that influence how we understand the world and how we take action.
- Building a shared vision of the future that fosters individuals' genuine commitment rather than compliance.
- 4) Team learning involving dialogue and thinking together. According to Senge (1990, p. 8), it is the teams rather than individuals who make up a learning unit in organizations.
- 5) Systems thinking, which is "the fifth discipline" and a core strategy integrating the other four elements. Senge describes holistic systems thinking as a cornerstone of the learning organization and as "the art of seeing the forest and the trees" (1990, p. 127).

In Senge's thinking, individual, collective and organizational learning are interdependent and intertwined. The shared vision of the staff or team members integrates personal visions and mastery into a common purpose. Similarly, in dialogues of team learning, individuals' perceptions, attitudes and knowledge (mental models) are shared and reflected upon. The outcome may be the creation of something that goes beyond existing ways of thinking and doing. Recognizing and understanding the interdependency and complexity of things, that is, systems thinking, is needed on individual, team and organizational levels. An organization is seen as product of how its members think and interact.

In Senge's theory, the fifth discipline—*systems thinking*—is the core element that integrates the other four. In the measurement tool by Marsick and Watkins (2003), systems thinking is operationalized as making systemic connections and creating embedded systems to capture and share knowledge, and, according to their studies, their findings support Senge's argument. Marsick and Watkins (2003) reported that, in their study, empowerment and team learning loaded with other individual-level variables, suggesting that they formed a cluster that was separate from the organizational-level system variables. Their conclusion was that an organizations' learning culture can be found in individuals' minds, and that the aforementioned dimensions comprising a learning organization are necessary but not sufficient conditions for promoting learning.

In his later work, Senge (Senge et al., 2012, p. 558) envisioned education for developing actors for an "interdependent world", and suggested that the following educational practices are needed to nurture "systems citizens": systems thinking and understanding complexity; reflection; collaboration and building learning partnerships; communicating and listening; design thinking; sense of self: aspiration, self-motivation, self-control, and sense of efficacy. Most of these practices have recently been converted to what are called 21st century skills (Binkley et al., 2012), future work skills (Institute for Future, 2011), and learners' competences (Fadel, Bialik, & Trilling, 2015). The idea of systems thinking can also be seen as a forethought of emergence of systems theories in the fields of education and organizational development.

Recently, Bui (2019) has revisited Senge's learning organization concept from a theoretical perspective and examined its application in practice. According to this work, building a learning organization requires special attention to be paid to two groups of factors: 1) Individual factors such as personal values, vision and experiences, spiritual growth, individual background, intrinsic motivation, and individual learning; and 2) Organizational factors including, for example, leadership, organizational culture, communication, reflective practice, interpersonal trust, training and development. Bui (ibid.) believes that by working with these factors, in order to develop Senge's five disciplines, leads to innovation and the success of the organization.

Measurement of learning organization characteristics: Watkins and Marsick

Watkins & Marsick (2003), basing their theory on informal and incidental learning (Marsick & Watkins, 1990, 1997) and the idea of organizational learning (Argyris & Schön, 1996), have emphasized the significance of creating a climate and culture that nurtures learning both at the individual and organizational level. They stress the close relationship between individual and organizational learning, and they note that "individual learning is related to organizational learning though not equal to it and potentially (though not necessarily) interdependent with it". They consider a learning organization to be one that has the capacity to respond fast and in new ways to challenges it meets, and, at the same time, to remove blocks to learning. They stated that there are many measurement tools for diagnosing the characteristics of organizations from the learning point of view, but that these are mostly informed by practice rather than research

(Gephart, Marsick, & Van Buren, 1996). For this reason, they developed a research-based instrument to measure shifts in an organization's learning climate and culture.

The instrument, called Dimensions of the Learning Organization Questionnaire (DLOQ; Marsick & Watkins, 2003), consists of the following constructs related to the processes and practices supporting learning: 1) Creation of continuous learning opportunities for employees; 2) promoting inquiry and dialogue through questioning, feedback and experimentation; 3) encouraging collaboration and team learning; 4) creation of systems to capture and share learning; 5) empowering people toward a collective vision; 6) connecting the organization to its environment; and 7) providing strategic leadership for learning. Furthermore, the instrument includes two dimensions related to key results of an organization: financial performance and knowledge performance.

The study by Yang (2003) showed that all seven dimensions of learning culture measured with the DLOQ instrument were significantly related to organizational performance variables. For example, about two-thirds of the variance in financial performance could be attributed to the variables measured with the instrument. Yang (ibid.) points out that, naturally, there are also other variables than those included in the study that can explain performance outcomes, such as the size of the organization, competition and market niche. In another study, Hernandez (2003) found that the learning organization environment was associated with the transfer of tacit knowledge and, in turn, that the transfer of tacit knowledge had a positive influence on performance.

In recent years, several other studies have reported similar positive impacts of learning organization characteristics on different kinds of outcome factors. For example, Ngah, Tai and Bontis (2016) examined the effect of knowledge management capabilities on organizational performance in Dubaian public sector organizations and found there to be a positive association. In a case study by Gagnon, Payne-Cagnon, Fortin, Paré and Cote (2015), the learning organization factor was found to contribute to nursing work in a positive way. In a study by Song, Chai, Kim and Bae (2018), a positive relationship was found between the learning organization culture in Korean workforce institutions and teachers' self-efficacy as well as work engagement, which, in turn, was positively associated to job performance. Furthermore, a study

conducted in the Malaysian public sector (Sulaiman, Mahbob, & Sannusi, 2015) reported that staff of the examined organization perceived organizational learning as a strategy to improve the performance of the department in the future.

The DLOQ has also been used in higher education contexts to examine whether universities can be regarded as learning organizations. Voolaid and Ehrlich (2017) asked the staff of two Estonian universities to answer the questionnaire, and their main result was that the organizational learning rate was above average. Similarly, Holyoke, Sturko, Wood and Wu (2012) found learning organization characteristics in colleges and universities in Washington and Idaho (USA), but that there were differences between men and women in how they perceived learning opportunities (see also Gouthro, Taber, & Brazil, 2018). Also, the staff members of 4year private institutions reported a more positive learning culture than did their colleagues in other types of higher education institutions.

Marsick and Watkins (2003) stress that even more interesting than the relationship between the dimensions of learning organization and organizational performance is the finding that people-related variables influenced system variables, and these, in turn, had an influence on performance variables through strategic leadership supporting learning. They also point out the finding that the only variable that directly predicted knowledge performance was the variable measuring whether the organization had created systems to capture and share knowledge.

