LEARNING BY EXPANDING, SECOND EDITION

First published in 1987, *Learning by Expanding* challenges traditional theories that consider learning a process of acquisition and reorganization of cognitive structures within the closed boundaries of specific tasks or problems. Yrjö Engeström argues that this type of learning increasingly fails to meet the challenges of complex social change and fails to create novel artifacts and ways of life. In response, he presents an innovative theory of expansive learning activity, offering a foundation for understanding and designing learning as a transformation of human activities and organizations. This second edition of this seminal text features a substantive new introduction that illustrates the development and implementation of Engeström's theory since its inception.

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Learning by Expanding

AN ACTIVITY-THEORETICAL APPROACH TO DEVELOPMENTAL RESEARCH

Second Edition

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PREFACE

This new edition of *Learning by Expanding* is essentially the same book that first appeared in 1987. The most important change is the inclusion of a new, rather substantial, introductory chapter, titled "Learning by Expanding: Origins, Applications, and Challenges." In this introductory chapter, I outline the development of the theory of expansive learning as it has unfolded after the initial publication of the book.

Besides this, the only changes in the original text are stylistic. These include formulating the references in accordance with APA rules, replacing the generic male "he" with "he or she" when possible, and adding an index at the end of the book.

In the original book, I named a long list of people to whom I was grateful for their inspiration and comments in the preparation of the book. I am still grateful to those people, but thanking them once was enough. More pertinently, I now see a much more complex and multilayered fabric of people who, directly or indirectly, have contributed to the formation of the ideas put forward in this book. It would be impossible to name all these people. It is sufficient to say that this book is a product and an instrument of cultural-historical activity theory understood as a living movement that does not recognize most of the conventional boundaries between nations, cultures, positions, and schools of thought.

I dedicate this new edition of *Learning by Expanding* to Annalisa Sannino and Jurij Enzo Engeström. Their collaboration and support truly made the completion of the job possible.

Sipoo, February 2014
Yrjö Engeström

LEARNING BY EXPANDING: ORIGINS, APPLICATIONS, AND CHALLENGES

Learning by Expanding was originally published in 1987. It was written in order to formulate a strong alternative to the dominant Cartesian views of cognition and learning that depicted the human mind as if it were a computer, isolated from the cultural context. In the 1980s, notions such as "everyday cognition" (Rogoff & Lave, 1984), "situated action" (Suchman, 1987), and "cognition in practice" (Lave, 1988) began to emerge and challenge the dominant views. *Learning by Expanding* was part of this emerging new groundswell.

The second motivation behind the book was methodological. Studies of cognition and learning were, and still are, predominantly observational and analytical. As Urie Bronfenbrenner (1977, p. 528) pointed out, "Most of our scientific ventures into social reality perpetuate the status quo; to the extent that we include ecological contexts in our research, we select and treat them as sociological givens rather than as evolving social systems susceptible to significant and novel transformation." Having grown up as an activist of the radical student movement, I was convinced that research needs to be actively involved in making the world better. *Learning by Expanding* built on an interventionist premise, well explicated by Bronfenbrenner.

> Naturalistic studies have the disadvantage of being limited to variations of macrosystems that presently exist or have occurred in the past. Future possibilities remain uncharted, except by hazardous extrapolation.... This foreshortened theoretical perspective was first brought to my attention by Professor A. N. Leont'ev of the University of Moscow.... "It seems to me that American researchers are constantly seeking to explain how the child came to be what he is; we in the USSR are trying to discover how he can become what he not yet is." ... Soviet psychologists often speak of what they call the "transforming experiment." By this term they mean an experiment that radically restructures the environment, producing a

> new configuration that activates previously unrealized behavioral potentials of the subject. (Bronfenbrenner [1977, p. 527–528])

The third force behind *Learning by Expanding* was the discovery of cultural-historical activity theory as a potent framework for understanding and changing the world. In the Soviet Union, activity theory had a sixty-year history of original insights, groundbreaking research, and severe oppression. In the West, Vygotsky's work was found and promoted from the 1960s on in escalating steps by well-known North American scholars, such as Jerome Bruner (1962) and Michael Cole and Sylvia Scribner (1978). Activity theory, the most important heir and extension of Vygotsky's legacy, was primarily discovered by radical European scholars and students in the 1970s and 1980s mainly through the works of Leont'ev (1978). In the late 1970s the work of Vassily Davydov (1977, 1990) made a strong impression on me, and I was fortunate enough to persuade him to visit Finland in the early 1980s. The first international congress on activity theory was organized in West Berlin in 1986. *Learning by Expanding* is a fruit of that movement.

THREE GENERATIONS OF ACTIVITY THEORY

We may distinguish among three generations in the evolution of cultural-historical activity theory (Engeström, 1996a). The first generation, centered around Vygotsky, created the idea of *mediation.* This idea was crystallized in Vygotsky's (1997c, p. 86) triangular model of "a complex, mediated act," which is commonly expressed as the triad of subject, object, and mediating artifact.