Different kinds of methods have been used in order to support learning organization related activities and processes, such as knowledge sharing. Yoo and Huang (2016) examined whether an e-learning system accelerates the process of companies becoming learning organizations. In their study of three Korean companies, in two of the companies e-learning systems facilitated the development of the organizations whereas no effect was found in the third one. A study on learning organizations in Indian higher education institutions (Chawla & Lenka, 2015) examined the antecedents to and consequences of becoming a learning organization , and it was found that resonant leadership, knowledge management, intrapreneurship and total quality management had a moderate impact on the learning organization charactistics.

In sum, theories by Argyris and Schön (1996), Senge (1990), as well as Marsick and Watkins (2003), and their concepts such as single- and double-loop learning, systems thinking and

learning culture have had a remarkable impact on subsequent studies focusing on how organizations can bring about learning. One example of recent studies utilizing all of these frameworks is a study by Jaaron and Backhouse (2017), who examined applying the systems thinking approach to activate douple-loop learning in banking and social care services. In order to bring about systems thinking, they used a specific procedure called the Vanguard Method (Seddon, 2003), where employees are to first analyze their current working system, then plan changes, and finally implement new solutions. The data were collected and analyzed with the mixed-methods approach, including the DLOQ, and interviews, observations, and documents. The findings showed that the Vanguard Method was positively related to creating double-loop learning in organizations through the activation of three factors, namely: systematic-operations improvement, organizational capacity development, and outside-in mode of working. All of these are embedded in the seven dimensions of the DLOQ.

Bak (2012) reported a case study of a UK higher education institution based on Senge's five charateristics of learning organizations. In the department studied, these characteristics were found to a limited extent and there were differences between academic and administrative members of the faculty as well as between newcomers and established staff members. The learning organization framework has also had an influence on a recent publication by the Organization for Economic Co-operation and Development (OECD, 2018). This document characterizes schools as learning organizations according to seven characteristics: 1) shared vision focused on learning by all students; 2) continuous professional learning by staff; 3) team learning and collaboration among all staff; 4) culture of inquiry, exploration and innovation; 5) systems for collecting and exchanging knowledge and learning; 6) learning with and from the external environment; and 7) modelling and growing learning leadership.

Sternberg (2015) has examined universities as learning organizations from the creativity point of view. His three-part model of institutional creative change is a tool for assessing universities' capability to move creatively into the future. The first part of the model, prerequisites, concerns universities' actual ability to change in a creative way and the belief in this ability. The second part deals with the institution's desire to change creatively, its desire to appear to change creatively, and its actual and potential creative quality. The third part of the model consists of mediating variables, such as the legitimacy of the creative-change agent, the credibility of the

creative-change agent, the ownership of creative change, the rate of creative change, and the cultural compatibility of the creative change.

The relationship between individual and organizational learning

In the literature of organizational learning and learning organization, individual learning and learning at the level of the organization are intertwined and overlap. Changes in an organization and in learning by employees are seen as interdependent. For example, Pedler, Burgoyne and Boydell (1991, p. 58 defined a learning company as "an organization that facilitates the learning of all its members and continuously transforms itself". The close reciprocal relation between the individual and the organization is similarly emphasized in Billett's (2002a, b) notion of workplace learning as an interdependent process between how a workplace affords opportunities to participate in diverse practices and how employees choose to respond to these affordances.

Tynjälä and Nikkanen (2009, pp. 130–132) describe the interrelationship of individual and organizational learning in their model of the origin and processes of innovations in a project developing networks of vocational institutes and workplaces. In this model:

- Work communities provided an environment characterized by a) open communication, b) equality, c) innovative activities, d) utilization of external help, and e) effective leadership and management.
- 2) In such an environment, individuals were able to express new ideas and carry out small experiments, usually in collaboration with colleagues and collaborative networks.
- Project organization—using leadership, funding resources and external contacts organized forums for discussions, which made it possible to share knowledge and disseminate the results of the experiments.

Thus, innovative practices in this project were brought about through the interaction of all three types of actors, that is, individuals, work communities, and the development project organization. The authors concluded that individual learning can be transformed into organizational learning when open communication and the formation of networks are intentionally promoted by the leadership.

Studies on the effects of learning organization environments have seldom examined its association to or effects on emotional aspects of individuals' learning and working. An exception is a study by Lau, McLean, Hsu and Lien (2017), who examined employees' perceptions of organizational culture and affective commitment through the perceptions of a learning organization in the Malaysian private sector. They found that all of the dimensions of organizational culture and what constitutes a learning organization had a significant positive correlation to affective commitment. The respondents' perceptions of learning organization mediated the relationship between the organizational culture and affective commitment. Respect for people, as a characteristic of organizational culture, and empowerment, as a learning organization characteristic, had the strongest associations with affective commitment.

Knowledge Creation and Innovative Knowledge Communities

Also concepts other than organizational learning and learning organization have been used in order to describe learning taking place beyond individuals. In their book entitled *Networked Expertise*, Hakkarainen, Palonen, Paavola and Lehtinen (2004) introduced the concept of the *innovative knowledge community* to depict communities that pursue creating new knowledge and transforming their practices. They present three examples of theoretical models representing innovation-seeking activities: *expansive learning* (Engeström, 1987, 2004, 2011), *knowledge building* (Bereiter & Scardamalia, 1993; Bereiter, 2002), and *knowledge creation* (Nonaka & Takeuchi, 1995). While empirical studies utilizing the concept of knowledge building have been mainly conducted in educational contexts and for student learning, the concepts of knowledge creations these two approaches are briefly presented.

Knowledge creation in organizations

One central research line in organizational studies has focused on knowledge creation, which is seen as a highly social process. Nonaka, Toyama and Konno (2000; see also Nonaka, 1994; Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998) have examined how organizations create, utilize and manage knowledge in a dynamic way. Their model of knowledge creation consists of

three components: 1) SECI process: socialization, externalization, combination, and internalization; 2) '*ba*', that is, shared space of knowledge creation; and 3) knowledge assets.