The insertion of cultural artifacts into human actions was revolutionary in that the basic unit of analysis now overcame the split between the Cartesian individual and the untouchable societal structure. The individual could no longer be understood without his or her cultural means; and the society could no longer be understood without the agency of individuals who use and produce artifacts. This meant that objects ceased to be just raw material for the formation of the subject as they were for Piaget. Objects became cultural entities and the object orientedness of action became the key to understanding human psyche.

The limitation of the first generation was that the unit of analysis remained individually focused. This was overcome by the second generation, led and inspired by Leont'ev's work. In his famous example of "primeval collective hunt" Leont'ev (1981, p. 210–213) showed how *historically evolving division of labor* has brought about the crucial differentiation between an

individual action and a collective activity. However, Leont'ev never graphically expanded Vygotsky's original model into a model of a collective activity system. In particular, the relationship between object-oriented production and communicative exchange between people remained somewhat unclear in Leont'ev's work. In Chapter 2 of *Learning by Expanding,* an effort was made to model the human activity system and to overcome the dualistic opposition between production and communication (see Figure 2.6).

The concept of activity took the paradigm a major step forward in that it turned the focus on complex interrelations between the individual subject and his or her community. In the Soviet Union, the societal activity systems studied concretely by activity theorists were largely limited to play and learning among children. Contradictions of activity remained an extremely touchy issue. Since the 1970s, the tradition has been taken up and recontextualized by radical researchers in the West. New domains of activity, including work, have been opened up for concrete research. A tremendous diversity of applications of activity theory began to emerge. The idea of internal contradictions as the driving force of change and development in activity systems, powerfully conceptualized by Ilyenkov (1977, 1982), began to gain its due status as a guiding principle of theoretical work and empirical research.

Ever since Vygotsky's foundational work, the cultural-historical approach has been very much a discourse of vertical development toward "higher psychological functions." Michael Cole (1988; see also Griffin & Cole, 1984) was one of the first to point out the deep-seated insensitivity of the second-generation activity theory toward cultural diversity. When activity theory became international, questions of diversity and dialogue between different traditions or perspectives became increasingly serious challenges. It is these challenges that the third generation of activity theory began to deal with.

The third generation of activity theory is developing conceptual tools to understand networks of interacting activity systems, dialogue, and multiple perspectives and voices. In this mode of research, the basic model is expanded to include minimally two interacting activity systems. This move toward networks of activities, while still in an embryonic form, was anticipated in the original text of *Learning by Expanding* (see in particular Figures 2.7 and 2.11).

Third-generation activity theory expands the analysis both up and down, outward and inward. Moving up and outward, it tackles multiple interconnected activity systems with their partially shared and often fragmented objects. Moving down and inward, it tackles issues of subjectivity,

experiencing, personal sense, emotion, embodiment, identity, and moral commitment. The two directions may seem incompatible. Indeed, there is a risk that activity theory is split into the study of activity systems, organizations, and history, on the one hand, and subjects, actions, and situations, on the other hand. This is exactly the kind of split the founders of activity theory set out to overcome. To bridge and integrate the two directions, serious theoretical and empirical efforts are needed.

DEVELOPMENTAL WORK RESEARCH AS AGENDA OF APPLICATION

The central ideas of this book may be condensed into the following five claims: (1) The object-oriented and artifact-mediated collective activity system is the prime unit of analysis in cultural-historical studies of human conduct; (2) historically evolving inner contradictions are the chief sources of movement, change, and development in activity systems; (3) expansive learning is a historically new type of learning, which emerges as practitioners struggle through developmental transformations in their activity systems, moving across collective zones of proximal development; (4) the dialectical method of ascending from the abstract to the concrete is the key for mastering cycles of expansive learning; and (5) an interventionist research methodology that aims at pushing forward, mediating, recording, and analyzing cycles of expansive learning in activity systems is needed.

At the time this book was initially written, my colleagues and I were taking the first steps toward constructing *developmental work research* as a systematic approach for applying activity theory and the theory of expansive learning in the world of work, technology, and organizations (e.g., Toikka, Engeström, & Norros, 1985; Engeström & Engeström, 1986; Engeström, 1991b, 1991c, 1993). Since then, a large number of studies and dissertations applying this framework have appeared (see Engeström, 2005a; Engeström, Lompscher, & Rückriem, 2005).

The focus of developmental work research is on the object of the activity (Engeström, Puonti, & Seppänen, 2003; Engeström & Blackler, 2005). The object is more than just a goal or product. Objects are durable concerns and carriers of motives; they are generators and foci of attention, volition, effort, and meaning. Through their activities people constantly change and create new objects. The new objects are often not intentional products of a single activity but unintended consequences of multiple activities. The object of an activity carries within it the foundational contradiction between the use value and the exchange value.

In our era of globalization and financialization, the use values of objects have become more difficult to grasp than perhaps ever before. But they have not vanished. The mission of developmental work research might be characterized as rediscovery and expansion of emancipatory use value in objects of human activity.

The expansion of the object proceeds in multiple dimensions. Engeström (2000b) and Hasu (2000) identified the social-spatial dimension ("Who else should be included?"), the anticipatory-temporal dimension ("What previous and forthcoming steps should be considered?"), and the moral-ideological dimension ("Who is responsible and who decides?"). Engeström, Puonti, and Seppänen (2003) compared three studies of expansive learning focusing on the sociospatial dimension, on the one hand, and the temporal dimension, on the other hand. They concluded that space and time are not the whole story; the moral-ideological dimension of power and responsibility is always also at stake. This third dimension was discussed by Puonti (2004) in her study of the investigation of economic crimes.

> A case under investigation consists of a constant interplay of the crime and its investigation. The case, however, is never merely unique: the crime under investigation constitutes a part of economic crime in general, and the investigation is part of economic crime prevention. The interplay between the crime and its investigation can be viewed at two levels: at the specific case level and at the general level. Expansion is a twofold movement: the crime is expanded by the criminal perpetrators, and the investigators have the opportunity to expand the object in their investigation. The self-movement of the object generates the potential for expansion, but the efforts to expand the object of investigation have remained insufficient. . . .
>
> Expansion is commonly understood as positive development. My empirical setting, however, shows the dark side of expansion as well. It may be seen as a shift of a contradictory phenomenon from one developmental phase to another. There is a constant battle between the criminals and the authorities: Which side is able to move first to the next phase of development? The investigation is not merely in the hands of the investigators, but the crime "strikes back" and forces the investigators to adopt new ways of action. (Puonti, 2004, p. 82)

In the following sections, I briefly discuss experiences of and challenges to the theory of expansive learning that my research groups and colleagues around the world have encountered in studies and interventions in various activity systems during the years after this book was initially published. Much of the research based on the theory of expansive learning has been

fairly thoroughly reviewed recently (Engeström & Sannino, 2010). Thus, I will concentrate on a few theoretical issues and refer to empirical studies only very selectively.

BEYOND UNIVERSALISM

The theory of expansive learning is a process or phase theory of learning. In other words, it proposes an ideal-typical sequence of learning actions that together make an expansive learning cycle. In this sense, the theory is prescriptive. A process theory tends toward orthodoxy if the sequence it promotes is taken as the universal and thus the only possible or desirable one.

Kruger and Tomasello (1998) and Tomasello (1999) forcefully demonstrate that human learning is to a large extent dependent on intentional instruction. The importance of this argument is that human learning is pervasively shaped according to normative cultural expectations. Such expectations are extremely diverse and they change historically. Thus, human learning processes are also very diverse and continuously changing. There is no single biologically determined universal, appropriate, or good way to learn among humans.

From this follows that a well-developed process theory of learning must denounce universalism and specify just what kind of learning it actually aims at describing, explaining, and promoting – and on what historical and cultural grounds. To preclude becoming a universalist orthodoxy, such a theory should make clear its own limits and engage in comparison and contrast with other theories of the learning process (Engeström & Sannino, 2012).

The theory of expansive learning builds on the idea of multiple types of learning, especially on Bateson's (1972) analysis of levels of learning (see Chapter 3). Expansive learning is defined as similar to Bateson's "Learning III." Such expansive learning is rare and risky: "Even the attempt at Level III can be dangerous, and some fall by the wayside" (Bateson, 1972, p. 305).

The historical emergence of expansive learning is discussed at length in Chapter 2 of *Learning by Expanding*. Three historical lineages of inner contradictions and potentials for the emergence of expansive learning are traced, namely, learning within school going, learning within work activity, and learning within science and art. The conclusion of the historical analysis is that "the ontogenetic emergence of [expansive] learning activity, at least in present-day capitalist societies, may with the highest probability take place in adulthood or adolescence, when the subject faces historically and individually pressing inner contradictions within his or her leading

activity – be it work, school-going, science or art." The historical emergence of expansive learning is connected to the increasingly rapid change of overall concepts of production, business, and organization in all spheres of economy and society (Pihlaja, 2005). Expansive learning is a type of learning needed and generated in radical transformations of entire activity systems and fields of activity. It is not a universal solution suitable for all learning needs.

In empirical research, one way to combat the tendency of universalization of a process theory of learning is to analyze one and the same set of data with the help of two or more different process theories, thus comparing and contrasting one's favorite theory with others. Such an analysis was conducted in a study that examined the innovative learning processes in two industrial team meetings, using the theory of expansive learning and Nonaka and Takeuchi's (1995) theory of knowledge creation side by side (Engeström, 1999c, 2008, pp. 118–168; see also Virkkunen, 2009).