According to the model by Nonaka and colleagues the core of the knowledge creation process consists of the interaction and conversion taking place between explicit and tacit knowledge. This conversion takes place in organizations through four modes comprising the SECI process: Socialization is a process where tacit knowledge, that is, implicit knowledge acquired through experience, accumulates and remains implicit in nature. This kind of tacit knowledge acquisition takes place, for example, when apprentices or newcomers observe and imitate more experienced colleagues. In other words, they are socialized into existing practices. In the process called *Externalization*, tacit knowledge is explicated and thus converted into explicit knowledge. Making tacit knowledge explicit happens through conversations, meetings, dialogues and writing, for instance. As examples of this, Nonaka and his colleagues (ibid.) mention concept creation in developing new products and quality control circles where employees discuss practices on the basis of their experience over the years in order to make improvements. The third mode of knowledge conversion, Combination, takes place when explicit knowledge is collected from different sources and transformed into a more complex compilation of explicit knowledge. Modern information and communication technologies and networks facilitate these processes of exchanging information and documents. For instance, the annual report of an organization represents explicit knowledge combined from smaller pieces of explicit knowledge. *Internalization*, the fourth mode of knowledge conversion, is a process where explicit knowledge is embodied into tacit knowledge within individuals. This process can often be characterized by 'learning by doing', that is, enriching one's understanding and developing know-how as a side effect of working. When internalized tacit knowledge is shared with others in everyday work practices, a new spiral of knowledge creation can start through new socialization processes. Thus, the SECI process is described as a spiral in which knowledge creation is an expanding process with new knowledge triggering a new spiral of knowledge creation.

Knowledge creation always takes place in a specific context, time and place. Knowledge creation requires time and space for thinking and interaction with others. Nonaka and Konno (1998; see also Nonaka et al., 2000) use the Japanese concept of *ba*, which refers to shared space for emerging relationships, comprised of both time and place. In the knowledge creation model, ba

is a shared space and time where knowledge is created and shared. Thus, knowledge creation takes place through the interaction between individuals, or between the individuals and their environments. Ba may also consist of mental and virtual spaces, not only physical ones.

Nonaka and his colleagues (2000) distinguish between four types of ba, based on which mode of knowledge conversion, type of interaction, and type of media are used. Socialization requires interaction between individuals and face-to-to face communication, and the type of ba for socialization is called *Originating ba*. There, people share their experiences, emotions and mental models. Typical to this ba is that boundaries between individuals are transcended by sympathizing and empathizing with other people. Externalization, that is articulating tacit knowledge into explicit knowledge, takes place in *Dialoguing ba* (formerly referred to as *Interacting ba*, Nonaka & Konno, 1998). It is a place for collective interaction, sharing knowledge, and conceptualizing experiences. *Systemizing ba* (formerly referred to as *Cyber ba*, ibid.) is defined by virtual interactions, and it provides a context for the combination process where explicit knowledge is transformed into more complex forms. Along with the development of information and communication technologies, this type of ba has become ever more important for disseminating knowledge. The fourth mode of knowledge conversion, the internalization of explicit knowledge into tacit knowledge, is supported in *Exercising ba*, where explicit knowledge is applied, used and reflected in action.

An essential element in the knowledge creation model by Nonaka and his colleagues (2000) is what they call *knowledge assets*. They define *assets* as "firm-specific resources that are indispensable to create values for the firm" (ibid., p. 20). The knowledge assets may be experiential, conceptual, systemic, or routinized. In the knowledge creation process, these resources may be either inputs or outputs, or moderating factors. As an example, the authors point to trust among the members of an organization. Such trust is brought about as an output of collaboration in the knowledge creation process, and, at the same time, it functions as a moderating factor of the process by affecting how the ba is working as a context for knowledge creation.

In sum, the knowledge creation process progresses like a spiral growing out of the SECI process in shared spaces, using knowledge assets. The role of dialectical thinking, top managements'

articulation of the organization's knowledge vision, and the middle management's energizing ba are emphasized (Nonaka et al., 2000). The created new knowledge then becomes the basis for a new spiral.

Expansive learning in organizations

The theory of *expansive learning* by Engeström (1987, 2011) is based on the ideas of the Russian cultural-historical school and *activity theory* (Engeström, 2011; Engeström & Sannino, 2010). The core of the activity theory is the *human activity system*, described as a triangle consisting of sub-triangles (Engeström, 1987, p. 78). One element of the model is the *Subject*, which refers to actors in a certain activity, that is, individuals or groups. Activity always has an *Object* that it is directed at and will ultimately be transformed into *Outcomes* of the activity with the aid of various *Instruments*. An individual's activity takes place in a *Community*, directed by a certain *Division of labor* and *Rules*, that is, written or unwritten codes for how things are to be done.

Engeström (1987, 2004, 2011) depicts expansive learning as a cycle consisting of specific actions. The first phase of the learning cycle, *Questioning*, begins when employees start to criticize, question or reject established practices. This indicates that there is a need for change. The second action, *Analysis*, involves people examining reasons or causes of the situation. The analysis may aim to trace the origins of the problematic practice, or it may focus on picturing inner systemic relations of the situation. The learning cycle continues with *Modelling* the new solution and *Examining* and testing the new model, and, after necessary adjustments, with *Implementing* the new model. The cycle concludes with the action of *Reflecting* on the whole process, plus, finally, with *Consolidating* and generalizing the new practice. The basic idea of the earlier described Vaguard Method (Seddon, 2003; Jaaron & Backhouse, 2017) is similar to the expansive learning cycle, but the latter is a more detailed model with a different theoretical background.

The theory of expansive learning has been used as a framework in numerous empirical studies in various organizations and fields (for reviews, see Engeström, 2011; Engeström & Sannino, 2010). One branch of studies involves intervention studies under the concept of Change Laboratory. In these studies, the group of researchers and staff members of the pilot unit of an organization get together in weekly meetings and follow-up sessions a few months later. The

intervention involves introducing specific tasks requiring certain expansive learning actions. The purpose of the intervention is to intensify and accelerate the expansive learning cycle. Different problem situations or critical incidents of work practices are documented and the data are used as a stimuli for reflection and analysis. Customers, patients or other stakeholders may be invited to join the sessions in order to participate in the analysis of specific cases. The researchers facilitate the sessions and introduce conceptual tools and models as additional stimuli (e.g., Ahonen & Virkkunen, 2003; Virkkunen & Ahonen, 2011; Pihlaja, 2005; Teräs, 2007).

The main idea in expansive learning is that the people, together, construct and implement a new concept, object or practice to enhance their collective activity (Engeström, 1987, 2011). While, in his early studies on expansive learning, Engeström focused on transformations taking place in one single work unit or organization, in his more recent works (Engeström, 2004, 2011) activity systems are also seen to be inter-organizational or network-based. He has examined co-configuration, the type of work requiring collaboration and what he calls *negotiated knotworking*. This kind of working is characterized by a pulsating movement of tying, untying and retying together otherwise separate threads of activity. People working in separate organizations come together for a shared purpose, negotiate meanings and solve problems, and then they continue with other partners in other projects but may get together again later on. Engeström argues that this way of working is a significant new form of current expert work within and between organizations. In contexts involving co-configuration and knotworking, expansive learning processes are even more demanding, requiring boundary crossing between organizations (e.g., Engeström, 2004, 2011; Dochy et al., 2011).