To take seriously the intentionally instructed nature of human learning does not mean that we should return to the idea of complete instructional control over learning. In research and interventions, the assumption of complete instructional control takes the insidious form of self-fulfilling prophecy. If you have a strong universalistic theory of the process of learning, you will tend to impose it upon your data and examples so that you will indeed find evidence confirming that your theory works in practice. Correspondingly, if you have a strong universalistic theory of the optimal process of learning guiding your intervention, you will tend to try to impose it upon the learners. In both cases, you tend to get what you want.

But the very assumption of complete instructional control over learning is a fallacy. In practice, such control is not possible to reach. Learners will always proceed differently from what the instructor, researcher, or interventionist had planned and tried to implement or impose. You get what you want only if you ignore this resistance to and deviation from the theory.

Therefore, we need to look at instruction and learning – the plans and actions of instructors as well as the actions of learners – as dialectically intertwined. This means that the prescribed and planned process the instructor is trying to implement must be compared and contrasted with the actual process performed by the learners. The two will never fully coincide. The gap, struggle, negotiation, and occasional merger between the two need to be taken as key resources for understanding the processes of learning as processes of formation of agency.

Analyses of different ways to articulate and bridge the gap – contestations, negotiations, formation of dual objects, and creation of

"third spaces" – (Gutiérrez, Rymes, & Larson, 1995; Gutiérrez, Baguedano-López, & Tejeda, 1999) are a particularly promising direction of research. This line of research will put the formation of participants' agency in the center of expansive learning (see Engeström, Rantavuori, & Kerosuo, 2013).

LEARNING ACTIONS AND EXPANSIVE CYCLES

The theory of expansive learning is based on the dialectics of ascending from the abstract to the concrete. This is a method of grasping the essence of an object by tracing and reproducing theoretically the logic of its development, of its historical formation through the emergence and resolution of its inner contradictions. A new theoretical idea or concept is initially produced in the form of an abstract, simple explanatory relationship, a "germ cell." This initial abstraction is step-by-step enriched and transformed into a concrete system of multiple, constantly developing manifestations. In an expansive learning cycle, the initial simple idea is transformed into a complex object, into a new form of practice. Such a theoretically grasped practice is concrete in systemic richness and multiplicity of manifestations.

In this framework, abstract refers to partial, separated from the concrete whole. In empirical thinking based on comparisons and classifications, abstractions capture arbitrary, only formally interconnected properties. In dialectical-theoretical thinking, based on ascending from the abstract to the concrete, an abstraction captures the smallest and simplest, genetically primary unit of the whole functionally interconnected concrete system (see Ilyenkov, 1977; Davydov, 1990; also Falmagne, 1995).

The expansive cycle begins with individual subjects questioning the accepted practice, and it gradually expands into a collective movement or institution. Ascending from the abstract to the concrete is achieved through specific epistemic or learning actions. Together these actions form a cycle or a spiral that may be called learning activity or expansive learning. The process of expansive learning should be understood as construction and resolution of successively evolving contradictions in the activity system. The new concepts and practices generated by expansive learning activity are future-oriented visions loaded with initiative and commitment from below. They cannot be predefined and safely constrained by researchers or authorities.

According to Davydov (2008), an ideal-typical sequence of learning activity consists of the following six learning actions: (1) transforming the conditions of the task in order to reveal the universal relationship of the object under study; (2) modeling the identified relationship in a material,

graphic, or literal form; (3) transforming the model of the relationship in order to study its properties in their "pure guise"; (4) constructing a system of particular tasks that are resolved by a general mode; (5) monitoring the performance of the preceding actions; and (6) evaluating the assimilation of the general mode that results from resolving the given learning task.

In subsequent years, the concept of expansive learning activity has been developed further, to deal with the challenges of learning outside the school and the classroom (Engeström, 1991d, 1999c). An ideal-typical sequence of epistemic actions in an expansive cycle may be described as follows (Engeström, 1999c, p. 383–384; Engeström & Sannino, 2010, p. 7):

- The first action is that of questioning, criticizing, or rejecting some aspects of the accepted practice and existing wisdom. For the sake of simplicity, I will call this action *questioning.*
- The second action is that of *analyzing* the situation. Analysis involves mental, discursive, or practical transformation of the situation in order to find out causes or explanatory mechanisms. Analysis evokes "Why?" questions and explanatory principles. One type of analysis is *historical-genetic;* it seeks to explain the situation by tracing its origins and evolution. Another type of analysis is *actual-empirical;* it seeks to explain the situation by constructing a picture of its inner systemic relations.
- The third action is that of *modeling* the newly found explanatory relationship in some publicly observable and transmittable medium. This means constructing an explicit, simplified model of the new idea that explains and offers a solution to the problematic situation.
- The fourth action is that of *examining the model,* running, operating, and experimenting on it in order to grasp fully its dynamics, potentials, and limitations.
- The fifth action is that of *implementing the model* by means of practical applications, enrichments, and conceptual extensions.
- The sixth and seventh actions are those of *reflecting* on and evaluating the process and *consolidating* its outcomes into a new stable form of practice.