Fuller and Unwin (2004, 2011) have used the concept of expansive learning in a different way to describe differences between organizations in their approaches to workforce development. They presented a continuum with *expansive workplaces* on one end and *restrictive workplaces* at the other end. While the former represent organizations where people have plenty of opportunities to participate in diverse activities and communities of practice, the latter refers to workplaces with limited learning opportunities. An expansive workplace makes sure that employees have time for reflection and support their career progress, whereas a restrictive workplace values learning only with regard to the existing job. In expansive organizations, managers serve as facilitators rather than as controllers and they value innovation and learning. In contrast, management in restrictive

workplaces tends to be controlling, and old practices are often valued over innovations. The distinction between expansive and restrictive organizations can be used as a useful tool to evaluate organizations' approaches to supporting learning.

In activity theory studies, the unit of analysis is the activity system rather than an individual. However, Engeström and Kerosuo (2007, p. 340) remind us that the systemic view on its own is insufficient. Thus, they state that it is necessary within the activity system to take into account also individual persons and groups who have their own aims, agendas and emotions. Activity theory and the theory of expansive learning can be seen as representing a form of systems theory approach, approaching learning as a holistic system consisting of interdependent parts rather than as an activity of independent individuals.

Ecological approach and ecosystems in learning organization research

In many human and social scientific fields, the ecological approach has recently emerged as a new way to examine human activity in its complicated interconnections and relations. Originally, as a field of biology, ecology examined the relations between living organisms and their environment. A central concept in ecology is the one of the ecosystem, which Ostroumov (2001, p. 141) defined as follows: "Ecosystem is the complex of interconnected living organisms inhabiting a particular area or unit of space [and time] together with their environment and all their interrelationships and relationships with the environment." In research on education and human development, Bronfenbrenner (1979, 1994, 2005) was the first one to apply the concept of ecology to describe complicated, multilevel and interrelated environments in individual development. His ecological model consisted of four interrelated and nested systems: 1) Microsystem including the individual's immediate social and physical environment such as family, friends and neighbourhood area; 2) *Mesosystem* consisting of two or more microsystems together; 3) *Exosystem* that has only indirect influence on the individual's development, such as educational policy; and 4) Macrosystem consisting of the ideologies and attitudes of the culture (Bronfenbrenner, 1979). Later, Bronfenbrenner (1986) added another level he named *Chronosystem*, which refers to socio-historical time and conditions that influence all of the other systems.

In this millennium, the concepts of ecology in general and ecosystem in particular have gained popularity in several disciplines. For example, in the field of economics, the concept of the business ecosystems (Moore, 1996) has been widely used, and concepts such as the e-learning ecosystem (e.g., Ouf et al., 2016), social learning ecosystem (e.g., Huntington & Bryant, 2014), and blended learning ecosystems (e.g., Nikolaudou et al., 2010) have emerged in the field of educational technology. The concept has also been applied in educational policy analysis (Weaver-Hightower, 2008).

Kemmis and Heikkinen (2012) have applied ecological principles by Capra (2004) to describe ecologies of practices in the field of teacher development. These principles include *Networks*, Nested systems, Niche (this item was added by Kemmis & Heikkinen), Interdependence, Diversity, Cycles, Flows, Development, and Dynamic balance. Kemmis and Heikkinen argue that these principles can be applied to any social practices as well as to biological environments. For example, educational organizations are now ever more networking with other organizations such as workplaces in public and private sectors. Therefore, it is important to examine how the networks are constructed on individual, unit and organizational levels, and whether the networks are dependent on individuals (which would make them vulnerable) or are embedded in basic operations and structures. The second ecological principle states that practices are interwoven, forming nested systems. Thus, an individual actor or an organization are not 'independent'; instead, they are dependent on the structures, legislations and agreed principles that apply to the whole network or ecosystem. Interdependency between nested systems means that anything taking place in any part of the system can have an influence on the other parts. Thus, dependencies within the ecosystem mean that a rupture or problem in a specific part could affect surrounding practices or procedures. Individual components should be seen in relation to the system as a whole. Any practices related to the development of an organization's learning capacities derive from, interrelate with and are interdependent on other practices, such as management and leadership practices. Together, these form nested systems. An ecology of practices features a diversity of practices which may have overlapping functions that can also replace one another. In biological ecosystems, the food chain is an example of cycles, and similar cycles can be seen in social practices. In nature, flows of energy can be seen, for example, in solar energy converting into chemical energy through photosynthesis. In the same vein, in organizations there are flows of information and command chains. Development as a

characteristic of a biological ecosystem has its counterpart in social ecosystems of practices, since practices have a tendency to develop through stages over time. In biological ecosystems, the niche is where an individual organism fits, providing the conditions to survive. Similarly, in the economy, there may be market niches for certain products or services, and in social communities there may be niches for certain kinds of practices. As a whole, the ecological principles are characterized by a holistic approach, and organizations, as parts of larger ecosystems, are seen in the context of their interconnections with their surroundings.

Recently Barnett and Jackson (2019) published a compilation examining learning from the ecological perspective. While its main focus is on higher education, its chapters—in line with ecological thinking—connect education to its wider context, including work, society and the world at large. Learning and education are seen as practices that are interrelated with other practices. Jackson and Barnett (2019, p. 6) argue that ecological thinking and considerateness are "necessary to build a resilient and sustainable society that cares about the whole world and not just itself." As a conclusion, their book portrays a vision of society as a learning ecology characterized by open access to information and knowledge, collective learning, active citizenship, creative spirit—all in all: *societal learning*.

In the compilation mentioned above, Evans (2019) examines learning ecologies at work. She makes a distinction between three scales of activity—*macro, intermediate,* and *individual* levels—that look similar to Bronfenbrenner's ecological systems. The *macro* level refers to wide social and economic structures as well as institutions that may either facilitate or prevent learning at the workplace. The *intermediate* level consists of activities and characteristics of the work environment that expand or restrict learning opportunities (see Fuller & Unwin, 2004). At the *individual* level, workers' past experiences, dispositions and current situation play an important role in their work and learning. All three levels are interconnected and thus influence one another.