These actions bear a close resemblance to the six learning actions put forward by Davydov (2008). Davydov's theory is, however, oriented at learning activity within the confines of a classroom, where the curricular contents are determined ahead of time by more knowledgeable adults. This probably explains why it does not contain the first action of critical questioning and rejection, and why the fifth and seventh actions, implementing and

consolidating, are replaced by "constructing a system of particular tasks" and "evaluating" – actions that do not imply the construction of actual culturally novel practices.

The theory of expansive learning was initially applied to large-scale transformations in activity systems, typically spanning a period of several months, sometimes years. Subsequent studies have shown that large-scale expansive cycles involve numerous smaller cycles of learning actions. Such a smaller cycle may take place within a single encounter or meeting that involves intensive collaborative analysis and problem solving. Careful investigation may reveal a rich texture of learning actions within such temporally short efforts. But can such a miniature cycle be called expansive?

> Miniature cycles of innovative learning should be regarded as *potentially* expansive. A large-scale expansive cycle of organizational transformation always consists of small cycles of innovative learning. However, the appearance of small-scale cycles of innovative learning does not in itself guarantee that there is an expansive cycle going on. Small cycles may remain isolated events, and the overall cycle of organizational development may become stagnant, regressive, or even fall apart. The occurrence of a full-fledged expansive cycle is not common, and it typically requires concentrated effort and deliberate interventions. With these reservations in mind, the expansive learning cycle and its embedded actions may be used as a framework for analyzing small-scale innovative learning processes. (Engeström, 1999c, p. 385)

In a recent study (Engeström, Rantavuori, & Kerosuo, 2013), expansive learning actions and the relationship between large-scale cycles and miniature cycles were investigated in detail. The analysis shows that in a real-life intervention, expansive learning actions were accompanied by a fairly large number and diversity of nonexpansive learning actions. Each expansive learning action was found to have several subtypes. For example, the action of modeling (see previous discussion) manifested itself in five subtypes: sketching the initial idea of a model, exploiting existing models, naming and defining the model, fixing the model in material or graphic form, and varying and adapting the model. The analysis of cyclicity revealed an iterative loop within the overall cycle of expansive learning, indicating that smaller cycles are indeed part and parcel of the overall cycle of expansive learning.

Another recent study (Nummijoki & Engeström, in preparation) asks how the theory of expansive learning might be able to describe both learning actions that lead to virtuous expansive cycles and learning actions that

lead to vicious defensive cycles. As the study analyzes learning in encounters between patients and their caregivers, it also asks how such learning episodes might be described as interplay between two cycles of learning, namely, between the patient's cycle and the caregiver's cycle. The study shows that it is indeed possible to extend the vocabulary of expansive learning to encompass actions of defensive or restrictive learning. The interplay between the patient's and the caregiver's learning cycles may take one of the four basic patterns, namely, ++, +–, –+, or ––, in which + stands for an expansive miniature cycle and – for a defensive or vicious miniature learning cycle.

As pointed out previously, expansive learning is a process of working out and resolving contradictions in the activity to be transformed. The activity-theoretical principle of contradictions has been used in a number of studies as a general explanatory lens (Murphy & Rodriguez-Manzanares, 2008). Recently a methodological framework was developed for systematic analysis of discursive manifestations of contradictions in the course of expansive learning as it unfolds in organizational change efforts and interventions (Engeström & Sannino, 2011). Four distinctive types of manifestations of contradictions were identified, namely, dilemmas, conflicts, critical conflicts, and double binds. Each type has its characteristic functions and linguistic cues. This framework enables the researcher to trace in detail the emergence and resolution of contradictions in the discourse of the participants going through an expansive learning cycle.

In expansive learning, new kinds of collective and transformative agency emerge (Virkkunen, 2006). Transformative agency may be defined as breaking away from the given frame of action and taking the initiative to transform it. The emergence of transformative agency is a stepwise process. To trace the steps of the process, a typology of six kinds of expressions of transformative agency has been developed (Engeström & Sannino, 2013). The six types of expressions are criticizing the existing activity and organization, resisting the interventionist or the management, explicating new possibilities, envisioning new patterns or models of the activity, committing to concrete actions aimed at changing the activity, and taking consequential actions to change the activity.

These recent methodological developments in the analysis of expansive learning enable researchers and interventionists to compare the detailed profiles of cycles of expansive learning conducted in different contexts and supported by different interventions. Expansive learning is not a uniform, mechanical process. Differences between expansive cycles reveal pitfalls and potentials that might otherwise not be detected and exploited in future efforts.

THE VERTICAL AND THE HORIZONTAL IN LEARNING AND DEVELOPMENT

Activity theory is a child of Marxist scholarship. As such, it is influenced by Enlightenment thinking in which history and development are often depicted in vertical evolutionary terms, as progress that follows predetermined stages. A few years after the publication of *Learning by Expanding*, I explicated my standpoint on this as follows.

> From the viewpoint of historicity, the key feature of expansive cycles is that they are definitely not predetermined courses of one-dimensional development. What is more advanced, "which way is up", cannot be decided using externally given fixed yardsticks. Those decisions are made locally, within the expansive cycles themselves, under conditions of uncertainty and intensive search. Yet they are not arbitrary decisions. The internal contradictions of the given activity system in a given phase of its evolution can be more or less adequately identified, and any model for future which does not address and solve those contradictions will eventually turn out to be non-expansive.
>
> An activity system is by definition a multi-voiced formation. An expansive cycle is a re-orchestration of those voices, of the different viewpoints and approaches of the various participants. Historicity in this perspective means identifying the past cycles of the activity system. The re-orchestration of the multiple voices is dramatically facilitated when the different voices are seen against their historical background, as layers in a pool of complementary competencies within the activity system. (Engeström, 1991a, p. 14–15)

The acknowledgment of the horizontal or "sideways" movement in learning and development (Engeström, 1996b, 2003) calls attention to dialogue as discursive search for shared meanings in object-oriented activities. James Wertsch (1991) has done much to introduce Mikhail Bakhtin's (1981, 1986) ideas on dialogicality as a way to expand the Vygotskian framework. Ritva Engeström (1995) went a step further by showing a parallel between Bakhtin's ideas of social language, voice, and speech genre and Leont'ev's concepts of activity, action, and operation. One might say that activity theory, and developmental work research as its application, incorporated dialogue and discourse into their foundational repertoires in the 1990s. This move is anticipated toward the end of Chapter 4 in *Learning by Expanding*.

The horizontal aspect was conceptualized as boundary crossing, a powerful lens for analyses of sideways interactions between different actors and activity systems (Engeström, Engeström, & Kärkkäinen, 1995;

Tuomi-Gröhn & Engeström, 2003). Another step was the formulation of the idea of negotiated "knotworking" as an emerging mode of collaboration across organizational, professional, and cultural boundaries (Engeström, Engeström, & Vähäaho, 1999; Engeström, 2005b, 2008).

The analysis of types of interaction among the participants in expansive learning is a fruitful way to include the horizontal aspect of learning in concrete investigations. A framework of three basic types of interaction – coordination, cooperation, and reflective communication – has been effectively used to capture the dynamics of collaboration in processes of problem solving and learning (Engeström, 2008; see also Leadbetter, 2004; de Lange, 2011). This framework makes visible the shifts in participants' orientation toward one another and toward the object of their learning efforts simultaneously.

While it is important to recognize and theoretically understand the horizontal movement in learning, the vertical or hierarchical aspect of learning and development must not be overlooked (Engeström, 1995). Accounts of learning and innovation that only operate with horizontal or "flat" notions of cognition miss a crucially important resource in failing to explore the particular complementary potentials and limitations of different types of hierarchically arranged mediational means (Engeström, 2007a; Toiviainen, 2007), as well as the dynamics of power between hierarchically organized activity systems (Engeström, 2009a).

Arguments for the continuing importance of the vertical aspect have sometimes been interpreted as falling back to deterministic models of developmental stages leading to a fixed end point. For example, Klaus Holzkamp interpreted Bateson's (1972) levels of learning and my use of them in *Learning by Expanding* as "development depicted as learning passage through a logically pre-constructed matrix of stages of learning" (Holzkamp, 1993, p. 238).

Does an argument for a vertical aspect of hierarchical levels automatically imply a fixed course of development? Holzkamp overlooked here the dialectics of universality and context specificity in development. This very issue was discussed by Sylvia Scribner (1985) in her analysis of Vygotsky's uses of history.

> But just as Vygotsky does not offer a "progression of cultural stages," he does not offer a stagelike progression of higher forms of behavior. One reason, I believe, is that he does not represent higher systems as general modes of thought or as general structures of intelligence in a Piagetian sense. *Vygotsky addressed the question of general processes of formation of particular functional systems, a project quite at variance from one aimed*

> *at delineating a particular sequence of general functional systems.*... Vygotsky's comparisons are always made with respect to some particular system of sign-mediated behavior – memory, counting, writing.... Each of these systems has its own course of development; all of them ("higher" or "cultural" by definition) advance from rudimentary to more advanced forms. But there is no *necessity* in theory for all functional systems characterizing the behavior of an individual, or behaviors in a given social group, to be at the same level. (Scribner, 1985, p. 132, first italics added by Y. E.)

In the context of my own argument, the spirit of Scribner's point translates as follows. I maintain that the Batesonian levels of learning represent "general processes of formation of particular functional systems." As general processes or general mechanisms, they contain no fixed order of progression, nor a fixed end point. They are continuously present as resources for the formation of specific innovations and transformations in specific activities. It is characteristic of the levels of learning that they appear in various combinations and that there is continuous interplay among the levels. In this sense, consider the levels as a kit of wrenches of successive sizes. The kit itself is pretty general – it may be used in a tremendous variety of specific tasks. But it is always put into use in a particular context and situation. There is definitely a hierarchy in the kit. Yet there is no inherent necessity that the wrenches must be used in a specific order.