In Finland, universities of applied sciences (UAS) have recently applied the concept of ecosystems in a large research and development project called eAMK (eUAS), which develops the digital provision of education, enabling students to choose studies across institutional boundaries within the national UAS network. At the same time, the aim is to offer students more

possibilities for work-based learning and combining work and studying. Thus, here the use of the concept of ecosystems seems to refer to the need to understand the interconnected wholeness of learners' diverse learning environments both in formal organizations and in informal contexts, and to strengthen the connections between them. The project is funded by the Finnish Ministry of Education with the purpose of strengthening partnerships between education and work, reducing study times, and promoting the transition from higher education to work. Virolainen and Heikkinen (2019) have examined this initiative from the perspective of the actor-network theory and discussions on ecosystems of learning. They concluded that, with certain reservations, both theoretical frameworks offer useful tools to analyze the networks between educationanl institutions and workplaces. Their literature review shows, however, that so far the studies featuring these approaches have focused more on other subjects.

While the concepts of learning ecologies and ecosystems provide promising tools to understand educational organizations' networking with other organizations, thus far other concepts have been used more to examine the characteristics of these potential ecosystems. For example, Billett, Ovens, Clemans and Seddon (2007) examined ten longstanding social partnerships in Australia and identified the following five principles and practices that seemed most likely to assist both the formation and development of partnerships: building and maintaining: (i) shared purposes and goals; (ii) relations with partners; (iii) capacities for partnership work; (iv) partnership governance and leadership; (v) trust and trustworthiness. Although the researchers here did not base their work on organizational learning theories or on the ecosystem concept, it is easy to see similarities between these principles and the characteristics of learning organizations (e.g., Senge, 1996; Marsick & Watkins, 2003) as well as the principles of ecosystems (Capra, 2004; Kemmis & Heikkinen, 2012). For instance, shared goals and trust are explicitly present in the learning organization measurement tool by Marsick and Watkins (2003), and partnerships themselves represent networks and nested systems, which are the main characteristics of ecosystems.

There are some other concepts and research lines that have conceptual connections to the concepts of learning organizations and learning ecosystems or ecologies of learning. For example, the concepts of *learning cities* and *learning regions* are based on the idea of highly networked organizations and actors in certain geographical regions that, through collaboration,

aim for economical growth, sustainable development or the promotion of social welfare. Yorks and Barto (2015) state that "diverse institutions that comprise cities and regions can function as organizational learning mechanisms in the 21st century. Learning cities themselves can also be conceptualized as societal learning organizations."

Conclusions

This review of research on workplace learning at the organizational level has shown that, in recent decades, the span of related studies has been extended and the field has been enriched in terms of conceptual variety. While the first scholars in the field (such as Argyris & Schön, 1978; and Senge, 1990) relied, as starting points, on concepts and ideas related to the learning of individuals and the relationship between individual and organizational learning, more recent research lines have focused more on the cultural features of organizations. However, in all of the main lines of research in the field, individual- and organization-level learning are seen to be highly interdependent and indivisible, although the organizational characteristics are the principal focus. As Senge (1990, p. 7) put it: "An organization's commitment to and capacity for learning can be no greater than that of its members"; or (1990, p. 139): "Organizations learn only through individuals who learn. Individual learning does not guarantee organizational learning. But without it, no organizational learning occurs." In addition to the relationship between individual and organizational learning, other common elements between different lines of research can be identified. Shin, Picken and Dess (2017) have crystallized a bulk of research on the development of sustainable learning organizations into five elements and processes, namely: establishing and communicating a clear sense of direction and purpose, empowering employees at all levels, accumulating and sharing internal knowledge, gathering and integrating external information, and challenging the status quo as well as enabling creativity.

Table 1 presents the main research lines of studies on learning organizations and related theoretical concepts. From the overview in the table, it can be seen that, in recent years, the context and focus of studies have expanded from individual organizations to considering the work and activities taking place in networks consisting of several organizations, and to even constellations referred to as ecosystems. This development can be seen to reflect similar trends in

learning research in general: Studies on individuals' learning from the cognitive point of view have extended toward more socio-cognitive and further to socio-cultural perspectives.

Main	Main scholars and concepts
research lines	
Organizational	Argyris & Schön (1978, 1996): Single-loop and douple-loop learning;
learning and	theories-in-use / espoused theories; reflection; learning climate;
Learning	organizational memory
organization	Senge (1990, 2000): Five disciplines: mental models, personal mastery,
	shared vision, teamwork, systems thinking
	Watkins & Marsick (2003): Learning organization dimensions: continuous
	learning opportunities, dialogue and inquiry, team learning, systems to
	capture and share learning empowerment, connectivity to the environment,
	strategic leadership for learning
Expansive	Engeström (1987, 2004, 2011): activity system; learning actions: questioning,
learning /	analysis, modelling, examining, testing, implementation, reflecting,
Expansive	consolidation; knotworking
workplace	
	Fuller & Unwin: expansive vs restrictive workplace
Knowledge	Nonaka & Konno (1998): explicit and tacit knowledge; SECI process:
creation	socialization, externalization, combination, internalization; ba (learning
	space)
Networked	Hakkarainen et al. (2004): innovative knowledge communities
expertise	
Learning	Bronfenbrenner (1979, 1986, 1994, 2005): ecological systems: micro-meso-
ecologies and	macro-chronosystems
Ecosystems of	
learning	Barnett: Learning ecologies

Table 1. Main Research Lines, Scholars and Concepts in Studies of Learning at the Organizational Level

In sum, the theories of organizational level learning discussed in this chapter, together, provide different perspectives and diverse conceptual tools to understand learning that goes beyond individual cognitive activity. As we have seen, they include similar elements but also different concepts directing attention to various characteristics of learning at the workplace. Chronologically, we can see movement from intra-organizational examination toward inter-organizational and networked learning, and very recently toward the concept of ecosystem. However, systems thinking, peculiar to ecological and ecosystem theories, was already present in Senge's model of the learning organization. In the same vein, activity theory represents a similarly holistic view, emphasizing the interconnectedness of different parts of the whole.

Compared to other branches of workplace learning research, studies focused on the organizational level represent more multidisciplinary and interdisciplinary lines of research, and they provide a knowledge base that is useful for other lines of workplace learning research as well (Tynjälä, 2013). Methodologically, the studies on learning at the organizational level have followed both quantitative and qualitative approaches as well as mixed methods, thereby providing not only measurement tools but also rich and deep conceptual models to understand workplace learning in a broader context.

According to Hoe (2019), interest in the learning organization concept has been growing among researchers, especially in the fields of health care and education; and the research plays an important role in improving organizational culture, innovation capacity, and performance. Similarly, Bui (2019) argues that the concept is still relevant to organizational management and development in the 21st century. Thus, we can expect that, in the future, research on learning organizations will continue to be relevant and further enriched by other concepts and models such as those presented in this chapter. The direction of the research seems to extend from intraorganizational studies toward research on wider networks or ecosystems of organizations and the interconnections between them.