This insistence on working with both the horizontal and the vertical aspects, or more generally, with the spatial-social and the temporal-historical, is also of serious practical consequence.

> It is surely appropriate to avoid rigid, one-dimensional sequences being imposed on social reality. But especially among Anglo-Saxon researchers adhering to the ideas of Vygotsky, the standard alternative seems to be to avoid history altogether. Differences in cognition across cultures, social groups and domains of practice are thus commonly explained without seriously analyzing the historical development that has led to those differences. The underlying relativistic notion says that we should not make value judgments concerning whose cognition is "better" or "more advanced" – that all kinds of thinking and practice are equally valuable. While this liberal stance may be a comfortable basis for academic discourse, it ignores the reality that in all domains of societal practice those very value judgments and decisions have to be made every day. People have to decide where they want to go, which ways is "up". If behavioral and social science wants to avoid that issue, it will be unable to work out useful, yet theoretically ambitious intellectual tools for practitioners making those crucial decisions. (Engeström, 1991a, p. 10)

The complementary relationship between the two aspects is highlighted in a recent study of expansive learning as collective concept formation (Engeström, Nummijoki, & Sannino, 2012). The analysis depicts ascending from the abstract to the concrete not simply as a vertical progression. Movement from an abstract germ cell toward the concrete is depicted as multidirectional, starlike expansion by means of trails in space. This view connects the dialectical theory of concept formation with the ideas of cognitive trails (Cussins, 1992; also Engeström, 2003) and lines of wayfaring (Ingold, 2007). Such a joining of ideas is, of course, also problematic and in need of further critical elaboration (Engeström, 2009b).

CRITIQUES OF THE THEORY

David Bakhurst's (2009) critical discussion of the current state of activity theory is a good example of criticism aimed at the ideas first formulated in *Learning by Expanding* (for a discussion of other critiques, see Engeström & Sannino, 2010, p. 16–20; Sannino, 2011, p. 577–580). Bakhurst argues that the triangular models of activity systems (see especially Figure 2.6 in this book) are not a theory but "a model or a schema that has minimal predictive power" (Bakhurst, 2009, p. 206).

> It is pretty much impossible to find something recognizable as an activity that does not fit the model. What is wrong with that?!, you might reply. Is not universality an advantage here? Not obviously so. The fact is that the model seems to work particularly well for the sorts of activity systems that activity theorists typically study: health care, work settings, some educational contexts; that is, where you have a reasonably well-defined object, a pretty good sense of desirable outcomes, a self-identifying set of subjects, a good sense of what might count as an instrument or tool, etc. It is much less plausible for activities like my writing and delivering this paper … or for modest activities such as having dinner with colleagues, walking the dog, visiting one's invalid relative. The point is not that you cannot make the model fit these activities – you can. It is just that it has no explanatory value for activities like these: they need to be understood using methods that are remote from the conceptual apparatus suggested by the schema. This implies that what we have here is a universal, but generally vacuous schema, that turns out to be a useful heuristic in reference to certain kinds of activity. (Bakhurst, 2009, p. 206)

In this passage, Bakhurst argues that the model of activity presented in Figure 2.6 has no explanatory value for activities such as writing a paper,

having dinner, or others he lists. However, from an activity-theoretical point of view, when a person writes a paper, has dinner, walks a dog, or visits a relative, we are not talking about relatively durable collective activities – we are talking about relatively short-lived individual or group actions or clusters of actions. In other words, by calling his examples "activities" Bakhurst mixes up key analytical categories in a way that may indeed lead to the notion that some "activities" are not analyzable with the help of the model. The distinction between activity and action is foundational for activity theory. Activities are realized by means of actions, and actions make sense when they are understood within the activities in which they emerge. Numerous studies, including some of my own (e.g., Engeström, 1989, 1996c, 2000a, 2000b; Hasu & Engeström, 2000), demonstrate that analyzing actions against the framework of the activity systems within which they arise can indeed have explanatory power. But this explanatory power is gained by the hard work of concrete analysis of data, not by proclamations.

Another criticism expressed by Bakhurst is the allegedly static structural character of the triangular model.

> The moral is that you must be very cautious about given, stable, structural representations where you aspire to understand dynamism, flux, reflexivity, and transformation. (Bakhurst, 2009, p. 207)

Activity theory does not see structure and dynamic transformations as mutually exclusive opposites. To the contrary, the founder of activity theory, A. N. Leont'ev, pointed out that "activity is not a reaction and not a totality of reactions but a system that has structure, its own internal transitions and transformations, its own development" (Leont'ev, 1978, p. 50). The triangular diagram is a tool for analyzing those transitions and transformations.