References

Ahonen, H. & Virkkunen, J. (2002). Shared challenge for learning: dialogue between management and frontline workers in knowledge management. International Journal of Information Technology and Management 2(1-2), 59-84.

Argyris, C. & Schön, D. (1978). Organizational learning: A theory of action perspective. Reading, Mass: Addison Wesley.

Argyris, C. & Schön, D. A. (1996). Organizational learning II: Theory, method and practice. Reading, MA: Addison-Wesley.

Bak, O. (2012). Universities: can they be considered as learning organizations? A preliminary micro-level perspective. The Learning Organization 19 (2), 163-172.

Barnett, R. (2019). Society as a learning ecology: Glimsed and now disappearing? In R. Barnett & N. Jackson (Eds.). Ecologies for learning and practice. Emerging insights, sightings, and possibilities (pp. 211-222). New York: Routledge.

Barnett, R. & Jackson, N. (Eds.) (2019). Ecologies for learning and practice. Emerging insights, sightings, and possibilities. New York: Routledge.

Bereiter, C. (2002). Education and mind in the knowledge age. Mahwah, NJ: Erlbaum.

Bereiter, C., & Scardamalia, M. (1993). Surpassing ourselves: An inquiry into the nature of expertise. Chicago: Open Court.

Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M., & M. Rumble. (2012). Defining twenty-first century skills. In P. Griffin, B. McGraw & E. Care (Eds.), *Assessment and teaching of 21st century skills* (pp. 17–66). New York: Springer

Billett, S. (2002a). Workplace pedagogic practices: Co-participation and learning. British Journal of Educational Studies, 50(4), 457-483.

Billett, S. (2002b). Toward a workplace pedagogy: Guidance, participation, and engagement. Adult Education Quarterly 53 (1), 27-43.

Billett, S. (2004). Learning through work: Workplace participatory practices. In H. Rainbird, A. Fuller & A. Munro (Eds.), Workplace learning in context (pp. 109-125). London: Routledge.

Billett, S., Ovens, C., Clemans, A., & Seddon, T. (2007). Collaborative working and contested practices: Forming, developing and sustaining social partnerships. Journal of Education Policy, 22(61),637-656.

Billett, S., & Seddon, T. (2004). Building community through social partnerships around vocational education and training. Journal of Vocational Education and Training, 56(1), 51-67.

Bronfenbrenner, U. (1979). The ecology of human development: Experiments by nature and design. Cambridge, MA: Harvard University Press.

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. Developmental Psychology 22, 723-742.

Bronfenbrenner, U. (1994). Ecological models of human development. In International Encyclopedia of Education, Vol 3, 2nd ed. Oxford: Elsevier SIVUT

Bronfenbrenner, U. (2005). The developing ecology of human development: Paradigm lost or paradigm reganed. In U. Bronfenbrenner (Ed.) Making human beings human: Bioecological perspectives on human development, pp. 94-105. Thousand Oaks, CA: Sage.

Boud, D., & Solomon, N. (Eds.). (2001). Work-based learning. A new higher education? Buckingham: The Society for Research into Higher Education & Open University Press.

Brown, J.S., & P. Duguid (1991). Organizational learning and communities of practice: toward a unified view of working, learning and innovation. Organization Science 2 (1), 40-57.

Bui, H.T.M. (2019). Senge's learning organization: The development of the learning organization model. In A. Örterblad (Ed.) The Oxford handbook of the learning organization (pp 35-49). Oxford, UK: Oxford University Press.

Cairns, L. (2011). Learning in the workplace: Communities of practice and beyond. In M. Malloch, L. Cairns, K. Evans, & B. O'Connor (Eds.). The SAGE handbook of workplace learning (pp. 73-85). Los Angeles, CA: SAGE.

Capra, F. (2004). The hidden connections: A science for sustainable living. New York: Anchor.

Chavla, S. & Lenka, U. (2015). A study on learning organizations in Indian higher educational institutes. *Journal of Workplace Learning* 27(2), 142-161.

Chiva, R. & Alegre, J. (2009). Organizational learning capability and job satisfaction: an empirical assessment in the ceramictile industry. *British Journal of Management* 20 (3), 323-340.

Cox, A. M. (2005) What are communities of practice? A comparative review of four seminal works. Journal of Information Science, 31 (6), 527-540.

Dochy, F., Engeström, Y., Sannino, A. & van Meeuwen, N. (2011). Inter-organisational expansive learning at work. In F. Dochy, D. Gijbels, M. Segers, & P. van den Bossche. (Eds.) (2011). Theories of learning for the workplace. Building blocks for training and professional development programs (pp. 125-147). London: Routledge.

Dochy, F., Gijbels, D., Segers, M. & van den Bossche, P. (Eds.) (2011). Theories of learning for the workplace. Building blocks for training and professional development programs. London: Routledge.

Engeström, Y. (1987). Learning by expanding: An activity-theoretical approach to developmental research. Helsinki: Orienta-Konsultit.

Engeström, Y. (2004). The new generation of expertise. Seven theses. In H. Rainbird, A. Fuller & A. Munro (Eds.), Workplace learning in context (pp. 145-165). London: Routledge.

Engeström, Y. (2011). Activity theory and learning at work. In M. Malloch, L. Cairns, K. Evans, & B. O'Connor (Eds.). The SAGE handbook of workplace learning (pp. 86-104). Los Angeles, CA: SAGE.

Engeström, Y. & Kerosuo, H. (2007). From workplace learning to inter-organizational learning and back: The contribution of activity theory. Journal of Workplace Learning 19, 336-342.

Engeström, Y., & Sannino, A. (2010). Studies of expansive learning: foundations, findings and future challenges. Educational Research Review 5, 1-24

Evans, K. (2019). Learning ecologies at work. In In R. Barnett & N. Jackson (Eds.). Ecologies for learning and practice. Emerging insights, sightings, and possibilities (pp. 163-176). New York: Routledge.

Fadel, C., Bialik, M., & Trilling, B. (2015). *Four-dimensional education: The competencies learners need to succeed*. Center for Curriculum Redesign.

Fenwick, T. (2011). Policies for the knowledge economy: knowledge discourses at play. In M. Malloch, L. Cairns, K. Evans, & B. O'Connor (Eds.). The SAGE handbook of workplace learning (pp. 319-330). Los Angeles, CA: SAGE.

Fuller, A., & Unwin, L. (2004). Expansive learning environments. Integrating organizational and personal development. In H. Rainbird, A. Fuller & A. Munro (Eds.), Workplace learning in context (pp. 126-144). London: Routledge.

Fuller, A. & Unwin, L. (2011). Workplace learning and the organization. In M. Malloch, L. Cairns, K. Evans, & B. O'Connor (Eds.). The SAGE handbook of workplace learning (pp. 46-59). Los Angeles, CA: SAGE.

Gephart, M. A., Marsick, V. J., Van Buren, M. E., & Spiro, M. S. (1996). Learning organizations come alive. Training and Development, 50(12), 34-45.

Gouthro, P., Taber, N. & Brazil, A. (2018). Universities as inclusive learning organizations for women? Considering the role of women in faculty and leadership roles in academe. Learning Organization 25 (1), 29-39.

Hakkarainen, K., Palonen, T., Paavola, S., & Lehtinen, E. (2004). Communities of networked expertise: Professional and educational perspectives. Amsterdam: Elsevier.

Harteis, C., Bauer, J., & Gruber, H. (2008). The culture of learning from mistakes: How employees handle mistakes in everyday work. International Journal of Educational Research 47, 223-231.

Hernandez, M. (2003). Assessing tacit knowledge transfer and dimensions of a learning environment in Colombian businesses. *Advances in Developing Human Resources* 5(2), 215-221.

Hoe, S.L. (2019). The topicality of the learning organization: Is the concept still relevant today? In A. Örterblad (Ed.) The Oxford handbook of the learning organization (pp 19-32). Oxford, UK: Oxford University Press.

Holyoke, L.B., Sturko, P.A., Wood, N.B. & Wu, L.J. (2012). Are academic departments perceived as learning organizations? Educational Management and Leadership 40 (4), 436-448.

Huntington, B. & Bryant, J.A. (2014). Integrating technology and medica and the social learning ecosystem. The evolving state of formal learning. New York: Routledge.

Institute for Future (2011). Future work skills 2020. <u>http://www.iftf.org/uploads/media/SR-1382A_UPRI_future_work_skills_sm.pdf</u> Assessed September 12 2016.

Jaaron, A.A.M. & Backhouse, C.J. (2017). Operationalising "Double-Loop" Learning in Service Organisations: A Systems Approach for Creating Knowledge. *Systemic Practice and Action Research* 30, 317-337

Jackson, N. & Barnett, R. (2019). Introduction: Steps to ecologies for learning and practice. In R. Barnett & N. Jackson (Eds.). Ecologies for learning and practice. Emerging insights, sightings, and possibilities (pp. 1-15). New York: Routledge.

Kemmis, S. & Heikkinen, H. (2012). Future perspectives. Peer-group mentoring and international practices for teacher development. In H. Heikkinen, H. Jokinen & P. Tynjälä (Eds.). *Peer-group mentoring for teacher development* (pp. 144-170). London: Routledge.

Knight, L. (2002). Network learning: Exploring learning by interorganizational networks. Human Relations, 55(4), 427-454.

Kramer, R. & Tyler, T. (1996). Trust in organizations: Frontiers of theory and research. Los Angeles, Ca: SAGE.

Lave, J., & Wenger, E. (1991). Situated learning. Legitimate peripheral participation. Cambridge: Cambridge University Press.

Lau, P.Y., McLean, G.N., Hsu, Y-C. & Lien, B Y-Hu. (2017). Learning organization, organizational culture, and affective commitment in Malaysia: A person–organization fit theory. Human Resource Development International 20 (2), 159-179

Malloch, M., Cairns, L., Evans, K. & O'Connor, B. (Eds.) (2011). The SAGE handbook of workplace learning. Los Angeles, Ca: SAGE

Marsick, V., J., & Watkins, K., E. (1990). Informal and incidental learning in the workplace. London: Routledge.

Marsick, V. J., & Watkins, K. E. (1997). Lessons from informal and incidental learning. In J. Burgoyne, & M. Reynolds (Eds.), Management learning: Integrating perspectives in theory and practice (pp. 295-311). Thousand Oaks, CA: Sage.

Marsick, V.J. & Watkins, K.E. (2003). Demonstrating the value of an organization's learning culture: the dimensions of the learning organization questionnaire. Advances in Developing Human Resources 5(2),132-151.

Marsick, V., Watkins, K. & O'Connor, B. (2011). Researching workplace learning in the United States. In M. Malloch, L. Cairns, K. Evans, & B. O'Connor (Eds.). The SAGE handbook of workplace learning (pp. 198-209). Los Angeles, CA: SAGE.

Mezirow, J. (1991). *Transformative Dimensions of Adult Learning*. San Francisco, CA: Jossey-Bass.

Miles, R. E., Miles, G., & Snow, C. C. (2005). Collaborative entrepreneurship. How communities of networked firms use continuous innovation to create economic wealth. Standford, CA: Stanford Business Books.

Moore, J.F. 1996. The death of competition: Leadership & strategy in the age of business ecosystems. New York: Harper Business.

Ngah, R. Tai, T & Bontis, N. (2016). Knowledge management capabilities and organizational performance in roads and transport authority of Dubai: The mediating role of learning organization. *Knowledge and Process Management* 23 (3), 184–193.

Nikolaidou, M., Sofianopoulou, C., Alexopoulou, N., & Anannostopoulos, D. (2010). The blended learning ecosystem of an academic institution in Greece. International Journal of Web-Based Learning and Teaching Technologies 5(3), 14-35.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14-37.

Nonaka, I., & Konno, N. (1998). The concept of "ba": Building a foundation for knowledge creation. California Management Review, 40(3), 40-54.

Nonaka, I., & Takeuchi, H. (1995). The knowledge-creating company. How Japanese companies create the dynamics of innovation. New York: Oxford University Press.

Nonaka, I., Toyama, R. & Konno, N. (2000). SECI, Ba, and leadership: a unified model of dynamic knowledge creation. *Long Range Planning* 33, 5-34.

OECD (2018). Developing Schools as Learning Organisations in Wales, Implementing Education Policies, OECD Publishing, Paris. https://doi.org/10.1787/9789264307193-en

Ouf, S., Abd, E. Mahmoud, S., Salama, S.E., & Helmy, Y. (2017). A proposed paradigm for smart learning environment based on semantic web. Computers in Human Behavior 72, 796-818.

Ostroumov, S.A. (2001). New definitions of the concepts and terms ecosystem and biogeocenosis. Doklady Biological Sciences, Vol 383, 2002, pp. 141-143- TARKISTA

Örtenblad, A. (2013). What do we mean by 'learning organization'? In A. Örtenblad (Ed.), Handbook of Research on The Learning Organization: Adaptation and Context. (pp 22-34). Elgar: Cheltenham.