> I maintain that with the help of this model activity can be analyzed in its inner dynamic relations and historical change. However, this claim must be substantiated by using and transforming the model in the analysis of the development of concrete activities. (Engeström, 1987, p. 81–82)

Sannino clarifies this argument further:

> The triangle is a unit of analysis which discloses its analytical quality in the process of the analysis, but does not correspond to the analysis itself. The triangle operates as a germ cell whose dynamics are displayed not in its mode of representation, but in its use in analysis and in construction of new solutions. (Sannino, 2011, p. 578)

Bakhurst takes the liberty to tell us that Evald Ilyenkov would have been dismayed by much that passes for activity theory today.

> Finally, I am sure that Ilyenkov would have been critical of the preoccupation with schematizing activity that is so evident in the ubiquitous triangles that define the … approach. He would have said that they were tolerable as a heuristic, but it is crucial not to let these models acquire a kind of theoretical life of their own. (Bakhurst, 2009, p. 207)

Bakhurst is here attributing his own thoughts to a scholar who can no longer answer for himself. In other words, Bakhurst has no evidence for his claim. What we do have evidence of is that Bakhurst's own view of contradictions is in stark opposition to that of Ilyenkov. Defending the formal-logical law of noncontradiction, Bakhurst flatly rejects the idea of dialectical contradictions as the motor of self-development in real systems. He concludes that "Ilyenkov's account of dialectical contradictions is flawed" (Bakhurst, 1991, p. 170). With this, Ilyenkov's entire method of ascending from the abstract to the concrete becomes "murky and sometimes inscrutable" for Bakhurst (1991, p. 174). This would indeed have dismayed Ilyenkov.

In his rather quick rejection of dialectical contradictions, Bakhurst ignores the possibility that dialectical contradictions are foundationally different from the contradictions described in the formal-logical principle of noncontradiction. The latter assumes a fixed time, while dialectics sees the world in constant movement through time. As Wilde (1989, p. 104) puts it, "In analyses of systems in motion the principle of non-contradiction loses its prominence." If one says that "It is raining now" and, referring to the same time and place, "It is not raining now," the principle of noncontradiction applies just fine. We have no problem seeing that the two mutually exclusive claims make no sense – only one can be true at any given moment in any given place. But this has nothing to do with dialectical contradictions. They refer to concrete evolving systems, such as human activity systems, in which opposite forces or tendencies are effective simultaneously, as if pulling the system and its participants constantly toward opposite directions. In capitalism, commodities, including human beings, are contradictory unities of use value and exchange value.

Leont'ev (1981, p. 254) gave an example of how this foundational contradiction might operate in the activity system of a medical doctor.

> The doctor who buys a practice in some little provincial place may be very seriously trying to reduce his fellow citizens' suffering from illness, and may see his calling in just that. He must, however, want the number

> of the sick to increase, because his life and practical opportunity to follow his calling depend on that.

Leont'ev (1981, p. 255) added that "to ignore these peculiarities and remove them from the context of psychological research is to deprive psychology of historical concreteness, converting it into a science solely of the psyche of an abstract man, of 'man in general'." This is what inevitably happens when dialectical contradictions are ignored or rejected.

Andy Blunden (2010) offers another example of critiques of the triangular model of activity developed in this book. For Blunden, the triangular model presented in Figure 2.6 simply "cannot be a unit of analysis," apparently because it is a system made up of too many components.

> The idea of pairs or triplets of concepts which are *mutually constitutive,* being a differentiated unity, has a long pedigree, but a set of *seven* mutually constitutive concepts is not really tenable, and Engeström surely doesn't mean it that way. (Blunden, 2010, p. 231)

Well, I actually do mean it just that way. Human activity is a complex systemic formation. Why would three mutually constitutive components be allowed but not seven? Is there some hidden universal law that forbids it? Blunden does not tell us. I suspect that the complexity represented in the model of Figure 2.6 seems just too laborious.

TOWARD A METHODOLOGY OF FORMATIVE INTERVENTIONS

The best way to respond to critiques is to demonstrate and develop further the power and potential of the theory in empirical research and living practice. Chapter 5 of *Learning by Expanding* is titled "Toward an Expansive Methodology." The chapter formulates a first draft for what is today called the methodology of formative interventions.

The historical legacy of cultural-historical activity theory is one of theoretically and methodologically argued interventionism. Vygotsky (e.g., 1997b, p. 68; 1997c; 1999, p. 57–59) used various terms to characterize this methodological orientation, including "experimental-genetic method," "instrumental method," "historical-genetic method," and "method of double stimulation." Davydov and his followers use the term "genetic modeling experiment" (Tsuckerman, 2011). This interventionist legacy has been picked up and systematically developed further in a few places in today's world, including Helsinki, Paris, and San Diego (for an overview, see Sannino, 2011). At the CRADLE research center in Helsinki, we use