Pedler, M., Burgoyne, J. & Boydell, T. (1991). The Learning Company: A strategy for sustainable development. Berkshire: McGraw-Hill.

Pemberton, J., Mavin, S., & Stalker, B. (2007). Scratching beneath the surface of communities of (mal)practice. The Learning Organization: The International Journal of Knowledge and Organizational Learning 14 (1), 62-73.

Pihlaja, J. (2005). Learning in and for production: An activity-theoretical study of the historical development of distributed systems of generalizing. Helsinki: University of Helsinki. Department of Education.

Rainbird, H., Fuller, A. & Munro, A. (Eds.) Workplace learning in context. London: Routledge.

Raij, K. (2007) Learning by developing. Vantaa: Laurea publications A 58.

Russell, J., Knutson, K., Crowley, K. (2013). Informal learning organizations as part of an educational ecology: lessons from collaboration across the formal-informal divide. Journal of Educational Change 14 (3), 259-281.

Salojärvi, S., Tynjälä, P., Myyry, L., Ikonen-Varila, M. & Nikkanen, P. (2010). How can a learning network support organisational development? International Journal of Strategic Change Management 2(4), 375-395.

Schön, D. (1987). Educating reflective practitioner. San Francisco, Ca: Jossey-Bass.

Seddon, J. (2003). Freedom from command and control: a better way to make the work work. Buckingham: Vanguard Education.

Senge, P. M. (1990). The fifth discipline: The art and practice of the learning organization. New York: Doubleday.

Senge, P.M. (2012). The systems citizen. Education for an Interdependent World. In P. Senge, N. Cambron-McCabe, N., T. Lucas, B. Smith, J. Dutton, & A. Kleiner (2012). Schools that learn. A fifth discipline fieldbook for educators, parents, and everyone who care about education. New York: Crown Business.

Senge, P. Cambron-McCabe, N., Lucas, E. Smith, B., Dutton, J. & Kleiner, A (2012). Education for an Interdependent World. In Schools that learn. A fifth discipline fieldbook for educators, parents, and everyone who care about education. New York: Crown Business.

Seppänen, R., Blomqvist, K. Sundqvist, S. (2007). Measuring inter-organizational trust – A critical review of the empirical research 1990-2003. *Industrial Marketing Management* 36 (2), 249-265

Shin, H.W., Picken, G.C. & Dess, G.G. (2017). Revisiting the learning organization: How to create it. *Organizational Dynamics* 46, 46-56.

Simons, R.-J., Germans, J. & Ruijters, M. (2003). Forum for organisational learning: combining learning at work, organisational learning and training in new ways. Journal of European Industrial Training 27(1), 41-48.

Simons, R.-J., & Rujters, M. C. P. (2004). Learning professionals: Towards an integrated model. In H. P. A. Boshuizen, R. Bromme & H. Gruber (Eds.), Professional learning: Gaps and transitions on the way from novice to expert (pp. 207-229). Dordrecht: Kluwer.

Song, J.H., Chai, D.S., Kim, J., & Bae, S.H. (2018). Job performance in the learning organization: the mediating impacts of self-efficacy and work engagement. Performance Improvement Quarterly 30(4), 249-271.

Sternberg, R.J. (2015). A model of institutional creative change for assessing universities as learning organizations. Creativity Research Journal 27 (3), 254-261.

Stenström, M-L. & Tynjälä, P.(Eds.) (2009). Towards integration of work and learning. Strategies for connectivity and transformation. Dordrecht: Springer.

Sveiby, K.-S., & Simons, R. (2002). Collaborative climate and effectiveness of knowledge work - an empirical study. Journal of Knowledge Management, 6(5), 420-433.

Teräs, M. (2007). Intercultural learning and hybridity in the culture laboratory. Helsinki: University of Helsinki. Department of Education.

Thamhain, H. (2013). Building a collaborative climate for multinational projects. Procedia – Social and Behavioral Sciences 74, 316-328.

Tsang, E.W.K. (1997). Organizational learning and the learning organization: a dichotomy between descriptive and prescriptive research. *Human Relations* 50 (1), 73-89.

Tynjälä, P. (2008). Perspectives into learning at the workplace. Educational Research Review 3, 130-154.

Tynjälä, P. (2013). Toward a Three-P Model of Workplace Learning: A literature review. Vocations and Learning 6(1), 11-36.

Tynjälä, P. & Nikkanen, P. (2009). Transformation of individual learning to organizational and networked learning in vocational education. In M-L. Stenström & P. Tynjälä (Eds.). Towards integration of work and learning (pp. 117-135). Springer.

Tynjälä, P., Välimaa, J. & Boulton-Lewis, G. (Eds.) (2006). Higher education and working life. Collaborations, confrontations and challenges. Amsterdam: Elsevier.

Virkkunen, J. & Ahonen, H. (2011). Supporting expansive learning through theoretical-genetic reflection in the change laboratory. Journal of Organizational Change Management 24(2), 229-243.

Virolainen, M., & Heikkinen, H.L.T. (2019). Vocational Education and Training Institutions' Collaboration with the World of Work from the Perspective of Actor Networks and Ecosystems of Learning. In L.M. Herrera, M. Teräs, & P. Gougoulakis (Eds.), *Vocational Education and Training: The World of Work and Teacher Education. Emergent Issues in Research on Vocational Education and Training* 3 (ss. 67–97). Stockholm: Premiss.

Visser, M. (2016). Organizational learning capability and battlefield performance. The British Army in World War II. *International Journal of Organizational Analysis* 24 (4), 573-590.

Visser, M. & Van der Togt, K. (2016). Learning in public sector organizations: A theory of action approach. *Public Organization Review* 16, 235-249.

Voolaid, K. & Ehrlich, Ü. (2017). Organizational learning of higher education institutions: the case of Estonia. Learning Organization 24 (5), 340-354.

Weawer-Hightower, M.B. (2008). An ecology metaphor for educational policy analysis. Educational Researcher 37 (3), 153-167).

Wenger, E. (1998). Communities of practice. Learning, meaning and identity. Cambridge: Cambridge University Press.

Wenger, E., McDermott, R., & Snyder, W.M. (2002). Cultivating communities of practice. Boston, MA: Harvard Business School Press.

Yang, B. (2003). Identifying Valid and Reliable Measures for Dimensions of a Learning Culture. Advances in Developing Human Resources 5(2), 152-162. https://doi.org/10.1177/1523422303005002003